The People's Republic of China

National Nuclear Safety Administration

2013 Annual Report

Contents

1 General Description

China's nuclear facilities have shown good performance on operating safety and constructing quality in 2013, without any safety incident or accident at the "International Nuclear and Radiological Event Scale (INES)" level 1 or above occurred in facilities or nuclear activities such as nuclear power plants in operating, research reactors, fuel cycle facilities, radioactive waste storage and disposal facilities, and the radioactive material transportation. The operating and constructing events of facilities were handled properly.

The radiation levels of nationwide environment were in good condition during 2013. The level of environmental ionizing radiation kept stable, and there were no evident changes on the radiation level around nuclear facilities and nuclear technology utilization projects. The overall condition of environmental electromagnetic radiation was good, and there were no evident changes on the radiation level around electromagnetic radiation facilities.

Capability Building

Breakthroughs were made in the construction of Chinese Technology R&D Base for Nuclear and Radiation Safety Regulation. The project application, including the construction scale of 92,596m^2 and the investment of 748.86 million Yuan, was approved in principle by National Development and Reform Commission. The compensation agreement on land utilization was signed with Fangshan Sub-Center of Beijing Land Arrangement and Reserve Center, and the compensation was paid for the right to use the building land with an area of 145,333.33m^2.

The construction on the monitoring capability was strengthened, and the work of ability assessments of provincial-level radiation environment monitoring organizations was completed. The project of building the dispatching platforms for nuclear and radiation emergency monitoring and fast response capability in key provinces and cities, which is acquired the emissions reduction fund in 2011, was basically completed, the projects in 2012 were implemented in an orderly manner, and the projects in 2013 were officially launched.

Regulation Strengthening

The Ministry of Environmental Protection (National Nuclear Safety Administration) [hereinafter referred to as MEP (NNSA)] intensified the inspection and increased it in

frequency, made unceasing efforts to enhance the normative regulation, and made progress in researching and enacting regulations, standards and rules. MEP (NNSA) organized and implemented the major inspection of nuclear and radiation safety, tracked and inspected the safety improvement action implementation after Fukushima nuclear accident. All the above measures made a further improvement of the safety level of nuclear and radiation.

MEP (NNSA) accelerated building the operating experience feedback system and safety performance indicators assessment system at nuclear power plants in operating, promoted the application of probabilistic safety analysis (PSA), and made efforts on technical review and on-site regulatory inspection. In 2013, no radioactive event, which could endanger the safety of public and environment, occurred in operating nuclear power plants, and the monitoring records for the year showed that the integrity of three safety barriers were well maintained. MEP (NNSA) reinforced the inspection of nuclear power plants under construction in the whole process of constructing and commissioning, reviewed relevant technical documents, and intensified the investigation and handling of constructing events and significant non-conformance items. MEP (NNSA) also preceded with routine inspection activities on research reactors. In 2013, 2 new nuclear power units were put into commercial operation after completing the construction, and another 2 units were issued the construction permit.

MEP (NNSA) urged relevant enterprises to implement the rectification requirements in comprehensive safety inspection of nuclear fuel cycle facilities after the Fukushima nuclear accident, and the short-term and medium-term rectification requirements were basically fulfilled. MEP (NNSA) speeded up the review and approval of the decommissioning of nuclear facilities and the management for radioactive waste at the “two nuclear plants and three research institutes”, and carried forward the disposal of radioactive waste left in the past in Zhejiang Shenxian Cave. MEP (NNSA) developed functions of the nationwide management system of radiation safety of nuclear technology utilization, and extended the use of the management system, as well as explored the strategy for recycling used radioactive resources. MEP (NNSA) exercised strict approval to the environmental impact report on the construction projects of power transmission and transformation, and carry out trials of environmental supervision over the construction projects of power transmission and transformation to achieve whole process management for the projects. MEP (NNSA) held a nationwide forum on the radiation safety regulation.

MEP (NNSA) strictly strengthened the regulation on nuclear safety-related equipment in accordance with the regulations. An nationwide on-the-spot meeting on the experience feedback of civilian nuclear safety related equipment was held, the special inspection on nuclear safety related equipment

was carried out, and a targeted clean-up campaign for patching welding against the rules was conducted. MEP (NNSA) implemented the review system of A/B role, and properly dealt with significant non-conformity items.

In order to reinforce the credential management of nuclear and radiation safety inspectors, and to make well-regulated inspection activities, MEP (NNSA) established the “Rules on credential management of nuclear and radiation safety inspectors” (the 24th decree of MEP).

MEP (NNSA) researched and explored the work approaches of the information transparency and publicity, strengthened their top design, and standardized work process. MEP (NNSA) explored effective ways to communicate with public about new nuclear power plant construction, and choosing the Xudapu Nuclear Power Plant as the pilot project established work programs and detailed rules for implementation of public communication jointly with the government of Liaoning province and the China National Nuclear Corporation.

2 Policies, Plans, Regulations and Standards

In 2013, MEP (NNSA) put emphasis up on promoting the legislation of the “Nuclear Safety Law”, formed special reports and prepared the draft, made efforts to simplify the administrative licensing, devolved examination and approval authority, combed nuclear and radiation safety regulation experiences of the 30th anniversary, developed the administration history materials and theoretical summary literature, strengthened the management of preparation and revision of regulations and standards, promoted the implementation of “The 12th Five-Year Plan and 2020 Long-term Goals on Nuclear Safety and Radioactive Pollution Prevention and Control”, strengthened the scientific research work, undertook relevant subjects of “Restudy of the nuclear energy development in China” from the Chinese academy of engineering; assisted foreign exchange, tracked the progress of the preparation and revision of the safety standards of the International Atomic Energy Agency (IAEA).

Nuclear Safety Legislation

According to the promoting scheme, MEP (NNSA) actively carried out preliminary work of the legislation, cooperate with the National People's Congress on legislation demonstration and on-site survey, organized 17 special studies and demonstrations addressing fundamental, important and difficult problems of the “Nuclear Safety Law”. On October 30, 2013, the legislation plan of the standing committee of the 12th National People’s Congress was published, the “Nuclear Safety Law” is listed as the second category legislation program, listed in the national legislation plan for the first time. Through concentrated preparation, MEP (NNSA) also formed the draft of the “Nuclear Safety Law”, defined relevant legal nature, stipulated 15 basic systems of nuclear safety, and put forward 7 aspects of system innovation, such as nuclear material license, provide supporting documents for Legislation of the National People’s Congress. MEP (NNSA) cooperated with the National People’s Congress to carry out commemorative activities for the 10th anniversary of the publication of “Law of the People’s Republic of China on the Prevention and Control of Radioactive Pollution”, looking back the history of ruling the nuclear by law and legislation pattern of nuclear and radiation safety.

System Innovation

According to the requirements of the Central People's Government of the People's Republic of China for streamlining administration and delegating power, put forward "Proposal for Optimizing Capabilities of Administrative Examination and Approval on Nuclear and Radiation Safety Regulation", formed the scheme of "Dispatch of 2 Items, Combination of 4, Extension of 1", and optimized the administrative licensing. In the process of implementation of the innovation of administrative examination and approval, the civilian non-destructive testing (NDT) personnel qualification management is relocated to MEP (NNSA) for uniformly implementation. MEP (NNSA) replied to some legal comments, undertook several suggested proposals of the National People's Congress and the Chinese People's Political Consultative Conference concerning system and mechanism innovation, such as "Proposal for strengthening nuclear safety regulation", and so on.

Nuclear Safety Plan

Published "The 12th Five-Year Plan and 2020 Long-term Goals on Nuclear Safety and Radioactive Pollution Prevention and Control" formally, issued the work division of departments of the State Council, and the work division within the ministry, finished formulating the mid-term evaluation scheme of the implementation status of the plan, launched the preliminary work of "The 13th Five-Year" plan of nuclear safety.

The Preparation and Revision of Regulations and Standards

MEP (NNSA) optimized the review mechanism by taking measures such as strengthening demonstration and enhancing the connection of general committee and sub-committee, convened 4 meetings of expert committee of nuclear and radiation safety regulations and standards review as planned. MEP (NNSA) also reviewed 22 regulations, standards, guides and technical documents (see Table 1 to Table 4), released 5 nuclear safety guides including "Decommissioning of gamma Irradiation Devices", etc., set up reporting system of nuclear safety regulations status, and issued "Nuclear Safety Regulations Status Report" quarterly. MEP (NNSA) set up revision work group to study existing problems in the use of "Regulation on the Safety of Nuclear Power Plants Quality Assurance", clarified direction and thought, and asked for external comments and organized to arrange feedback.

MEP (NNSA) enhanced the preparation, revision and management of standards, formed preliminary conception of the top-level design of nuclear and radiation safety standards; cooperated to complete revision of 3 standards such as the "Operation Technical Specification on Automatic Monitoring System of Atmosphere Radiation Environment", etc., and 5 standards were reviewed and submitted for approval, such as "Design of Solid Radioactive Waste Treatment System of PWR Nuclear Power Plant", etc. Qualification of the nuclear power

safety standards in energy industries was carried out, according to the “Interim Measures for the Implementation of Management and Endorsement of Nuclear Safety Related Nuclear Power Standards in Energy Industries”, “Management Procedure in Endorsement of Nuclear Safety Related Nuclear Power Standards in Energy Industries (trial)” was developed. The standard “Operating Condition Categories of PWR Nuclear Power Plant” released by National Energy Administration, and reviewed and approved by the expert committee of nuclear and radiation safety regulations and standards.

Table 1. The First Review Meeting of Nuclear and Radiation Safety Regulations and Standards in 2013

Title	Category	Stage	Author	Review Group	Result
Operation Limit and Condition and Operation Procedure of Research Reactor	Guide	First draft for approval	Suzhou Nuclear Safety Center	General committee	Accepted
Aging Management of Research Reactor	Guide	First draft for approval	Suzhou Nuclear Safety Center	General committee	Accepted
Development and Application of Computer Software for Safety Assessment of Nuclear Power Plant	Guide	First draft for comment	State Nuclear Power Technology Corporation	Nuclear safety group	Accepted
Nuclear and Radiation Events Classification Manual (2012 edition)	Technical document	Draft for review	Nuclear and Radiation Safety Center	Nuclear safety group	Accepted
Fundamental Requirements on Qualification Management of Welder (HAF603/01)	Department rule	First draft for comment	Northern Regional Office of Nuclear and Radiation Safety Inspection, MEP	Nuclear equipment group	Accepted
Fundamental Requirements on Qualified Program Code Management of Welder (HAF603/02)					
Fundamental Requirements on Program Examination Technology of Welder (HAF603/03)					
Fundamental Requirements on Theory Examination Management of Welder (HAF603/04)					
Fundamental Requirements on Program Examination Management of Welder (HAF603/05)					
Supplement Requirements on Program Examination Quality Assurance of Welder (HAF603/06)					
Fundamental Requirements on Inspection Management of Program Examination Quality Assurance of Welder(HAF603/07)					

continued

Title	Category	Stage	Author	Review Group	Result
Fundamental Requirements on Program Examination Management of Special Machine Welder of Employing Organizations (HAF603/08) Application and Acceptance Conditions of Designation of Examination Organizations of Welder (HAF603/09) Fundamental Requirements on Test Specimen Inspection Organizations of Program Examination of Welder (HAF603/10) Fundamental Requirements on Replacement Management of Continuous Operation Records of Employing Organizations of Welder (HAF603/11)	Department rule	First draft for comment	Northern Regional Office of Nuclear and Radiation Safety Inspection, MEP	Nuclear equipment group	Accepted

Table 2. The Second Review Meeting of Nuclear and Radiation Safety Regulations and Standards in 2013

Title	Category	Stage	Author	Review Group	Result
Nuclear Emergency Exercise of Nuclear Power Plant Operating Organization	Guide	First draft for approval	Tsinghua University	General committee	Rejected
Nuclear Events Classification Manual	Technical document	First draft for approval	Nuclear and Radiation Safety Center	General committee	Accepted
Radiation Safety and Protection Requirements of gamma Radiographic Inspection in Industry	Standard	Draft for review	Jiangsu Radiation Monitoring Management Office	Radiation safety group	Accepted
Content and Format of Environment Impact Assessment Report /Forms of Nuclear Technology Application Program	Standard	Draft for review	Nuclear and Radiation Safety Center	Radiation safety group	Suspended
Radiation Safety Technical Specification on Electron Linear Accelerator Industrial CT	Standard	First draft for comment	Chongqing University	Radiation safety group	Accepted
Formulation of PWR Nuclear Power Plant Emergency Action Level	Guide	Draft for review	Tsinghua University	Radiation safety group	Accepted
Fundamental Requirements on Program Examination Technology of Welder	Department rule	Draft for review	Northern Regional Office of Nuclear and Radiation Safety Inspection, MEP	Nuclear equipment group	Accepted

Table 3. The Third Review Meeting of Nuclear and Radiation Safety Regulations and Standards in 2013

Title	Category	Stage	Author	Review Group	Result
Radiation Safety and Protection Requirements of gamma Radiographic Inspection in Industry	Standard	First draft for approval	Jiangsu Radiation Monitoring Management Office	General committee	Rejected
Formulation of PWR Nuclear Power Plant Emergency Action Level	Guide	First draft for approval	Tsinghua University	General committee	Accepted
Fundamental Requirements on Program Examination Technology of Welder	Guide	First draft for approval	Northern Regional Office of Nuclear and Radiation Safety Inspection, MEP	General committee	Accepted
Decommissioning Safety Requirements of Facilities Using Radioactive Materials	Technical document	First draft for approval	Institute for Standardization of Nuclear Industry	General committee	Changed to the translation
Severe Accident Management of Nuclear Power Plant	Technical document	First draft for approval	Shanghai Jiao Tong University	General committee	Accepted
Guide on Periodic Safety Performance Evaluation of Radioactive Goods Transport Container	Technical document	First draft for approval	China Academy of Machinery Science and Technology	General committee	Accepted
Code on the Safety Regulation for Radioactive Waste	Department rule	First draft for comment	China Institute for Radiation Protection	Radiation safety group	Accepted
Format and Content of Environment Impact Assessment Report of Nuclear Power Plant	Guide	First draft for comment	Nuclear and Radiation Safety Center	Radiation safety group	Accepted

Table 4. The Fourth Review Meeting of Nuclear and Radiation Safety Regulations and Standards in 2013

Title	Category	Stage	Author	Review Group	Result
Radiation Safety and Protection Requirements of gamma Radiographic Inspection in Industry	Standard	First draft for approval	Jiangsu Radiation Monitoring Management Office	General committee	Accepted
Technical Conditions Management of Nuclear Power Plant	Guide	First draft for comment	China General Nuclear Power Group	Nuclear safety group	Accepted

3 Safety Regulation on Nuclear Power Plants

Nuclear Power Plants in Operation

In 2013, there was no radioactive event endangering the safety of the public or the environment in operating nuclear power plants. The monitoring indicators over the year showed the integrity of all three safety barriers was in good status. After the Fukushima accident in Japan, MEP (NNSA) carried out verification and inspection on nuclear power plants compliance with the Post-Fukushima additional improvement requirements. The results indicated that all operational nuclear power plants have implemented the additional requirement well, safety risk was under control, and the safety was assured.

Operating data of operating nuclear power plants in 2013 is shown in Table 5, and nuclear power plant (NPP) operator license issuance and renewal in 2013 is shown in Table 6.

Table 5. Operating Data of Operating Nuclear Power Plants in 2013

NPP Name	Generation Output in 2013 (TWh)	Unit	Unit No.	Nominal Power (MW)	Generation Output of Unit (TWh)	Load Factor (%)	Capability Factor (%)
Qinshan	2.303	1	CN01	320	2.303	84.82	81.61
Qinshan Phase II	20.37	1	CN04	650	4.942	86.80	85.79
		2	CN05	650	5.126	90.02	88.74
		3	CN14	650	5.413	95.07	93.50
		4	CN15	650	4.889	85.37	84.28
Qinshan Phase III	11.917	1	CN08	700	5.653	92.19	89.91
		2	CN09	700	6.264	102.16	99.86
Daya Bay	14.895	1	CN02	900	7.479	86.76	86.83
		2	CN03	900	7.416	86.04	85.93
Ling'ao	31.549	1	CN06	990	7.144	82.38	82.94
		2	CN07	990	7.569	87.28	88.58
		3	CN12	1080	8.446	88.78	90.11
		4	CN13	1080	8.389	88.18	88.95
Tianwan	16.686	1	CN10	1060	8.413	90.60	90.70
		2	CN11	1060	8.273	89.10	89.14

Table 6. NPP Operator License Issuance and Renewal in 2013

NPP Name	NEW (individuals)		Renewal (individuals)		Total (individuals)
	Operator	Advanced Operator	Operator	Advanced Operator	
Qinshan	39	0	8	16	63
Qinshan Phase II	19	22	39	37	117
Qinshan Phase III	11	8	28	36	83
Daya Bay	17	23	19	27	86
Ling'ao NPP Units 1&2	23	21	17	24	85
Ling'ao NPP Units 3&4	8	16	21	22	67
Tianwan	24	1	43	33	101
Total	141	91	175	195	602

Qinshan NPP

In 2013, Qinshan NPP was kept in stable operation and in good safety state. The R14 refueling overhaul was completed. Three safety barriers were intact, and the gross damage rate of fuel assembly, the leakage rate of the primary loop pressure boundary, and the leakage rate of the containment were all within the specified limits.

Nuclear safety related approvals for Qinshan NPP in 2013 are shown in Table 7, Inspection activities for Qinshan NPP in 2013 are shown in Table 8, Operating event of Qinshan NPP in 2013 is shown in Table 9, and radiation protection dose of Qinshan NPP in 2013 is shown in Table 10.

Vice Minister of MEP, Administrator of NNSA Li Ganjie Inspected the Qinshan Nuclear Power Base

Table 7. Nuclear Safety Related Approvals for Qinshan NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]60	03/05/13	Notification of Approving the Modification with the Reactor Building Pit Filter Screen of Qinshan NPP
NNSA[2013]65	03/11/13	Notification of Approving the Modification with Adding Emergency Water Supply Interface of Qinshan NPP Primary Circuit
NNSA[2013]96	04/24/13	Notification of Release the Re-criticality Control Point after the R14 of Qinshan NPP

continued

Document No.	Approval Date	Title
NNSA[2013]172	10/15/13	Notification of Approving the Refueling Program of Qinshan NPP
NNSA[2013]204	12/06/13	Notification of Approving the Modification with Adding Air Conditioner in Circulation-Pump Building
NNSA[2013]215	12/26/13	Reply to the Operating QAP and Related Licensing Documents Revision for Qinshan NPP I, II, and III
NNSA[2013]217	12/30/13	Notification of Approving to Add Weld Beads to the Hydrogen Recombiner System of Qinshan NPP

Table 8. Inspection Activities for Qinshan NPP in 2013

Start Date	Item	Main Contents
04/19/13	Nuclear Safety Inspection before Re-criticality Following the R14 Refueling	Compliance with conditions set for re-criticality after the R14 refueling
08/28/13	Comprehensive Safety Inspection to Qinshan NPP base	Main problems of the Post-Fukushima modifications and remaining issues

Table 9. Operating Event of Qinshan NPP in 2013

Event Date	Title	Cause	INES Classification
04/26/13	Automated Shutdown Triggered by SG Low Water Level Signal.	Human error	0

Table 10. Radiation Protection Dose of Qinshan NPP in 2013

Annual Man Average Effective Dose (mSv)	Annual Maximum Individual Effective Dose (mSv)	Annual Collective Effective Dose (man • Sv)	Normalized Collective Effective Dose (man • mSv/Gwh)
0.281	6.073	0.494,843	0.214,9

Qinshan NPP Phase II

The operation of 4 units of Qinshan Phase II NPP was kept stable and safe. The 10th refueling overhaul of unit 1, the 9th refueling overhaul of unit 2, the 3rd refueling overhaul of unit 3, and the 1st refueling overhaul of unit 4 were completed. The three safety barriers were kept intact. The gross damage rate of fuel assembly, the leakage rate of the primary loop pressure boundary, and the leakage rate of the containment were all within the specified limits.

Nuclear safety related approvals for Qinshan Phase II NPP in 2013 are shown in Table 11, Inspection activities for Qinshan NPP Phase II in 2013 are shown in Table 12, Operating events of Qinshan NPP Phase II NPP in 2013 are shown in Table 13, and radiation protection dose of Qinshan NPP Phase II in 2013 is shown in Table 14.

Table 11. Nuclear Safety Related Approvals for Qinshan Phase II NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]15	01/15/13	Notification of Approving the Alternation of HSI Check Valve for Qinshan NPP Phase II Unit 1 and Unit 2
NNSA[2013]64	03/11/13	Notification of Approving the Alternation of RCV Valve Actuator for Qinshan NPP Phase II Unit 3 and Unit 4
NNSA[2013]68	03/11/13	Notification of Approving the Preventative Maintenance of RRI Valves for Qinshan NPP Phase II Unit 1 and Unit 2
NNSA[2013]70	03/12/13	Notification of Approving Main Feed-Water Reliable Isolation for Qinshan NPP Phase II
NNSA[2013]71	03/12/13	Notification of Approving to Dismantle Parts of Double Fence South of Crane #1 during R110 of Qinshan NPP Phase II Unit 1
NNSA[2013]74	03/12/13	Notification of Approving the Preventative Maintenance Schedule Adjustment of SEC Pumps for Qinshan NPP Phase II Unit 1 and Unit 2
NNSA[2013]76	03/12/13	Notification of Approving to Release the Re-criticality after the 1st Refueling Overhaul of Qinshan NPP Phase II Unit 4
NNSA[2013]93	04/18/13	Notification of Approving to Add the Passive Hydrogen Recombiners to Qinshan Phase II NPP unit 1 and Unit 2
NNSA[2013]102	05/10/13	Notification of Approving to Release the Re-criticality Control Point after 10th Refueling Overhaul of Qinshan Phase II NPP Unit 1
NNSA[2013]125	06/14/13	Notification of Approving the In-reactor Test of Chinese Gen II Fuel Assemblies (CF2) of Qinshan NPP Phase II
NNSA[2013]130	06/28/13	Notification of Approving to Release the Re-criticality Control Point after the 9th Refueling Overhaul of Qinshan NPP Phase II Unit 2
NNSA[2013]167	09/29/13	Notification of Approving the Modification with Warehouse to be Included in the Security Control Zone of Qinshan NPP Phase II
NNSA[2013]178	10/15/13	Notification of Approving the Modification of Inspection Hole Bolt of SG for Qinshan NPP Phase II Unit 1 and Unit 2
NNSA[2013]179	10/15/13	Notification of Approving the Part Modification of the Operation Technical Specification (Rev.1) of Qinshan NPP Phase II Unit 3 and Unit 4
NNSA[2013]195	11/11/13	Notification of Approving to Release the Re-criticality Control Point after the 3rd Refueling Overhaul of Qinshan NPP Phase II
NNSA[2013]198	11/28/13	Notification of Approving the Modification of Fuel Assembly and Storage System of Qinshan NPP Phase II Unit 1 and Unit 2

Table 12. Inspection Activities for Qinshan NPP Phase II in 2013

Start Date	Item	Main Contents
03/07/13	Nuclear Safety Inspection for Re-criticality after 401 Overhaul of Qinshan NPP Phase II	The conditions conformity for reactor re-criticality after 401 overhaul
05/07/13	Nuclear Safety Inspection for Re-criticality after 110 Overhaul of Qinshan NPP Phase II	The conditions conformity for reactor re-criticality after 110 overhaul

continued

Start Date	Item	Main Contents
06/25/13	Nuclear Safety Inspection for Re-criticality after 209 Overhaul of Qinshan NPP Phase II	The conditions conformity for reactor re-criticality after 209 overhaul
11/06/13	Nuclear Safety Inspection for Re-criticality after 303 Overhaul of Qinshan NPP Phase II	The conditions conformity for reactor re-criticality after 303 overhaul
11/20/13	The Environmental Protection Acceptance Inspection of Qinshan NPP Phase II Unit 3 and Unit 4	Environmental protection and emergency facility

Table 13. Operating Events of Qinshan NPP Phase II NPP in 2013

Event Date	Title	Cause	INES Classification
01/24/13	Automatic shutdown due to mistaken break of the power source of all hydro couplers of main feed-water pumps of Qinshan Phase II NPP unit 3	Human error	0
04/20/13	Leaner display during the RT inspection of M13 beam of RRA entry piping of Qinshan NPP Phase II	Equipment failure	0
06/08/13	Failure to meet the operation technical specification due to the unavailability of two DVN system Iodine filter pipelines of Qinshan Phase II NPP unit 4	Equipment failure	0
08/21/13	Emergency shut-down due to the poor contact of auxiliary contact point during RPB signal T3 test for Qinshan Phase II	Equipment failure	0

Table 14. Radiation Protection Dose of Qinshan NPP Phase II in 2013

Annual Man Average Effective Dose (mSv)	Annual Maximum Individual Effective Dose (mSv)	Annual Collective Effective Dose (man • Sv)	Normalized Collective Effective Dose (man • mSv/Gwh)
0.385	8.726	1.177	0.057,8

Qinshan NPP Phase III

In 2013, the two units of Qinshan Phase III NPP were kept in stable operation and in good safety state. the 7th outage of unit 1 was completed, there was no outage for unit 2 in the year. The three safety barriers were kept intact. The gross damage rate of fuel assembly, the leakage rate of the primary loop pressure boundary, and the leakage rate of the containment were all within the specified limits.

Nuclear safety related approvals for Qinshan Phase III NPP in 2013 are shown in Table 15, Inspection activity for Qinshan NPP Phase III in 2013 is shown in Table 16, and radiation protection dose of Qinshan NPP Phase III in 2013 is shown in Table 17.

Table 15. Nuclear Safety Related Approvals for Qinshan Phase III NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]59	03/01/13	Notification of Approval of the Isolation Maintenance of CI Firefighting Spray Pipeline Network of Firefighting System for Qinshan NPP Phase III
NNSA[2013]66	03/11/13	Notification of Approving the Refueling Program of Qinshan Phase NPP III
NNSA[2013]109	05/14/13	Notification of Approving to Add the Passive Hydrogen Recombiners for Qinshan Phase NPP III
NNSA[2013]111	05/22/13	Notification of Approving the Preliminary Scheme of Radioactive Waste Resin for Qinshan NPP Phase III
NNSA[2013]118	05/31/13	Notification of Release the Re-criticality Control Point after the 7th Overhaul for Qinshan NPP Phase III Unit 1
NNSA[2013]140	07/23/13	Notification of Approving the Extension of Part Pipes Replacement of Re-circulation Cooling Water System for Qinshan NPP Phase III Unit 1
NNSA[2013]164	09/18/13	Notification of Approving the Overhaul Schedule Optimization Project for Qinshan NPP Phase III
NNSA[2013]180	10/15/13	Notification of Approving the Revision of the Operation Limits of On-site Air Coolers in Technical Specification for Qinshan NPP Phase III
MEP App[2013]196	08/13/13	Reply to the Environment Registration form of Operation Support Center of Qinshan NPP Phase III

Table 16. Inspection Activity for Qinshan NPP Phase III in 2013

Start Date	Item	Main Contents
05/28/13	Nuclear Safety Inspection before the Criticality after the 107 Overhaul of Qinshan NPP Phase III	The completion status of the 107 overhaul and the fulfillment of criticality conditions of the unit

Table 17. Radiation Protection Dose of Qinshan NPP Phase III in 2013

Annual Man Average Effective Dose (mSv)	Annual Maximum Individual Effective Dose (mSv)	Annual Collective Effective Dose (man·Sv)	Normalized Collective Effective Dose (man • mSv/Gwh)
0.324	6.362	0.630	0.052,9

Daya Bay NPP and Ling'ao NPP

In 2013, the 16th refueling overhaul of Daya Bay NPP unit 1 and unit 2 was carried out. The 11th refueling overhaul of unit 1 of Ling'ao NPP was completed, and unit 2 was kept in safe operation the whole year; the third refueling overhaul of unit 3 and the second refueling overhaul of unit 4 were completed; no unplanned reactor shutdown events happened in the 6 units. The three safety barriers were kept intact. The gross damage rate of fuel assembly, the leakage rate of the primary loop pressure boundary, and the leakage rate of the containment were all within the specified limits.

Nuclear safety related approvals for Daya Bay and Ling'ao NPP in 2013 are shown in Table 18

(7 common approvals for Daya Bay and Ling'ao NPP, 4 only for Daya Bay, 5 for Ling'ao NPP unit 1 and unit 2, 17 for Ling'ao NPP unit 3 and unit 4), Inspection activities for Daya Bay and Ling'ao NPP in 2013 are shown in Table 19, Operating events of Daya Bay and Ling'ao NPP in 2013 are shown in Table 20, and radiation protection dose of Daya Bay and Ling'ao NPP in 2013 is shown in Table 21.

Table 18. Nuclear Safety Related Approvals for Daya Bay and Ling'ao NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]7	01/08/13	Notification of Approving the Modification to Add the Passive Hydrogen Recombiners in Containments of Unit 1 and Unit 2 of Daya Bay NPP and Ling'ao NPP
NNSA[2013]8	01/08/13	Notification of Approving the Modification to Add Corrective Process for RCS Cold Phase and Hot Phase Temperature, average temperature, and ΔT of Daya Bay NPP Unit 3 and Unit 4
NNSA[2013]9	01/08/13	Notification of Approving the Modification to Add Front Delay to Re-loading Signal of Emergency Diesels of Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]10	01/08/13	Notification of Approving the Modification to Extend Capacity of Reactor Protection Power Source of Ling'ao NPP
NNSA[2013]11	01/08/13	Notification of Approving the Modification of Tachometer Measurement of Primary Pumps of Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]35	01/18/13	Notification of Approving the Modification to Optimize Loading of the ALUZ of Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]49	02/26/13	Notification of Approving the Modification of blocking ATWT Logic of LND Power Loss of Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]50	02/26/13	Notification of Approving the Operation Licenses Extension of Daya Bay NPP and Ling'ao NPP Unit 1 and Unit 2
NNSA[2013]67	03/11/13	Notification of Approving the Modification to Add the Plant System Input for the Project of "NPP Passive Emergency High-level Cooling Water Source System R&D" to Ling'ao NPP Unit 4
NNSA[2013]69	03/11/13	Notification of Approving to Release the Re-criticality Control Point after 11th Refueling Overhaul of Ling'ao NPP Unit 1
NNSA[2013]82	03/21/13	Notification of Approving the Modification of the Power Mode of the ARE Feed-Water Flow Signals for Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]84	03/21/13	Notification of Approving Ling'ao NPP Unit 4 Receiving the Spent Fuel Assemblies from Daya Bay NPP Unit 1 and Unit 2
NNSA[2013]91	04/02/13	Notification of Releasing the Re-criticality Control Point after 2nd Refueling Overhaul of Ling'ao NPP Unit 4
NNSA[2013]110	05/17/13	Notification of Approving the Re-criticality Control Point after the 16th Refueling Overhaul of Daya Bay Unit 2
NNSA[2013]115	05/24/13	Notification of Releasing the Re-criticality Control Point after 3rd Refueling Overhaul of Ling'ao NPP Unit 3
NNSA[2013]131	07/09/13	Notification of Issuing the Operation License for Ling'ao NPP Unit 3 and Unit 4

continued

Document No.	Approval Date	Title
NNSA[2013]132	07/17/13	Notification of Approving the Modification to Optimize the Power Circuit of Feed Water Control System Transducer for Daya Bay and Ling'ao NPP Unit 1 and Unit 2
NNSA[2013]139	07/23/13	Notification of Approving the Modification with the Containment Pit Screen for Unit 1 and Unit 2 of Daya Bay and Ling'ao NPP
NNSA[2013]143	07/30/13	Notification of Approving the Process Modification for the Radioactive Liquid Waste Filter Cores of Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]153	08/23/13	Notification of Approving to Stop the Spent Fuel Pool Cooling Pump and RRI Pump for 1 Bar Inspection during Containment Pressure Test of Ling'ao NPP Unit 2
NNSA[2013]158	09/03/13	Notification of Approval of the 18 Months Refueling Modification of Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]159	09/03/13	Notification of Approving the Modification with Position of Working Tables in the Central Control Room for Ling'ao Unit 3 and Unit 4
NNSA[2013]160	09/03/13	Notification of Approving the Modification to Add Diesel Generators to LLS Systems of Unit 1 and Unit 2 of Daya Bay NPP and Ling'ao NPP
NNSA[2013]171	10/15/13	Notification of Approving the Reactor Cooling Monitoring System Modification of Daya Bay NPP
NNSA[2013]181	10/16/13	Notification of Approving the Revision of Operation Technical Specification of Daya Bay and Ling'ao NPP
NNSA[2013]186	10/25/13	Notification of Approving the Digitization Modification of Nuclear Instrumentation System of Ling'ao NPP Unit 1 and Unit 2
NNSA[2013]196	11/20/13	Notification of Releasing the Re-criticality Control Point after 16th Refueling Overhaul of Daya Bay Unit 1
NNSA[2013]199	11/28/13	Notification of Approving the Modification of KRT Cabinet (2KRT001AR) during the 11th Refueling Overhaul of Ling'ao NPP Unit 2
NNSA[2013]205	12/12/13	Notification of Approving Increasing the Boric Acid Concentration in Spent Fuel Pool, Caging Pool and Refueling Pool of Ling'ao NPP Unit 3 and Unit 4
NNSA[2013]206	12/12/13	Notification of Approving Increasing the Boric Acid Concentration of Primary Circuit of Ling'ao NPP Unit 3 and Unit 4
MEP App[2013]154	06/24/13	Reply to the Environment Impact Assessment Report of 18 Months Refueling Modification for Ling'ao NPP Unit 3 and Unit 4
MEP App[2013]197	08/13/13	Reply to the Environment Impact Assessment Form of Construction Project of Primary Pump Maintenance Center Building of Daya Bay NPP
MEP App[2013]198	08/13/13	Reply to the Environment Impact Registration Form of Construction Project of Main Transformer Neutral Point DC Suppression Device Building of Ling'ao NPP Unit 3 and Unit 4

Table 19. Inspection Activities for Daya Bay and Ling'ao NPP in 2013

Start Date	Item	Main Contents
03/06/13	Inspection before Re-criticality after the 11th Refueling Overhaul of Ling'ao NPP Unit 1	Fulfillment of reactor criticality conditions after L111 refueling overhaul
03/27/13	Inspection before Re-criticality after the 2nd Refueling Overhaul of Ling'ao NPP Unit 4	Fulfillment of reactor criticality conditions after L402 refueling overhaul
05/15/13	Inspection before Re-criticality after the 16th Refueling Overhaul of Daya Bay NPP Unit 2	Fulfillment of reactor criticality conditions after D216 refueling overhaul
05/20/13	Inspection before Re-criticality after the 3rd Refueling Overhaul of Ling'ao NPP Unit 3	Fulfillment of reactor criticality conditions after L303 refueling overhaul
11/14/13	Inspection before Re-criticality after the 16th Refueling Overhaul of Daya Bay NPP Unit 1	Fulfillment of reactor criticality conditions after D116 refueling overhaul

Table 20. Operating Events of Daya Bay and Ling'ao NPP in 2013

Event Date	Title	Cause	INES Classification
05/10/13	The unavailability of flow high alarm signals of SG #2 auxiliary feed-water of Ling'ao unit 3	Equipment failure	0
05/10/13	The unavailability of flow high alarm signals of SG #2 auxiliary feed-water of Ling'ao unit 4	Equipment failure	0

Table 21. Radiation Protection Dose of Daya Bay and Ling'ao NPP in 2013

NPP/Unit	Annual Man Average Effective Dose (mSv)	Annual Maximum Individual Effective Dose (mSv)	Annual Collective Effective Dose (man • Sv)	Normalized Collective Effective Dose (man • mSv/Gwh)
Daya Bay NPP	0.549	13.345	1.768,762	0.118,7
Ling'ao NPP unit 1 and unit 2	0.887	13.696	3.238,171	0.220,1
Ling'ao NPP unit 3 and unit 4	0.188	5.660	0.576,920	0.034,3

Tianwan NPP

In 2013, the overall operation conditions of Tianwan NPP unit 1 and unit 2 were good. The 6th refueling overhauls of the two units were completed. The three safety barriers were kept intact. The gross damage rate of fuel assembly, the leakage rate of the primary loop pressure boundary, and the leakage rate of the containment were all within the specified limits.

Nuclear safety related approvals for Tianwan NPP in 2013 are shown in Table 22, Inspection activities for Tianwan NPP in 2013 are shown in Table 23, Operating event of Tianwan NPP in 2013 is shown in Table 24, and radiation protection dose of Tianwan NPP in 2013 is shown in Table 25.

Table 22. Nuclear Safety Related Approvals for Tianwan NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]42	02/05/13	Notification of Approval of Important Modification with the Primary and Second Loops and SFP Emergency Backup Water for Tianwan NPP Unit 1 and Unit 2
NNSA[2013]43	02/05/13	Notification of Approval of Optimizing Radioactive Effluent Discharge Limits of Tianwan NPP
NNSA[2013]63	03/08/13	Notification of Approving to Release the Re-criticality Control Point after the 6th Refueling Overhaul for Tianwan Unit 1
NNSA[2013]77	05/06/13	Notification of Approving to Release the Re-criticality Control Point after the 6th Refueling Overhaul for Tianwan Unit 2
NNSA[2013]83	03/21/13	Notification of Approval of Modification with the Solidifying Container for Liquid Radioactive Waste of Tianwan NPP
NNSA[2013]124	06/05/13	Notification of Approving the Modification with the Man-hole Gasket Replacement of Middle-pressure ACC of Tianwan NPP Unit 1 and Unit 2
NNSA[2013]129	06/24/13	Notification of Approval of the Exclusion for the Waste Resin of Tianwan NPP
NNSA[2013]163	09/18/13	Notification of Approving the Modification of Long Cycle Refueling Scheme of Tianwan NPP Unit 1 and Unit 2
NNSA[2013]182	10/16/13	Notification of Approving the Modification to Add Flanges to the Manometer Pipelines of the 2nd Choke Block of Primary Pump for Tianwan NPP
NNSA[2013]190	10/31/13	Notification of Approval of Modification to Replace the KBE10AA201 Valve Electrical Actuator for Tianwan NPP Unit 1 and Unit 2
NNSA[2013]214	12/23/13	Notification of Approving the Modification to Add Primary Loop Hydrogen Sweeping Pipeline to KTB20 System for Tianwan Unit 1 and Unit 2
MEP App[2013]225	09/18/13	Reply and Approval of the Environment Impact Assessment Form for Long Cycle Refueling Modifications for Tianwan Unit 1 and Unit 2

Table 23. Inspection Activities for Tianwan NPP in 2013

Start Date	Item	Main Contents
02/27/13	Routine nuclear safety inspection before the 1st criticality after T106 overhaul of Tianwan NPP unit 1	Fulfillment of criticality conditions after T106 overhaul
05/02/13	Routine nuclear safety inspection before the 1st criticality after T206 overhaul of Tianwan NPP unit 2	Fulfillment of criticality conditions after T206 overhaul

Table 24. Operating Event of Tianwan NPP in 2013

Event Date	Title	Cause	INES Classification
03/05/13	Shut-down protection actuate during the heating process of Tianwan unit 1	Human error	0

Table 25. Radiation Protection Dose of Tianwan NPP in 2013

Annual Man Average Effective Dose (mSv)	Annual Maximum Individual Effective Dose (mSv)	Annual Collective Effective Dose (man • Sv)	Normalized Collective Effective Dose (man • mSv/Gwh)
0.177	2.615	0.466,7	0.028

Nuclear Power Plants under Construction

Liaoning Hongyanhe NPP

Hongyanhe NPP unit 1 reached the initial criticality on January 16 and was put into commercial operation on June 6. Unit 2 had the 1st loading on September 3, and was connected to the grid on November 23. Unit 3 began the cold test since December 27, and unit 4 began the peak period for installation.

Nuclear safety related approvals for Hongyanhe NPP in 2013 are shown in Table 26, Inspection activities for Hongyanhe NPP in 2013 are shown in Table 27. Three constructing events and thelve operating events occurred in Hongyanhe NPP in 2013 (see Table 28 and Table 29).

An Overall View of Hongyanhe NPP Unit 1 to 4

Inspection before the 1st Fuel Loading of Unit 2 on August 20, 2013

Table 26. Nuclear Safety Related Approvals for Hongyanhe NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]12	01/11/13	Notification of Approving to Release the 1st Criticality Control Point of Hongyanhe NPP Unit 1
NNSA[2013]46	02/17/13	Notification of Approving to Release the 1st Grid Connecting Control Point of Hongyanhe NPP Unit 1
NNSA[2013]92	04/03/13	Notification of Approving to Release the 90% Power Control Point of Hongyanhe NPP Unit 1

continued

Document No.	Approval Date	Title
NNSA[2013]156	09/02/13	Notification of Issuing the “Instrument of ratification for the first fuel loading” of Hongyanhe NPP Unit 2
NNSA[2013]169	10/14/13	Notification of Approving to Release the 1st Criticality Control Point for Hongyanhe NPP Unit 2
NNSA[2013]202	11/29/13	Notification of Approving the Modification with the Entry and Exit points of Main Control Room Area of Hongyanhe NPP Unit 1 and Unit 2
NNSA Notice[2013]8	01/16/13	Notification of Issuing the “Inspection Report for the 1st Criticality of Hongyanhe NPP Unit 1”
NNSA Notice [2013]90	09/02/13	Notification of issuing the “Inspection Report of First Fuel Loading” of Liaoning Hongyanhe NPP Unit 2
NNSA Notice[2012]138	11/20/13	Reply Letter of Accepting the “Quality Assurance Program during Commissioning of Hongyanhe NPP Phase I” (Rev.1)
NNSA Notice [2012]141	11/28/13	Reply Letter of Accepting the “Quality Assurance Program during Design and Construction of Hongyanhe NPP Phase I” (Rev.1)
NNSA Notice [2012]160	12/10/13	Reply Letter of Accepting the “Quality Assurance Program during Commissioning of Hongyanhe NPP Unit 3 and Unit 4” (Rev.B)

Table 27. Inspection Activities for Hongyanhe NPP in 2013

Start Date	Item	Main contents
01/05/13	Nuclear safety inspection on the 1st criticality control point of Hongyanhe NPP unit 1	Remaining problems status after comprehensive nuclear safety inspection before the 1st loading of Hongyanhe unit 1, nuclear safety SSCs and activities during design, manufacturing, and commissioning from the 1st loading to 1st criticality
02/05/13	Nuclear safety inspection before the 1st connection to the grid for Hongyanhe NPP unit 1	System commissioning status before grid connection and deficiency repairs, operation management, maintenance management and status of remaining problems and management requirements in each inspections during construction
02/25/13	Nuclear safety inspection of main piping welding preparation of Unit 3 and torque exceeding problem of main bolts of unit 2	Quality Assurance Program implementation during design and construction, on-site quality control of main components installation, the 1st welding preparation of the main piping of unit 3, torque exceeding problem of #30 main bolts of unit 2 and its experience feedback
03/18/13	Control point inspection of 50% power of Hongyanhe NPP unit 1	Fulfillment of system tests before surpassing the 50% power level, operation management, chemical management, effluent monitoring, radiation protection, the management requirements in each safety inspections and their fulfillment
03/26/13	Control point inspection of 90% power of Hongyanhe NPP unit 1	Quality assurance, system tests and power increase preparation, implementation of operation technical specification, equipment abnormal and maintenance management

continued

Start Date	Item	Main contents
06/24/13	Nuclear safety inspection on commissioning status of Hongyanhe NPP unit 2	Commissioning management and quality assurance, hot tests completion, DCS, NCR status and other issues
07/16/13	Nuclear safety routine inspection of quality assurance of Hongyanhe NPP	Quality Assurance Program during design and construction and its sub-programs, commissioning phase Quality Assurance Program and its sub-programs, operation phase Quality Assurance Program and its sub-programs
08/20/13	Nuclear safety inspection before the 1st fuel loading of Hongyanhe NPP unit 2	Quality assurance, structures and components related to nuclear safety, system commissioning, operation preparation, radiation protection, emergency preparation, physical protection and fuel storage, environmental protection facility, license conditions, applying documents, implementation of the safety requirements in each inspection, Post-Fukushima improvements and other issues concerned
08/20/13	Operation safety inspection of Hongyanhe NPP unit 1	Test operation phase quality assurance, operation management, periodic test, maintenance, event and deviation, experience feedback concerning personnel, SSCs and related activities
09/20/13	Nuclear safety inspection of Hongyanhe NPP and 100% power inspection	Completion of commissioning tests, operation management of unit 1, radiation protection, effluents and wastes management, fulfillment of the safety requirements in each inspection and dialogue meetings, Post-Fukushima improvements and fulfillment, emergency preparation and other issues concerned
10/08/13	Comprehensive nuclear safety inspection before the 1st criticality of Hongyanhe unit 2	Completion status of commissioning tests before the 1st criticality, main incident sheets, design modification application, etc., preparation status before the 1st criticality, implementation of technical specification after criticality (including operating events analysis), regular tests status, other safety requirements and special subjects concerning safety
10/30/13	Pre-service and in-service inspections of Hongyanhe NPP, and the routine inspection before main piping welding of unit 4	In-service inspection preparation of unit 1 and unit 2, pre-service inspection management and status of unit 3, main piping welding quality control of unit 4, 1st welding preparation of unit 4 main piping, NCR and other issue feedback, etc.
11/13/13	Comprehensive inspection before the grid connection of Hongyanhe NPP Unit 2	System tests completion before the grid connection, system delivery, UES and DCR status, operation and maintenance management of unit 2, implementation of safety requirements in each inspection and other issues
12/02/13	Cold test control point inspection of Hongyanhe NPP unit 3, and radiation monitoring of Hongyanhe NPP unit 1	System delivery for cold tests of unit 3, cold tests documents, personnel preparation and systems delivery of unit 3, cold tests experience feedback, events and NCR of unit 3, radiation monitoring of unit 1 and other issues
12/11/13	Control point inspection of 50% power level of Hongyanhe NPP unit 2	Commissioning tests completion, UES and DCR status, experience feedback, implementation of safety requirements in each inspection and other issues

Table 28. Constructing Events of Hongyanhe NPP in 2013

Event Date	Unit	Title
03/01/13	Hongyanhe NPP unit 2	Deformation of auxiliary feed-water tank
05/21/13	Hongyanhe NPP unit 3	Leakage during CRDM nozzle base metal hydro test
08/30/13	Hongyanhe NPP unit 2, unit 3 and unit 4	Non-conformity between design and fabrication drawings of primary pump supports

Table 29. Operating Events of Hongyanhe NPP in 2013

Event Date	Title	Cause	INES Classification
01/09/13	Loss of 9DVN normal ventilation due to H9DVN heater freezing and HOSES failure of Hongyanhe unit 1	Equipment failure	0
01/18/13	Obliged to stop of H9DVN normal ventilation due to HOSES heating pipeline leakage of Hongyanhe unit 1	Equipment failure	0
01/23/13	Reactor shut-down triggered by H1RPN013MA step failure during the 0 power physic tests of Hongyanhe unit 1	Human failure	0
02/25/13	Reactor shutdown triggered by SG #1 water level high high and P7 signal of Hongyanhe unit 1	Human error	0
02/27/13	Fan's low flow failure due to H1ETY002ZV fan inversion of Hongyanhe unit 1	Human error	0
03/22/13	H1RCV010VP gas leakage due to wrong isolation of gas supply valve of Hongyanhe unit 1	Human error	0
04/06/13	H1RCP and core overall flows surpassing the mechanical design flow criteria of Hongyanhe unit 1	Equipment failure	0
04/14/13	Reactor shut-down triggered by false operation of generator malfunction protection during the load rejection test at 100% power level of Hongyanhe unit 1	Human error	0
04/16/13	TG and reactor tripped due to turbine axial position above-criteria during the load rejection test at 100% power level of Hongyanhe unit 1	Equipment failure	0
04/27/13	H1LLS001AP vibration measure not be performed according to frequency set by periodic test surveillance requirement	Human error	0
09/09/13	Unavailability of H2RPN014/024MA due to 2RPN power range sleeve change of Hongyanhe unit 2	Human error	0
11/28/13	Loss of main off-site site power due to H2GST001MP piping joint loosing during connection to 500kV bus test	Equipment failure	0

Fujian Ningde NPP

Ningde NPP unit 1 reached full power on March 8 and began commercial operation on April 15. Unit 2 finished the 1st loading on November 14. Unit 3 finished the main piping welding of primary loop on October 21. Unit 4 was in the phase of equipment installation.

Nuclear safety related approvals for Ningde NPP in 2013 are shown in Table 30, Inspection activities for Ningde NPP in 2013 are shown in Table 31. One constructing event and ten operating events occurred in Ningde NPP in 2013 (see Table 32 and Table 33).

Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua Inspected Ningde NPP on Site

Table 30. Nuclear Safety Related Approvals for Ningde NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]61	03/06/13	Notification of Approving to Release the 90% Power Control Point of Ningde NPP Unit 1
NNSA[2013]194	11/08/13	Notification of Issuing the “Instrument of ratification for the first fuel loading” of Ningde NPP Unit 2
NNSA[2013]207	12/19/13	Notification of Releasing the 1st Criticality Control Point of Ningde NPP Unit 2
NNSA Notice[2013]128	11/04/13	Notification of Issuing the “Report of Comprehensive Inspection before the 1st fuel Loading of Ningde NPP Unit 2”

Table 31. Inspection Activities for Ningde NPP in 2013

Start Date	Item	Main Contents
02/27/13	Inspection on the 90% power control point of Ningde NPP unit 1	Completion of systems commissioning after the 1st criticality, main events treatment and design modification, operation management, fulfillment of maintenance and implementation of safety requirements
04/07/13	Control point inspection of main system cold function tests of Ningde NPP unit 2	System cold tests and delivery status, cold tests preparation of unit 2, implementation of safety requirements in each dialogue meeting and inspection
05/13/13	First routine safety inspection on Ningde NPP in 2013	Unit 3 construction management, main piping welding preparation, implementation of safety requirements in each dialogue meeting and inspection

continued

Start Date	Item	Main Contents
07/01/13	Second routine safety inspection on Ningde NPP in 2013	Unit 1 operation management, radiation protection, emergency preparation, effluents management, implementation of safety requirements in each inspection
08/19/13	Comprehensive safety inspection on Ningde NPP	Implementation of Quality Assurance Program, implementation of safety requirements in each inspection, post-Fukushima improvements, engineering and operation management, environment monitoring, emergency preparation, radiation protection and sources management, industrial security, physical protection, fire-fighting safety
09/04/13	Third routine safety inspection on Ningde NPP in 2013	Implementation of Quality Assurance Program for unit 1, main system hot test management for unit 2, DCS installation and commissioning
09/09/13	Random safety inspection on Ningde NPP	Implementation of Quality Assurance Program and safety requirements in each inspection, post-Fukushima improvements, engineering and operation management, emergency preparation and environment monitoring, major modifications, NCR and events
10/21/13	Comprehensive inspection before the 1st fuel loading of Ningde NPP unit 2	Quality Assurance, structures and nuclear safety equipment, system tests and operation preparation, physical protection and fuel storage, radiation protection, environment protection facility and emergency preparation, license conditions, remaining problems and post-Fukushima improvements
10/21/13	Safety inspection of the test operation of Ningde NPP unit 1	Quality Assurance, operation management, operating events and deviations, physical protection, emergency preparation, radiation protection and waste management, implementation of safety management requirements and remaining issues
12/11/13	Inspection before the 1st criticality of Ningde NPP unit 2	Commissioning tests progress before 1st criticality, incident sheet and design modification, preparation before 1st criticality, implementation of technical specification after 1st fuel loading (including operating events analysis) , periodic tests, implementation of relevant safety management requirements and other issues concerning safety

An Overall View of Ningde NPP Unit 1 to 4

Steam Turbine Installation of Ningde Unit 2

Table 32. Constructing Event of Ningde NPP in 2013

Event Date	Unit	Title
06/28/13	Ningde NPP unit 2 and unit 3	Vertical support non-conformity with design blueprint of some main components

Table 33. Operating Events of Ningde NPP in 2013

Event Date	Unit	Title	Cause	INES Classification
01/19/13	Ningde NPP unit 1	1RPN014MA step failure triggered source range neutron flux high signal for shutdown	Equipment failure	0
02/23/13	Ningde NPP unit 1	Initiation operation during 1/2 TEG two compressors unavailable	Human error	0
03/09/13	Ningde NPP unit 1	1RCP loop flow and core overall flow surpassed the mechanical design flow criteria of Ningde NPP	Equipment failure	0
03/13/13	Ningde NPP unit 1	Ningde unit 1 carried out the generator load dump to service power and caused reactor automatic shutdown	Equipment failure	0
04/17/13	Ningde NPP unit 1	Long time unavailability of 1DVD001~004AE of Ningde NPP	Equipment failure	0
07/15/13	Ningde NPP unit 1	Non-conformity of “1PTR001BA hydrological gauge comparison” with “Safety related system and equipment periodic test surveillance requirement of Ningde unit 1 and unit 2”	Human error	0
09/20/13	Ningde NPP unit 1	9DVN001/002MD main control displayed data higher than real values	Human error	0
10/12/13	Ningde NPP unit 1	1KRT018/019MA shut simultaneously during software updating	Human error	0
10/24/13	Ningde NPP unit 1	1SEC pumps performance test non-conformity with the “Safety related system and equipment periodic test surveillance requirement of Ningde unit 1 and unit 2”	Human error	0
12/15/13	Ningde NPP unit 2	2ASG137/138/237/238VV failure treatment time surpassed the maintenance limit required by operation technical specification	Equipment failure	0

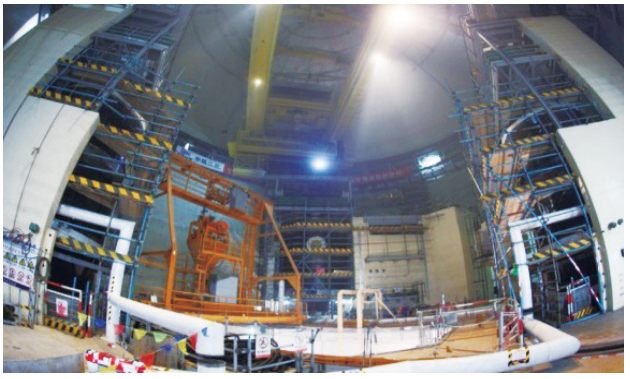
Fujian Fuqing NPP

For unit 1, the 1st batch of nuclear fuel assemblies was delivered on site. Containment pressure test and primary circuit hydro tests were completed. Project schedule was delayed due to the delayed delivery of DCS key equipment, the unit 1 first fuel loading was planned to begin in May 2014. For unit 2, main components like RPV, SG, pressurizer, and main pump were installed. For unit 3, main components were delivered on site and

installation was in process. Unit 4 was in phase of civil works.

Nuclear safety related approvals for Fuqing NPP in 2013 are shown Table 34, Inspection activities for Fuqing NPP in 2013 are shown in Table 35. One constructing event occurred in Fuqing NPP in 2013 (see Table 36).

Fuqing NPP Unit 1



Fuqing NPP Unit 2 Inside NI Building

Table 34. Nuclear Safety Related Approvals for Fuqing NPP in 2013

Document No.	Approval Date	Title
NNSA Notice[2013]37	04/02/13	Reply Letter of Accepting the "Quality Assurance Program (commissioning phase) (Rev.0) of Fujian Fuqing Unit 1 and Unit 2"
NNSA Notice[2013]49	05/10/13	Reply Letter of Approving and Issuing the Nuclear Material License of Fujiang Fuqing Nuclear Power Company
NNSA Notice[2013]101	09/29/13	Reply Letter of Accepting the "Fujian Fuqing Nuclear Power Company Unit 1 and Unit 2 Commissioning Program"
NNSA Notice[2013]127	10/31/13	Reply Letter of Approving the "Overall plan of Fujian Fuqing Nuclear Power Company Radiation Environment On-site Supervising Monitoring System (final for approval)"

Table 35. Inspection Activities for Fuqing NPP in 2013

Start Date	Item	Main Contents
04/10/13	Non-routine nuclear safety inspection of primary pump on-site assembling	Quality assurance system operation, organization and quality control during the primary pump on-site assembling
05/16/13	First regular dialogue meeting of Fujian Fuqing NPP	Primary pump on-site assembly personnel training, welder qualification, NCR management and work zone cleaning, unit 1 inspection items and methods during commissioning, pre-service inspection progress of unit 1, implementation of improvement requirements of nuclear material license application inspection by NNSA
06/08/13	Checking on the 1st batch fuel assemblies delivered on site of Fuqing NPP	Preparation of nuclear material acceptance on site, effectiveness of the quality assurance system

continued

Start Date	Item	Main Contents
07/22/13	Comprehensive annual routine inspection of construction and installation of Fuqing NPP	Implementation of Quality Assurance Program, quality control for NI components installation, quality control on NI civil construction
08/21/13	Self-inspection on safe operation of Fuqing NPP	Implementation of quality assurance system, safety requirements in each inspection, post-Fukushima improvement, engineering and operation management, emergency preparation and environment monitoring, industrial security, physical protection, and fire-fighting status
09/02/13	Random inspection on safe operation of Fuqing NPP	Implementation of quality assurance system, safety requirements in each inspection, post-Fukushima improvement, engineering and operation management, emergency preparation and environment monitoring, industrial security, physical protection, and fire-fighting status
09/22/13	Safety inspection before primary circuit hydro test of Fuqing NPP unit 1	Implementation of quality assurance system in commissioning phase, implementation of quality assurance program in construction phase of Fuqing unit 1, primary circuit hydro test preparation, safety requirements in each inspection
09/22/13	Inspection before main piping welding of Fuqing NPP Unit 3	Quality control on construction and installation, main piping welding preparation
12/03/13	Inspection of hot test stage 1 of Fuqing NPP unit 1	Project overall management, zone division and personnel management, other issues concerning hot function tests

Table 36. Constructing Event of Fuqing NPP in 2013

Event Date	Unit	Title
09/19/13	Fuqing NPP unit 1	Bolt tap hole damage of man-hole bed of pressurizer

Yangjiang NPP

Yangjiang NPP, unit 1 finished the first fuel loading on October 29, 2013, and connected to the grid on December 30, 2013. Unit 2 started the cold function tests on December 30. Unit 3 entered into installation peak period. The NI building internal structure of unit 4 had been constructed to 8m. Unit 5 started pouring first concrete on September 18, and finished the raft foundation maintenance. Unit 6 started pouring first concrete on December 23.

Nuclear safety related approvals for Yangjiang NPP in 2013 are shown in Table 37, Inspection activities of Yangjiang NPP in 2013 are shown in Table 38. Two constructing events and one operating event occurred in Yangjiang NPP in 2013 (see Table 39 and Table 40).

An Overall View of Yangjiang NPP Unit 1 to 6

Inspection before the First Fuel Loading of Yangjiang NPP Unit 1

Table 37. Nuclear Safety Related Approvals for Yangjiang NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]161	09/16/13	Notification of Issuing Construction Permit of Yangjiang NPP Unit 5 and Unit 6
NNSA[2013]187	10/25/13	Notification of Issuing the “Instrument of ratification for the first fuel loading” of Yangjiang NPP Unit 1
NNSA[2013]203	12/03/13	Notification of Releasing the Control Point of the First Criticality of Yangjiang NPP Unit 1
NNSA[2013]208	12/19/13	Notification of Releasing the FCD Control Point of Yangjiang NPP Unit 6
NNSA Notice[2013]17	02/07/13	Reply Letter of Accepting the “Commissioning Program of Yangjiang NPP Unit 1 and Unit 2 (Rev. B)”
NNSA Notice[2013]18	02/07/13	Reply Letter of Accepting the “Quality Assurance Program in Commissioning Phase of Yangjiang NPP Unit 1 and Unit 2 (Rev.12)”
NNSA Notice[2013]26	03/12/13	Official Letter of Issuing the “Nuclear Safety Inspection Report on NI Foundation Pit Evacuation of Yangjiang NPP Unit 5 and Unit 6”
NNSA Notice[2013]53	05/24/13	Official Letter of Inquiring the Comments on Construction Permit of Guangdong Yangjiang NPP Unit 5 and Unit 6
NNSA Notice[2013]72	07/23/13	Reply Letter of Accepting “Quality Assurance Program During Design and Construction Phase (Rev. 11)”
NNSA Notice[2013]73	07/23/13	Letter of Issuing “Nuclear Safety Inspect Report on on-site Preparation before FCD of Yangjiang NPP Unit 5”
NNSA Notice[2013]102	09/30/13	Letter of Issuing “Comprehensive Inspection Report before the First Fuel Loading of Yangjiang NPP Unit 1”
NNSA Notice[2013]136	11/08/13	Reply to the Approval of “Commissioning Program of Yangjiang NPP, Unit 1 and Unit 2 (Rev. C)”
MEP App[2013]219	09/16/13	Reply of Approving Environment Impact Assessment Report of Yangjiang NPP, Unit 5 and Unit 6 (construction phase)
MEP App[2013]262	10/22/13	Reply of Approving Environment Impact Assessment Report of Yangjiang NPP Unit 1 and 2 (operation phase)

Table 38. Inspection Activities for Yangjiang NPP in 2013

Start Date	Item	Main Contents
01/08/13	Nuclear safety inspection before the 1st welding for main piping of Yangjiang NPP unit 2	Implementation of quality assurance program during design and construction phase, on-site main components installation quality control, the 1st welding preparation of unit 2 main piping, implementation of construction permit and nuclear safety management requirements in each inspection, WPS and adaptive analysis, experience feedback of main piping automatic welding
02/04/13	Safety inspection on commissioning management of Yangjiang NPP unit 1 before primary system cold tests	Implementation of quality assurance program and commissioning program, preparation before cold tests program of primary system, implementation of construction permit and nuclear safety management requirements in each inspection, system commissioning and delivery related to cold tests, tests completion before cold tests and result analysis, remaining problems, NCRs and safety related abnormal conditions during commissioning
02/26/13	Nuclear safety inspection to NI foundation pit after evacuation of Yangjiang NPP unit 5 and Unit 6	On-site inspection on NI pit, procedures of NI pit evacuation and civil construction records, detailed survey result check of the evacuation, NCRs during civil construction and solutions, quality assurance of the project and implementation, preparation for subsequent civil construction
05/14/13	On-site non-routine inspection of nuclear safety equipment and NCR management of Yangjiang NPP	Problems and solutions of SEC/RIS/EAS systems, problems and solutions of RPV, problems and solutions related to the primary pump, problems and solutions related to fuel storage and refueling crane, other issues related to delivered safety equipment (including suppliers of Shengu, Kiamusze, Remeng, Dagao, and Samxon delivering equipment, etc.), the impact to unit 1 hot function tests of above problems
06/24/13	Nuclear safety inspection of on-site preparation before the FCD of Yangjiang NPP unit 5	Implementation of the quality assurance program during design and construction phase, on-site quality control on safety related SSCs installation. Solutions to remaining problems of unit 5 NI foundation, preparation for FCD of unit 5 NI foundation
08/28/13	Comprehensive nuclear inspection of Yangjiang NPP	Implementation of quality assurance system, nuclear safety management requirements in each inspection, post-Fukushima improvements, engineering management, operation management; emergency preparation and environment monitoring; other aspects to be concerned by the regional office
09/16/13	Comprehensive safety inspection before the 1st fuel loading of Yangjiang NPP unit 1	Quality assurance, SSCs, system commissioning, operation preparation, radiation protection, emergency preparation, physical protection and fuel storage, environment protection facilities, license conditions, application documents and review comments, implementation of nuclear safety management requirements in each inspection, other items such as post-Fukushima improvements
11/25/13	Nuclear safety inspection before the 1st Criticality of Yangjiang NPP unit 1	Solutions of remaining problems after the comprehensive safety inspection of Yangjiang NPP unit 1 before the 1st fuel loading, SSCs and activities during the design, fabrication, civil works, installation, and tests from 1st fuel loading to criticality
12/04/13	Nuclear safety inspection before the cold function tests of Yangjiang NPP unit 2	Preparation before the main system cold function tests, implementation plan of the main system cold function tests, construction license conditions and nuclear safety management requirements in each inspection, system commissioning and delivery related to the cold tests, completion result evaluation of the tests, remaining problems, NCRs, and solutions to abnormal events before the cold tests

continued

Start Date	Item	Main Contents
12/08/13	Nuclear safety inspection of on-site preparation before FCD to Yangjiang NPP unit 6	Performance of the quality assurance, on-site quality control on installation and construction of safety important items , solutions to the remaining problems of NI foundation of unit 6, preparation before FCD to unit 6
12/18/13	Control point inspection before main piping 1st welding of Yangjiang NPP unit 3	Implementation of quality assurance program during design and construction phase, quality control on installation and construction of main components of unit 3, 1st welding preparation of main system piping of unit 3, implementation of regulatory requirements for unit 3, event solution feedback of main components supports installation of unit 1 and unit 2
12/24/13	Nuclear safety inspection before the 1st grid connection of Yangjiang NPP, unit 1	Completion of commissioning tests, operation tests, I & C tests before the 1st grid connection, execution result of criticality, zero-power, and increasing power physical tests, solutions to NCR, UES, DCR, TCA related to nuclear safety, compliance with technical specification after criticality, preparation for the grid connection, track and solutions to remaining safety related problems during the construction phase

Table 39. Constructing Events of Yangjiang NPP in 2013

Event Date	Unit	Title
06/28/13	Yangjiang NPP unit 1	#32 bolt unable to unscrew automatically, many damage points on the bolt found after drilled out
07/26/13	Yangjiang NPP unit 1 and unit 2	Support to main pump of Yangjiang NPP, unit 1 and unit 2, and the SG support different from the design

Table 40. Operating Event of Yangjiang NPP in 2013

Event Date	Unit	Title	Cause	INES Classification
11/03/13	Yangjiang NPP unit 1	ASG steam-driven auxiliary feed-water pump of ASG001ZE failure due to hand-hole not shut-down	Human error	0

Qinshan NPP Expansion Project (Fangjiashan NPP)

Fangjiashan NPP unit 1 had containment pressure test on May 24, cold tests on October 15, and started hot tests on Nov 20. Unit 2 is under the process of a primary circuit welding.

Nuclear safety related approvals for Fangjiashan NPP in 2013 are shown in Table 41, Inspection activities for Fangjiashan Nuclear Project in 2013 are shown in Table 42. Three constructing events occurred in Fangjiashan NPP in 2013 (see Table 43).

Vice Administrator of NNSA, Director General of Nuclear and Radiation Safety Regulation Department II of MEP Wang Zhongtang Inspected on Fangjiashan NPP

Containment Pressure Test of Unit 1 Finished

First Fuel of Unit 1 Delivered into Fangjiashan NPP

Table 41. Nuclear Safety Related Approvals for Fangjiashan NPP in 2013

Document No.	Approval Date	Title
NNSA Notice[2013]54	05/27/13	Reply Letter of Optimizing the Plan of Primary Circuit Main Components Pre-service Inspection of Fangjiashan NPP
NNSA Notice[2013]103	10/10/13	Reply Letter of Approving "Commissioning Program of Qinshan NPP (Fangjiashan Nuclear Project) Expansion (Rev. B)"
NNSA Notice[2013]104	10/10/13	Reply Letter of Approving "Commissioning Phase Quality Assurance Program of Qinshan NPP (Fangjiashan Nuclear Project) Expansion"

Table 42. Inspection Activities for Fangjiashan Nuclear Project in 2013

Start Date	Item	Main Contents
03/14/13	Main piping welding control point inspection on Fangjiashan NPP unit 2	Preparation of main piping welding of unit 2, and solutions to the event of broken anchor bolt of the pressurizer lower support of unit 2
05/08/13	Routine inspection of commissioning preparation of Fangjiashan NPP unit 1	Implementation of commissioning quality assurance program, cold tests preparation, concerned items in each inspection
08/27/13	Random inspection of safety production for Fangjiashan Nuclear Program	Organization and implementation of quality assurance program of Fangjiashan Nuclear Project, project progress and engineering quality, implementation and reform of safety requirements in each routine and special inspection, post-Fukushima improvements
09/25/13	Control point inspection of cold function tests of unit 1	Implementation of commissioning quality assurance program, cold tests preparation of unit 1

Table 43. Constructing Events of Fangjiashan Nuclear Project in 2013

Event Date	Unit	Title
01/29/13	Fangjiashan NPP unit 2	#23 anchor bolt of pressurizer lower vertical support skirt broken
05/15/13	Fangjiashan NPP unit 1	Non-conformity found in some CRDM nozzles by NDT after the base metal hydrostatic test
05/15/13	Fangjiashan NPP unit 2	Out of tolerance when welding the fit-up of the main loop and the RPV

Sanmen NPP

In 2013, the construction and installation quality of Sanman NPP unit 1 and unit 2 were under control. The steel containment top head of unit 1 was assembled, main components were put in its position or installed in the Nuclear Island (NI), and main piping has been assembled. For unit 2, the 4th ring of steel containment was installed.

Nuclear safety related approvals for Sanmen NPP in 2013 are shown in Table 44, Inspection activities for Sanmen NPP in 2013 are shown in Table 45. Two constructing events occurred in Sanmen NPP in 2013 (see Table 46).

An Overall View of Sanmen NPP

Hoisting in Position for the Containment Top Head of Unit 1

Table 44. Nuclear Safety Related Approvals for Sanmen NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]36	01/28/13	Notification of Releasing Control Point of Steel Containment Top Head Installation of Sanmen NPP Unit 1
NNSA Notice[2013]69	07/16/13	Reply to the Official Letter of Approving the Pressurizer Lower Vertical Support Repair of Sanmen NPP Unit 1 and Unit 2 and Haiyang NPP Unit 1
MEP App[2013]31	09/16/13	Notification of Accepting the Environment Impact Assessment Report (operation phase) for Sanmen NPP Phase I

Table 45. Inspection Activities for Sanmen NPP in 2013

Start Date	Item	Main Contents
01/10/13	Routine inspection of preparations before polar crane installation of Sanmen NPP unit 1	Polar crane assembling of Sanmen NPP, unit 1, test preparation and components protection, etc.
01/15/13	Routine inspection of preparations before integral head of RPV installation of Sanmen NPP unit 1	Assembling, transportation, and preparations for the installation of the RPV integral head of Sanmen NPP unit 1 and components protection

continued

Start Date	Item	Main Contents
01/24/13	Routine inspection of preparations before the CV top head installation of Sanmen NPP unit 1	Preparations before the CV top head assembling and installation of Sanmen NPP unit 1
05/07/13	Routine inspection to welding of the steel containment top head and the fourth ring of Sanmen NPP unit 1	Welding management of the containment top head and the fourth ring girth welding of Sanmen NPP, unit 1, personnel qualification and components protection, etc.
05/07/13	The first Routine safety inspection of the construction quality of Sanmen NPP in 2013	NI construction and installation of Sanmen NPP, shield building construction, built-in parts construction of NI, etc.
08/15/13	Nuclear safety comprehensive inspection of Sanmen NPP	Effectiveness of quality assurance program of Sanmen NPP, implementation of nuclear safety management requirements posted during each inspection, implementation of post-Fukushima improvements, engineering management, industrial safety, emergency preparation and environment monitoring, fire-fighting, and radioactive source management, etc.
11/14/13	Non-routine inspection before steel dome installation of shield building of Sanmen NPP unit 1	The preparation before steel dome assembling and installation of shield building of Sanmen NPP unit 1

Table 46. Constructing Events of Sanmen NPP in 2013

Event Date	Unit	Title
05/14/13	Sanmen NPP unit 1	Impeller blade loosen during AP1000 SN9 primary pump function tests before delivery
12/25/13	Sanmen NPP unit 1	Thrust collar pitting of AP1000 primary pump

Haiyang NPP

In 2013, the construction and installation quality of unit 1 and unit 2 of Haiyang NPP were under control. For unit 1, the installation of the top head assembling of the steel containment was completed. Main components were already in position or moved in nuclear island, the primary circuit pipe was assembled. For unit 2, the steel containment barrel's 4th ring was installed.

Nuclear safety related approvals for Haiyang NPP in 2013 are shown in Table 47, Inspection activities for Haiyang NPP in 2013 are shown in Table 48. One constructing event occurred in total (see Table 49).

Haiyang NPP Unit 1

The Steel Containment Dome of Shield Building Installed in Place of Haiyang NPP Unit 1

Table 47. Nuclear Safety Related Approvals for Haiyang NPP in 2013

Document No.	Approval Date	Title
NNSA[2013]88	03/27/13	Notification of Releasing the Installation Control Point of Containment Dome of Haiyang NPP Unit 1
NNSA[2013]69	07/16/13	Reply Letter to Agree the Repair Work of Vertical Support Under Pressurizer of Sanmen NPP Unit 1 and Unit 2 and Haiyang NPP Unit 1
NNSA[2013]100	09/27/13	Reply Letter to Endorse the Quality Assurance Program (design and construction stage) (Rev. B) of Haiyang NPP Unit 1 and Unit 2
NNSA[2013]105	10/11/13	Notice of Approving to Change the Vertical Support Design Under Pressurizer of Haiyang NPP Unit 2
MEP Notice[2013]10	10/28/13	Notification of Accepting Environmental Impact Assessment Report of Haiyang NPP Unit 1 and 2 (operation stage)

Table 48. Inspection Activities for Haiyang NPP in 2013

Start Date	Item	Main Contents
01/07/13	Routine inspection on the primary piping welding preparation status of Haiyang NPP unit 1	Staff qualification, welding procedure qualification, preparation of tools and field, and finished product protection of Haiyang NPP unit 1
02/26/13	Routine inspection on the preparation status before steam generator installation of Haiyang NPP unit 1	steam generator and its support, staff qualification, preparation of tools and field, and finished product protection of Haiyang NPP unit 1
03/06/13	Routine inspection on the preparation status before integrated upper head installation of reactor vessel of Haiyang NPP unit 1	Assembling, transportation, installation preparation, finished product protection of integrated upper head of reactor vessel
03/12/13	Routine inspection on the preparation status before polar crane installation of Haiyang NPP unit 1	Status of polar crane assembling, test preparation , finished product protection, etc.

continued

Start Date	Item	Main Contents
03/18/13	Inspection on the control point before installation of the steel containment top head assembling of Haiyang NPP unit 1	General progress, compliance with construction license conditions and nuclear safety management requirements of previous inspections, implementation of the quality assurance program. Quality control of important items and activities, assembling, transportation, installation preparation status of top head the steel containment. Treatment status of major non-conformity
05/13/13	First routine inspection on status of construction and installation of Haiyang NPP in 2013	Construction and installation of nuclear island, construction situation of shield building and embedded part of NI
05/13/13	Routine inspection on construction situation of top head assembling of the steel containment and 4th ring girth	Construction management of top head assembling of the steel containment and 4th ring girth, staff qualification and finished product protection
08/12/13	Nuclear safety comprehensive inspection on Haiyang NPP	Effectiveness of the quality assurance program, implementation of nuclear safety management requirements in previous inspections and improvement actions after Fukushima accident, management status of engineering, industry safety, emergency preparation and environmental monitoring, fire protection, management of radioactive sources, etc.
12/09/13	Routine inspection on preparation status before shield building dome installation of Haiyang NPP unit 1	Preparation status of shield building steel dome assembling and installation of Haiyang NPP unit 1

Table 49. Constructing Event of Haiyang NPP in 2013

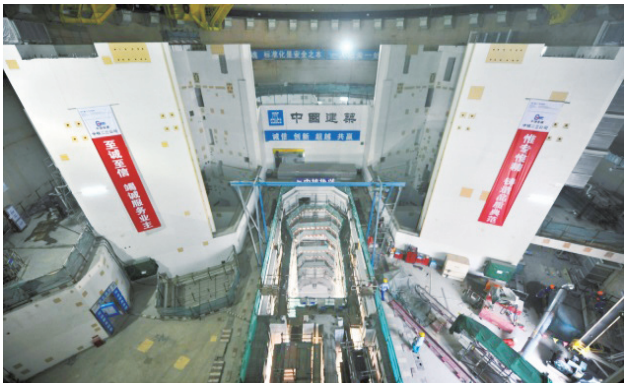
Event Date	Unit	Title
04/08/13	Haiyang NPP unit 1	Pit defect found on IHP CRDM pneumatic shell surface of reactor pressure vessel of Haiyang NPP unit 1

Taishan NPP

For Taishan NPP unit 1, the construction of nuclear island structure was finished. Except for hydraulic components of primary pump and control rod driven mechanism, the installation of primary equipment and part of nuclear auxiliary system and equipment were finished. For Taishan NPP unit 2, the construction of containment and nuclear island containment building reached a peak, and the manufacture of primary equipment was basically finished.

Nuclear safety related approvals for Taishan NPP in 2013 are shown in Table 50, Inspection activities for Taishan NPP in 2013 are shown in Table 51. One constructing event occurred in total (see Table 52).

Taishan NPP Unit 1



Construction of Inner Structure of Taishan NPP Unit 2

Table 50. Nuclear Safety Related Approvals for Taishan NPP in 2013

Document No.	Approval Date	Title
NNSA Notice[2013]142	11/28/13	Official Letter of the "Non-routine Nuclear Safety Inspection Report on Quality Assurance of Construction and Equipment Management of Taishan NPP"
NNSA[2013]210	12/20/13	Notification of Issuing the Approval of Applying the New Fuel Transportation Container, FCC4-V1 of Taishan Nuclear Power Co., Ltd.

Table 51. Inspection Activities for Taishan NPP in 2013

Start Date	Item	Main Contents
01/16/13	Special inspection on management of civil engineering laboratory of Taishan NPP	Purchase, check and acceptance of raw concrete materials, test document management of unit 1 and unit 2
02/25/13	Special inspection on non-conformance management	Sampling inspection on non-conformity on site, detailed understanding on the reasons and implementation of rectification measures
03/14/13	Special inspection on document management of execution tracking and recording file (ETF)	ETF document in the process of pre-stress test, situation of on-site ETF signature and management of ETF reference room
04/08/13	Special inspection on frictional force test of Gamma steel cable	Situation of steel strand in frictional force test, inspection on latest provided program, on-site witness on implementation of the test
04/25/13	Special inspection on pre-stress construction of unit 2	Full scale test of pre-stress, experience feedback, purchase and acceptance check of raw materials, and management of tools and instruments
05/21/13	Special inspection on installation of electric instruments system	Organization structure, on-site training of personnel, preparation of construction, entry and maintenance of equipment, treatment of non-conformance and experience feedback, etc.
07/22/13	Special inspection on maintenance of the installed equipment of unit 1	Corrosion status of carbon steel part of the installed pressure vessel, steam generator and pressurizer of unit 1, and inspection on the on-site maintenance status and the following treatments

continued

Start Date	Item	Main Contents
08/22/13	Special inspection on holders of special technology license of nuclear safety equipment	Sample inspection on qualification and authorization status of civil nuclear safety equipment welding operator and NDT personnel
08/26/13	Nuclear safety comprehensive inspection on Taishan NPP	Quality assurance system, implementation of the all previous requirements of inspection and improvement actions after Fukushima accident, treatment of constructing events, implementation of rectification measures in self-inspection report
10/09/13	Special inspection on vertical pre-stress frictional force of unit 2	On-site implementation of test program and experience feedback status between unit 1 and unit 2
10/10/13	Non-routine inspection on primary equipment of Taishan NPP unit 1	Corrosion problem of primary equipment, treatment of non-conformance, and cleanliness control of primary equipment
10/30/13	Routine inspection on auxiliary system of primary circuit and pipe construction and installation	Pipe hydrostatic test and equipment qualification of NPP, purchase and check of equipment and welding materials, welding procedure qualification, management of Non-destructive testing, personnel qualification and operating status of quality assurance
11/11/13	Non-routine on quality assurance and equipment management of Taishan NPP	Quality assurance of construction, design and qualification of system and equipment, procurement management of primary equipment and auxiliary equipment of nuclear island, non-conforming control, installation of system and equipment and related experience feedback, and other special subjects related to nuclear safety
11/18/13	Special inspection on installation of primary system of unit 1	Progress of surge pipeline welding of unit 1, concern the change of construction sequence and detection method during construction progress, concern cleanliness status of construction site
11/25/13	Special inspection on temporary water injection of RC pool	Water quality test, airbag material for blocking, and risk control of cleanliness inside RPV and implementation of program
12/25/13	Special inspection on medium-pressure accumulator discharge test of unit 1	Confirmations of medium-pressure accumulator discharge tests meet the requirements of safety analysis report and quality assurance

Table 52. Constructing Event of Taishan NPP in 2013

Event Date	Unit	Title
07/30/13	Taishan NPP unit 1 and unit 2	Assembly of vertical supports of steam generator and primary pump non-conformity with their drawings

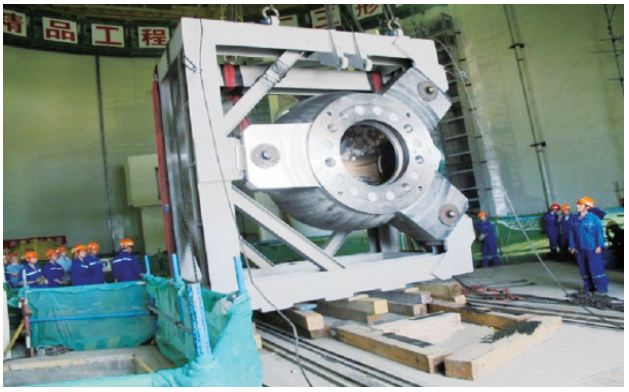
Hainan Changjiang NPP

For Hainan Changjiang NPP unit 1, Primary pipe welding was started on August 26. The installation of primary equipment was at peak.

For unit 2, the installation of equipment in nuclear island building was in progress after the dome was installed. The polar crane was put

into use on April 24.

Nuclear safety related approval for Changjiang NPP in 2013 is shown in Table 53, Inspection activities for Changjiang NPP in 2013 are shown in Table 54. Two constructing events occurred in total (see Table 55).



Installation of Primary Pump Shell of Changjiang NPP Unit 1

Primary Pipe Welding of Changjiang NPP Unit 1

Table 53. Nuclear Safety Related Approval for Changjiang NPP in 2013

Document No.	Approval Date	Title
NNSA Notice[2013]16	01/28/13	Reply Letter of Endorsing the "Quality Assurance Program at Design and Construction Stage of Hainan Changjiang NPP Unit 1 and Unit 2" (Rev. 4)

Table 54. Inspection Activities for Changjiang NPP in 2013

Start Date	Item	Main Contents
06/25/13	Routine nuclear safety inspection on effectiveness of quality assurance program	Organization structure and staffing at construction stage of Changjiang NPP, document control, procurement control, item control, technological process control, non-conformity item control, inspection and test control, record, check and so on
08/12/13	Inspection on installation preparation of primary system and the control point of primary pipe welding of Changjiang NPP	Organization structure related to primary system installation, personnel qualification management, preparation of primary system welding document and non-conformance item control, inspection of incoming merchandise, maintenance and cleanliness control of on-site primary equipment, components and parts, management of welding materials, tools and instruments
08/22/13	Nuclear safety comprehensive inspection on Changjiang NPP	Operation status of the quality assurance program, implementation of nuclear safety management requirements since 2013, implementation of improvement actions after Fukushima Accident, constructing events and major non-conformance items, three proofings, emergency, security, communication and public sentiment response, implementation of rectification measures in self-inspection report
11/12/13	Routine inspection on field management of Changjiang NPP	Facility management of nuclear island, GAGB gallery, PX pump building and on-site storage area, finished product protection, cleanliness control, storage management of Changjiang NPP unit 1 and unit 2

Table 55. Constructing Events of Changjiang NPP in 2013

Event Date	Unit	Title
07/30/13	Changjiang NPP unit 1 and unit 2	Some primary equipment vertical support inconformity with drawing
08/27/13	Changjiang NPP unit 1	Welding direction opposite to welding technology requirement when welding the first welded junction 1U1 of primary pipe

Guangxi Fangchenggang NPP

For Guangxi Fangchenggang NPP unit 1, Primary pipe welding was started on September 23. The installation of primary equipment was at peak. For unit 2, the installation of equipment in NI building was in progress after the dome was installed. The polar crane was put into use on May 30.

Nuclear safety related approval for Fangchenggang NPP in 2013 is shown in Table 56, Inspection activities for Fangchenggang NPP in 2013 are shown in Table 57. One constructing event occurred in total (see Table 58).

Installation of Generator Stator of Fangchenggang NPP Unit 1

Routine Inspection Activity of Resident Inspectors from South China Regional Office of NNSA

Table 56. Nuclear Safety Related Approval for Fangchenggang NPP in 2013

Document No.	Approval Date	Title
NNSA Notice[2013]15	01/28/13	Reply Letter of Endorsing "Quality Assurance Progress at Design and Construction Stage of Guangxi Fangchenggang NPP Unit 1 and 2" (Rev. 3)

Table 57. Inspection Activities for Fangchenggang NPP in 2013

Start Date	Item	Main Contents
06/27/13	Nuclear safety inspection on the control point before the installation of first primary equipment of unit 1	Inspection on adjustment and operation of organization structure, engineering management and treatment of non-conformity items, come up with 7 management requirements

continued

Start Date	Item	Main Contents
08/07/13	Nuclear safety inspection on the preparation status of EM2 construction and control point of the 1st primary piping welding line	Preparation of the 1st welding line construction, preparation of EM2 construction, etc., come up with 11 management requirements
08/19/13	Nuclear safety comprehensive inspection on Fangchenggang NPP	Come up with 5 management requirements related to three proofings, emergency and non-conformance items, come up with management process and method for non-conformity item improvement of installing company, come up with requirements about treatment of part safety significant items

Table 58. Constructing Event of Fangchenggang NPP in 2013

Event Date	Unit	Title
08/05/13	Fangchenggang NPP unit 1	Primary equipment support non-conformity with design drawing, components installed backward

Tianwan NPP Phase Ⅱ

For Tianwan NPP unit 3 and 4, the construction quality was under control in 2013. The FCD of unit 4 was on September 27, 2013.

Nuclear safety related approval for Tianwan NPP Phase Ⅱ in 2013 is shown in Table 59, Inspection activities for Tianwan NPP Phase Ⅱ in 2013 are shown in Table 60.

An Overall View of Tianwan NPP Unit 3 and Unit 4

Table 59. Nuclear Safety Related Approval for Tianwan NPP Phase Ⅱ in 2013

Document No.	Approval Date	Title
NNSA Notice[2013]95	09/24/13	Official Letter of Issuing "Nuclear Safety Inspection Report of Preparation Status Before the FCD of Tianwan NPP Unit 4"

Table 60. Inspection Activities for Tianwan NPP Phase Ⅱ in 2013

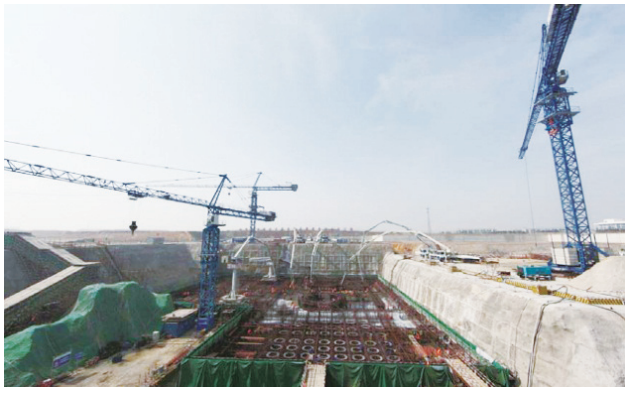
Start Date	Item	Main Contents
04/27/13	Routine nuclear safety inspection on implementation status of quality assurance program of Tianwan NPP unit 3 and 4	Implementation status of quality assurance program at construction stage of Tianwan NPP unit 3 and unit 4

continued

Start Date	Item	Main Contents
07/30/13	Non-routine nuclear comprehensive inspection on Tianwan NPP	Industry safety, fire protection, construction quality and non-conformance item treatment of Tianwan NPP unit 3 and unit 4
07/15/13	Special inspection on implementation status of working procedures of Tianwan NPP unit 3 and unit 4	Construction procedures of major contractors, implementation status of checking procedures
09/16/13	Nuclear safety inspection on on-site preparation status before FCD of Tianwan NPP unit 4	Construction organization of nuclear island, construction plan, construction program, on-site construction preparation status before FCD, implementation status of quality assurance program at construction stage
12/24/13	Non-routine inspection on construction quality control status and management of non-conformance items of Tianwan NPP unit 3 and unit 4	Construction status, the normalization of non-conformance item management and implementation status of nuclear safety related requirements of Tianwan NPP unit 3 and unit 4

Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project

In 2013, the construction of Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project was progressing smoothly. Each node was completed on schedule. The concrete pouring of nuclear island baseplate was completed on March 17. The concrete pouring of NI −11m floor was completed on August 8, and −5m floor construction was completed on November 21. On-site installation work mainly includes installation of cabin embedded parts and spent fuel building silo embedded parts, the prefabrication and installation of steam generator cabin shielding cooling water system model and reactor cabin shielding cooling system model were partly completed. The design drawings met the demands of recent construction progress, verification test proceed as planned, the research, development and fabrication progress of major equipment met the schedule basically.



Concrete Pouring of NI Baseplate 2m Floor

Installation of Reactor Cabin Shielding Cooling Water System Module A

Nuclear safety related Approvals of Huaneng

Shandong Shidao Bay NPP HTR-PM Demonstration Project in 2013 are shown in Table 61, Inspection activities for Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project in 2013 are shown in Table 62.

Table 61. Nuclear Safety Related Approvals for Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project in 2013

Document No.	Approval Date	Title
NNSA[2013]141	07/23/13	Notification of Approving the Modification of Reactivity Control Method of Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project
NNSA Notice[2013]44	04/24/13	Reply Letter of Endorsing "Quality Assurance Program at Design and Construction Stage of Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project" (Rev. C)
NNSA Notice[2013]139	11/22/13	Reply to High-Temperature Material Durability Test Implemented Simultaneously with Product Manufacture of HTR-PM Demonstration Project
NNSA Notice[2013]145	11/28/13	Official Letter of Endorsing Pressure Vessel Support Point Detailed Design and Concentrated Load Calculation Report (of lower support) of Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project

Table 62. Inspection Activities for Huaneng Shandong Shidao Bay NPP HTR-PM Demonstration Project in 2013

Start Date	Item	Main Contents
01/19/13	Non-routine nuclear safety inspection on FCD maintenance status	Inspection on FCD maintenance status and quality management of demonstration project
04/15/13	Nuclear safety inspection on construction management and implementation status of quality assurance program	Inspection on construction management and implementation status of quality assurance program of demonstration project

Planned Nuclear Power Plants

Sanmen NPP Unit 3 and Unit 4

In 2013, MEP(NNSA) accepted the site safety analysis report and environmental impact assessment report (at siting stage) of Sanmen NPP unit 3 and unit 4.

Haiyang NPP Unit 3 and Unit 4

In 2013, MEP (NNSA) accepted the site safety analysis report and environmental impact assessment report (at siting stage) of Haiyang NPP unit 3 and unit 4.

Xudapu NPP Unit 1 and Unit 2

In 2013, MEP(NNSA) restored the review of site safety analysis report and environmental impact assessment report (at siting stage) of Xudapu NPP unit 1 and unit 2.

Lufeng NPP Unit 1 and Unit 2

In 2013, MEP(NNSA) accepted the site safety analysis report and environmental impact assessment report (at siting stage) of Lufeng NPP unit 3 and unit 4.

Large-scale Advanced PWR Major Special Project CAP1400 Demonstration Project

In 2013, MEP(NNSA) accepted the site safety analysis report and environmental impact assessment report (at siting stage) of Large-scale advanced PWR major special project CAP1400 demonstration project.

4 Safety Regulation on Research Reactors

In 2013, there were totally 19 research reactors in service, in which 9 were in operation, 4 were long-term shutdown, 6 were not in operation(see Table 63). 12 operating events were reported in 2013, all of which happened in Nuclear Power Institute of China High flux engineering test reactor. Most of them are non-planned shutdown caused by off-site grid voltage fluctuation or transient loss of voltage(see Table 64). Moreover, 1 external event was reported by operating organization due to Ya'an Lushan earthquake.

The View of CEFR

Table 63. Operating Status of Research Reactors in 2013

Facility Name	Design Power	Operating Organization	Operating Status	Integral Power
101 heavy water reactor (101 HWR)	10MW	China Institute of Atomic Energy (CIAE)	Permanently Closed	—
China experimental fast neutron reactor (CEFR)	65MW	CIAE	Not in operation	—
China advanced research reactor (CARR)	60MW	CIAE	60h	31.44MW • d
49-2 swimming pool reactor (49-2 SPR)	3.5MW	CIAE	1,504.58h	219.47MW • d
Miniature neutron source reactor (MNSR)	27kW	CIAE	32 times /233.25h	3,106.35kW • h
Miniature reactor zero power facility (CFMNSR)	—	CIAE	Not in operation	—
Zirconium hydride solid critical facility (SSZR)	—	CIAE	Long-term shutdown	—
DF-VI fast neutron criticality facility(DF-VI CFFR)	—	CIAE	Not in operation	—

continued

Facility Name	Design Power	Operating Organization	Operating Status	Integral Power
Pilot plant nuclear criticality safety experiment facility (UCF)	—	CIAE	Not in operation	—
Shielding experiment reactor (SER)	1MW	Institute of Nuclear and New Energy Technology of Tsinghua University (INET/TU)	Long-term shutdown	—
5MW experimental low temperature nuclear heating reactor (5MW-NHR)	5MW	INET/TU	Experiment operation	Operating power was less than 1kW
10MW high temperature gas-cooled reactor (10MW-HTGR)	10MW	INET/TU	Not in operation	—
High flux engineering test reactor (HFETR)	125MW	Nuclear Power Institute of China (NPIC)	174.05d	12,226.64MW • d
High flux engineering test reactor experimental facility (HFETR)	—	NPIC	Long-term shutdown	—
China burst reactor (CRP)	1MW	NPIC	5 times	67.714MW • d
Minjiang test reactor (MJTR)	5MW	NPIC	72.85h	12.9 MW • d
18-5 Critical Facility	—	NPIC	84 times	—
Miniature neutron source reactor of Shenzhen University (MNSR)	30kW	Joint Institute of Applied Nuclear Technology, Shenzhen University (INTCA/SU)	Not in operation	—
In-hospital neutron irradiator (IHNI)	30kW	Beijing Capture Technology Co., Ltd (CNCT)	27 times/62.03h	892.2kW • h

Table 64. Operating Events of Research Reactors in 2013

Event Date	Facility Name	Title	Cause	Level
01/20/13	HFETR	Protective shutdown induced by transient voltage fluctuation of off-site power source section I	Equipment failure	0
01/20/13	HFETR	Reactor Shutdown manually in low speed	Equipment failure	0
02/26/13	HFETR	Short-period protective shutdown of reactor induced by reactivity excessive insertion caused by violation operation	Human factor	0
05/24/13	HFETR	Protective shutdown induced by transient voltage fluctuation of off-site power source section Ⅱ caused by thunder and lightning	Equipment failure	0
06/18/13	HFETR	Protective shutdown induced by transient voltage fluctuation of off-site power source section I caused by thunder and lightning	Equipment failure	0

continued

Event Date	Facility Name	Title	Cause	Level
06/19/13	HFETR	Protective shutdown induced by loss of power of off-site power source section II caused by thunder and lightning	Equipment failure	0
06/25/13	HFETR	Protective shutdown induced by transient voltage fluctuation of off-site power source section II	Equipment failure	0
07/15/13	HFETR	Protective shutdown induced by transient voltage fluctuation of off-site power source section I and II caused by thunder and lightning	Equipment failure	0
07/17/13	HFETR	Protective shutdown induced by transient voltage fluctuation of off-site power source section I caused by thunder and lightning	Equipment failure	0
09/26/13	HFETR	Protective shutdown induced by loss of off-site power caused by relay fault of low voltage section II	Equipment failure	0
11/05/13	HFETR	Protective shutdown induced by loss of power of high voltage section I caused by off-site power fault	Equipment failure	0
12/14/13	HFETR	Protective shutdown induced by transient voltage fluctuation of off-site power source section I	Equipment failure	0

In May 2013, operating license (exceeded design lifetime) renewal of SER was approved. In August, operating license of UCF was issued. In October 2013, adding high-temperature helium experimental loop to 10MW- HTGR of Tsinghua University was approved, CIAE was approved to carry out miniature reactor (low enriched uranium) zero power test on CFMNSR, reconstructing the radioactive waste treatment facilities in service of NPIC was approved. In November, power replacement plan of 5MW-NHR and 10MW-HTGR of Tsinghua University was approved, carrying out new criticality experiment on UCF was approved. Nuclear safety related approvals for research reactors in 2013 are shown in Table 65, and inspection activities for research reactors in 2013 are shown in Table 66.

Table 65. Nuclear Safety Related Approvals for Research Reactors in 2013

Document No.	Approval Date	Title
NNSA[2013]97	04/28/13	Notification of Approving of Resume Operation of HFETR
NNSA[2013]103	05/13/13	Notification of Approving to Operate License (exceeded design lifetime) Renewal of SER
NNSA[2013]155	08/28/13	Notification of Issuing Operating License of UCF
NNSA[2013]183	10/21/13	Notification of Approving to Add High-temperature Helium Experimental Loop to 10MW- HTGR of Tsinghua University
NNSA[2013]184	10/21/13	Notification of Approving CIAE to Carry out Miniature Reactor (low enriched uranium) Zero Power Test on CFMNSR
NNSA[2013]185	10/25/13	Notification of Approving to Reconstruct the Radioactive Waste Treatment Facilities in Service of NPIC

continued

Document No.	Approval Date	Title
NNSA[2013]200	11/28/13	Notification of Approving Power Replacement Plan of 5MW-NHR and 10MW-HTGR of Tsinghua University
NNSA[2013]201	11/28/13	Notification of Approving to Carry out Criticality Experiment on UCF
MEP Acc[2013]8	01/05/13	Notice of Environmental Acceptance Comments of Construction Project Completion of UCF of CIAE

Table 66. Inspection Activities for Research Reactors in 2013

Start Date	Item	Main Contents
11/04/13	Annual routine inspection on research reactors in service of NPIC	Management and implementation of the quality assurance program and relevant quality assurance documents, modification and change management of items important to safety of research reactors, management and assessment of operating events
11/12/13	Annual routine nuclear safety inspection on INET/TU	Management and implementation of the quality assurance program and relevant quality assurance documents, modification and change management of items important to safety of research reactors, preparing condition before startup of 5MW-NHR

5 Safety Regulation on Nuclear Fuel Cycle Facilities

In 2013, in-service facilities for producing, fabricating, storing, and reprocessing nuclear fuels (see Table 67) were maintained in safe operation, and the quality of under-construction facilities was effectively controlled. The nuclear fuel cycle facilities kept good safety records, while their environmental impacts were attenuated continually, and no unacceptable nuclear and radiation harm to the personnel, the public, or the environment ever happened.

In 2013, comments for 1 site assessment was replied to, 1 construction license and 2 operation licenses were issued, 10 environmental impact assessment reports/ forms for other projects and 7 nuclear safety technical reform certifications were replied to, and 6 environmental acceptance tests for construction projects were completed. The main accomplishments are: the construction license was issued for the Nuclear Fuel Component Fabrication Line of High Temperature Gas-cooled Reactor Nuclear Power Plant, the paradigm project of China Northern Nuclear Fuel Co., Ltd., CNNC; operation licenses were issued for the Centrifugation Project of Shaanxi Uranium Co., Ltd., CNNC Phase IV, and for Temporary Dry Storage Facilities for Spent Fuel of Qinshan NPP Phase III; the reply and evaluation of environmental impact assessment was completed for the Fuel Component

Vice Administrator of NNSA, Director General of Nuclear and Radiation Safety Regulation Department III of MEP Ye Min Inspected a Minefield in GansuProvince

Nuclear Fuel Component Fabrication Line

Fabrication Line of High Temperature Gas-cooled Reactor During the Construction Phase of China Northern Nuclear Fuel Co., Ltd., CNNC; environmental acceptance tests were completed for the 3th and 4th modules of the Temporary Dry Storage Facilities for Spent Fuel of Qinshan NPP Phase III; technical reform was approved for the TVS-2M Component Fabrication Line of Jianzhong Nuclear Fuel Co., Ltd., CNNC.

Nuclear safety related approvals for nuclear fuel cycle facilities in 2013 are shown in Table 68, Inspection activities for nuclear Fuel cycle facilities in 2013 are shown in Table 69.

Table 67. Major Facilities for Producing, Fabricating, Storing, and Reprocessing Civil Nuclear Fuel

No.	Facility Name	Operating Organization	Product Form	Current Status
1	Chemical Conversion Wet Fabrication Line	China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC	UO_2 powder	In operation
2	Chemical Conversion Dry Fabrication Line	China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC	UO_2 powder	In operation
3	Powder Metallurgical Fabrication Line	China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC	Gd_2O_3 and UO_2 sintered pellet	In operation
4	Nuclear Fuel Assembly Fabrication Line	China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC	PWR fuel assembly	In operation
5	IDR Process Research and Equipment Production Line	China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC	UO_2 powder	In trial operation
6	Extension and Technical Reform of Nuclear Fuel Elements Fabrication Line	China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC	PWR nuclear fuel assembly	Under construction
7	Baotou HWR Nuclear Fuel Fabrication Line	China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC	HWR nuclear fuel assembly	In operation
8	Baotou PWR Nuclear Fuel Fabrication Line	China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC	PWR nuclear fuel assembly	In operation
9	AP1000 Nuclear Fuel Elements Fabrication Line	China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC	AP1000 nuclear fuel assembly	Under construction
10	High Temperature Gas-cooled Reactor Fuel Elements Fabrication Line	China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC	High temperature gas-cooled reactor fuel assembly	Under construction
11	Shaanxi Uranium Centrifugation Separation Facility	Shaanxi Uranium Co., Ltd., CNNC	Low enrichment UF_6	In operation
12	Shaanxi Phase IV Centrifugation Project	Shaanxi Uranium Co., Ltd., CNNC	Low enrichment UF_6	In operation
13	North Region Centrifuge Extension Project	Shaanxi Uranium Co., Ltd., CNNC	Low enrichment UF_6	In trial operation
14	Lanzhou Uranium Centrifugation Separation Facility, Phase I	Lanzhou Uranium Co., Ltd., CNNC	Low enrichment UF_6	In operation

continued

No.	Facility Name	Operating Organization	Product Form	Current Status
15	Lanzhou Centrifuge Commercial Paradigm Project	Lanzhou Uranium Co., Ltd., CNNC	Low enrichment UF_6	In operation
16	Lanzhou Uranium Concentration Project, Phase III	Lanzhou Uranium Co., Ltd., CNNC	Low enrichment UF_6	In trial operation
17	Spent Fuel Reception and Storage Facility	The 404 Co., Ltd., CNNC	—	In operation
18	Spent Fuel Storage Pool Extension Project of Reprocessing Pilot Plant	The 404 Co., Ltd., CNNC	—	Under construction
19	Spent Fuel Reprocessing Pilot Plant	The 404 Co., Ltd., CNNC	—	In trial operation
20	Temporary Dry Storage Facility for Spent Fuel	Qinshan NPP Phase III	—	In operation

Table 68. Nuclear Safety Related Approvals for Nuclear Fuel Cycle Facilities in 2013

Document No.	Approval Date	Title
NNSA[2013]5	01/08/13	Reply to the Second Renovation Proposal after the Hot Test of the Reprocessing Pilot Plant of The 404 Co., Ltd., CNNC
NNSA[2013]6	01/08/13	Notification of the Construction License for Uranium Concentration Project Phase IV of Uranium Enrichment Co., Ltd., CNNC
NNSA[2013]29	01/17/13	Reply to the Reform of the Nitric Acid System of the HWR Nuclear Fuel Assembly of China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC
NNSA[2013]30	01/17/13	Reply to the Additional Fuel Pellet Tube-filling Machine of the Nuclear Fuel Component Assembling Line of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC
NNSA[2013]31	01/17/13	Reply to Replacing Part of the GFX200 Exhaust Gas System of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC
NNSA[2013]33	01/17/13	Reply to the Additional Sintering Furnace of the PWR Nuclear Fuel Fabrication Line of China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC
NNSA[2013]44	02/06/13	Notification of Construction License for Nuclear Fuel Component Fabrication Line of High Temperature Gas-cooled Reactor Nuclear Power Plant, the paradigm project of China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC
NNSA[2013]79	03/15/13	Reply to the SAR of the Technical Reform Project of the TVS-2M Fuel Assembly Fabrication Line of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC
NNSA[2013]80	03/15/13	Notification of Approving the Additional Item of the Safety Technical Reform Project of Lanzhou Uranium Co., Ltd., CNNC

continued

Document No.	Approval Date	Title
NNSA[2013]85	03/21/13	Notification to Agree with the Second Module Loading Fuel Trial Operation of the Temporary Dry Storage Facility for Spent Fuel, Qinshan NPP, Phase III
NNSA[2013]95	04/24/13	Reply to the Site Change of the 214 Air Feeder Room of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC
NNSA[2013]127	06/17/13	Reply to the Additional Fuel Pellet Tube-filling Machine of the PWR Nuclear Fuel Fabrication Line of China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC
NNSA[2013]135	07/17/13	Reply to the Third Renovation Proposal after the Hot Test of the Reprocessing Pilot Plant of The 404 Co., Ltd., CNNC
NNSA[2013]168	09/29/13	Notification of Approving the SAR of the Nuclear Facility Safety Renovation Project of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC
NNSA[2013]170	10/15/13	Notification of Approving the SAR of Saving Energy and Emissions Reduction and Infrastructure Renovation Project of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC
NNSA[2013]189	10/31/13	Reply to the Forth Renovation Proposal after the Hot Test of the Reprocessing Pilot Plant of The 404 Co., Ltd., CNNC
NNSA[2013]216	12/30/13	Notification of Issuing Operation License for the Temporary Dry Storage Facility for Spent Fuel of Qinshan NPP, Phase III
NNSA Notice [2013]2	01/04/13	Official Letter to agree the Specialized Purification of UO_2 in National Storage by the China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC in HWR Nuclear Fuel Component Fabrication Line
NNSA Notice [2013]4	01/08/13	Official Letter of Issuing the “Non-routine Nuclear Safety Inspection Report for the Reprocessing Pilot Plant of The 404 Co., Ltd., CNNC”
NNSA Notice [2013]97	09/29/13	Reply Letter of Relevant Issues of the Adjusting the Uranium Residue Storage Operating Limit of PWR Nuclear Fuel Assembly Fabrication Line of China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC
NNSA Notice [2013]155	12/03/13	Reply Letter of Re-postponing the Trial Operation of Uranium Concentration Project of Uranium Enrichment Co., Ltd., CNNC, Phase III
NNSA Notice [2013]162	12/23/13	Reply Letter of the Agreement about Postponing the Approval of Process Research and Facility Loading of 200 tons/year Uranium IDR of China Jianzhong Nuclear Fuel Co., Ltd., CNNC
NNSA Notice [2013]163	12/23/13	Reply Letter of the Approval of the Test Program and the Quality Assurance Program (test phase) of the AP1000 Nuclear Fuel Element Fabrication Line and the PWR Nuclear Fuel Component Fabrication Line Continuous Construction Project
MEP App[2013]57	02/06/13	Reply to the Environmental Impact Assessment Report of Nuclear Fuel Component Fabrication Line of the High Temperature Gas-cooled Reactor Nuclear Power Plant (applying for construction license), the paradigm project of China Northern Nuclear Fuel Co., Ltd., CNNC
MEP App[2013]77	03/13/13	Reply to the Environmental Impact Assessment Report of Technical Reform of the TVS-2M Fuel Assembly Fabrication Line of China Jianzhong Nuclear Fuel Co., Ltd., CNNC

continued

Document No.	Approval Date	Title
MEP Acc[2013]255	11/22/13	Official Letter of the Environmental Acceptance Test Comments on Project Completion of the North Region Centrifuge Extension (phase I) of Shaanxi Uranium Co., Ltd.
MEP Acc[2013]279	12/10/13	Official Letter of the Environmental Acceptance Test Comments on Project Completion of the 3rd and 4th Modules of Temporary Dry Storage Facility for Spent Fuel, Qinshan NPP, Phase III

Table 69. Inspection Activities for Nuclear Fuel Cycle Facilities in 2013

Start Date	Item	Main Contents
04/09/13	2013 Nuclear Facility Regulatory Coordination Meeting between Nuclear and Radiation Safety Supervision Department (III) of NNSA and China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC	Nuclear facility regulatory coordination
04/24/13	2013 Nuclear Facility Regulatory Coordination Meeting between Nuclear and Radiation Safety Supervision Department (III) of NNSA and Shaanxi Uranium Co., Ltd., CNNC	Nuclear facility regulatory coordination
08/29/13	Specialized Supervision of the Production Safety Inspection by Southwest China Regional Office of NNSA	Nuclear safety inspection
10/11/13	Environmental Acceptance Test for Project Completion of the 3rd and 4th Modules of Temporary Dry Storage Facility for Spent Nuclear Fuel of Qinshan NPP, Phase III	Environmental acceptance test for project completion
10/28/13	Environmental Acceptance Test for Project Completion of the North Region Extension Project (phase I) of Shaanxi Uranium Co., Ltd.	Environmental acceptance test for project completion

6 Radiation Environment Regulation on Exploitation and Utilization of Uranium Mines

The review and approval of the environmental impact assessment for 7 construction projects were undertaken by NNSA: the System Engineering of Nuclear Emergency Response, the Environmental Safety Renovation Project of Uranium Purification Fabrication Line, and the Recovery and Reconstruction Project of Former Uranium Purification Fabrication Line of The 272 Uranium Co., Ltd., CNNC; the Prospecting and Sampling Project of Xujia Uranium Deposit of Fuzhou Jin'an Uranium Co., Ltd., CNNC; the In Situ Uranium Leach Mining Experiment in Bayanwula Uranium Deposit of Xi'an Blue Sky Uranium Co., Ltd., CNNC; the 2756-meter Middle Section Tunnel Exploration Project in Sawabuqi Uranium Deposit of Xinjiang Development Co., Ltd., CGNPC; and the Integrated Technical Reform Project (safety) of Shaoguan Jinhong Uranium Co., Ltd., CNNC. The environmental acceptance tests for 2 completed projects were undertaken: Nuclear Facilities Safety Emergency Regulation Project; and the Emission Reduction Technical Reform Project of Fuzhoujin'an Uranium Co., Ltd., CNNC. MEP (NNSA) also organized to revise "Environment Safety Supervision and Inspection of Uranium Mining and Metallurgy Radiation Program (trial)", and completed the review of "Safety Management Technology Requirements of Uranium Exploration Mining and Metallurgy Radioactive Waste".

Radiation environment regulation approvals for exploitation and utilization of uranium mines in 2013 are shown in Table 70.

Table 70. Radiation Environment Regulation Approvals for Exploitation and Utilization of Uranium Mines in 2013

Document No.	Approval Date	Title
MEP App [2013] 62	02/22/13	Reply to the Environmental Impact Assessment Report of the Integrated Technical Reform Project (safety) of Shaoguan Jinhong Uranium Co., Ltd., CNNC

continued

Document No.	Approval Date	Title
MEP App [2013] 108	04/18/13	Reply to the Environmental Impact Assessment Report of 2756-meter Middle Section Tunnel Exploration Project in Sawabuqi Uranium Deposit of Xinjiang Development Co., Ltd., CGNPC
MEP App [2013] 166	07/18/13	Reply to the Environmental Impact Assessment Report of the Leach Uranium Mining Experiment in Bayanwula Uranium deposit of Xi'an Blue Sky Uranium Co., Ltd., CNNC
MEP App [2013] 174	07/18/13	Reply to the Environmental Impact Assessment Report of the Prospecting and Sampling Project of Xujia Uranium Deposit of Fuzhou Jin'an Uranium Co., Ltd., CNNC
MEP App [2013] 179	07/23/13	Reply to the Environmental Impact Assessment Report of the Recovery and Reconstruction Project of Former Uranium Purification Fabrication Line of Uranium Purification of The 272 Uranium Co., Ltd., CNNC
MEP App [2013] 257	10/15/13	Reply to the Environmental Impact Assessment Report of the Environmental Safety Renovation Project of Uranium Purification Fabrication Line of The 272 Uranium Co., Ltd., CNNC
MEP App [2013] 258	10/15/13	Reply to the Environmental Impact Assessment Report of the System Engineering of Nuclear Emergency Response of The 272 Uranium Co., Ltd., CNNC
MEP Acc [2013] 142	07/05/13	Official Letter of Environmental Acceptance Test Comments on Project Completion of the Emission Reduction Technical Reform of Fuzhou Jin'an Uranium Co., Ltd., CNNC
MEP Acc [2013] 276	12/09/13	Official Letter of Environmental Acceptance Test Comments on Project Completion of the Nuclear Facilities Safety Emergency Regulation Project

Inspections of Radiation Environment Safety of Uranium Mining and Milling

According to united deployment of the "Notification of the State Council to Undertake Production Safety Inspection that Requires Further Work about Nuclear and Radiation Safety" (NNSA Notice [2013]65), MEP (NNSA) undertook environmental radiation safety inspections to the uranium mining and metallurgy enterprises, and organized non-routine radiation environmental safety inspections to The 272 Uranium Co., Ltd., CNNC, Ganzhou Jinrui Uranium Co., Ltd., CNNC, Fuzhou Jin'an Uranium Co., Ltd., CNNC, and Guyuan Uranium Co., Ltd., CNNC.

Environmental Management of Associated Ore

MEP (NNSA) issued the "Notification of Issuing the Regulatory Directory for Radiation Environment in Exploitation and Utilization of Mineral Resources (I)" (MEP Office [2013]12). MEP (NNSA) also reviewed the Interconnecting Upgrading Renovation Project of Rare Earth Separation Fabrication Line in Jiangsu

Guosheng of CHALCO Guangxi Nonferrous Rare Earth Development Co., Ltd., and the Radiation Impact Chapter of the Environmental Impact Assessment Report for Selection Program of the Rare Earth Mineral Resources Integrated Development Project in Maoniuping, Town of Mianning of Sichuan Jiangxi Copper Rare Earth Co., Ltd.

The Tailings Pond Wastewater Collection Pool of Ganzhou Jinrui Uranium Co., Ltd., CNNC

7 Safety Regulation on Radioactive Wastes

According to the "Law of the People's Republic of China on the Prevention and Control of Radioactive Pollution", the preparation and revision of regulations on the radioactive waste was enhanced, and efforts were taken actively to construct safety regulations of radioactive waste and radioactive waste disposal site, and to treat and dispose the radioactive waste residue.

In 2013, Northwest Low and Intermediate Level Waste Repository accepted 901.1m^3 low and intermediate level wastes, 3, 558 barrels or boxes in total. The main nuclides contained in the wastes were ^{60}Co, ^{137}Cs, with total radioactivity of 3.63E+13Bq. By the end of 2013, Northwest Waste Repository accepted 9, 454.72m^3 wastes, 18, 032 barrels or boxes in total, with total radioactivity of 8.16E+13Bq.

In 2013, Guangdong Beilong Low and Intermediate Level Waste Repository accepted 113 radioactive waste packages, which were generated in Daya Bay NPP, and Ling'ao NPP. Waste package types are C1 concrete barrels, with total volume of 226m^3, and total radioactivity of 1.7E+12Bq. Till the end of 2013, Guangdong Beilong Low and Intermediate Level Waste Repository had totally accepted 702 waste packages, with total volume of 1,493.16m^3, and total radioactivity of 3.69E+13Bq. In addition, Guangdong Beilong Low and Intermediate Level Waste Repository stored 30 containers for controlled waste, with total volume of 830m^3, and total radioactivity of 4.62E+10Bq.

Feifengshan Low and Intermediate Level Waste Repository is currently under construction.

Administrative approvals related to radioactive waste safety in 2013 are shown in Table 71, Inspection activities related to radioactive waste safety in 2013 are shown in Table 72.

Table 71. Administrative Approvals Related to Radioactive Waste Safety in 2013

Document No.	Approval Date	Title
NNSA[2013]1	01/04/13	Notification of Issuing the Approval of the Transport Container for Radioactive Materials (I) of Sanmen NPP, CNNC
NNSA[2013]2	01/04/13	Notification of Approval of the Nuclear and Radiation SAR of Nuclear Fuel Components (provided by the U.S.) Transportation of Sanmen NPP, CNNC

continued

Document No.	Approval Date	Title
NNSA[2013]3	01/04/13	Notification of Issuing the Approval of the Transport Container for Radioactive Materials (I) of Shandong Nuclear Power Co., Ltd.
NNSA[2013]4	01/07/13	Notification of Approving to Renew the Nuclear and Radiation SAR Validity for Co-60 Radioactive Source Transportation for Industrial Use of Bine High-Tech Co., Ltd.
NNSA[2013]32	01/17/13	Notification of Approving the Additional Materials of Nuclear and Radiation SAR for Nuclear Fuel Components Transportation of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC
NNSA[2013]41	02/04/13	Notification of Approving Nuclear and Radiation SAR for Nuclear Fuel Material Components Transportation of Yangjiang NPP
NNSA[2013]81	03/15/13	Notification of Approving Limit Change of the NAC-STC Spent Fuel Transport Container of Qingyuan company
NNSA[2013]101	05/10/13	Notification of Approving to Renew the Nuclear and Radiation SAR Validity for Co-60 (imported) Transportation of Chengdu Gaotong Isotope Co., Ltd., CNNC
NNSA[2013]126	06/14/13	Notification of Approving the Use of the Transport Container for Radioactive Materials from Russia's State Nuclear Fuel Company within P. R. China
NNSA[2013]134	07/17/13	Notification of Issuing the Design Approval of ZHQY-QG-001 Transport Container
NNSA[2013]137	07/18/13	Notification of Approving to Change the Permission Availability of the Transport Container Manufacturing License for Radioactive Material (I) of CIAE
NNSA[2013]138	07/18/13	Notification of Approving Nuclear and Radiation SAR for the Package Highway Transportation of the YKT1B-160000/4300 Container Loaded Co-60 Radioactive Source of China Atomic Energy Industry Co., Ltd.
NNSA[2013]149	08/13/13	Notification of Approving Nuclear and Radiation SAR for the Co-60 Radioactive Source (container R7008) Transportation of Zhongjin Irradiation Incorporated Company
NNSA[2013]150	08/13/13	Notification of Approving Nuclear and Radiation SAR for the Co-60 Radioactive Source (container F168) of Zhongjin Irradiation Incorporated Company
NNSA[2013]154	08/28/13	Notification of Approving the Use of the TYK-39M1 Transport Container of a Kazakhstan Metallurgy Joint-Stock Company within P. R. China
NNSA[2013]173	10/15/13	Notification of Approving the Use of the Additional Transport Container for Radioactive Materials (I) of Russia's State Nuclear Fuel Company within P. R. China
NNSA[2013]174	10/15/13	Notification of Approving Nuclear and Radiation SAR for the Nuclear Fuel Material Components Transportation of Tianwan NPP
NNSA[2013]175	10/15/13	Notification of Approving Nuclear and Radiation SAR for the First Furnace Nuclear Fuel Material Components Transportation of Haiyang NPP Unit 1 and Unit 2

continued

Document No.	Approval Date	Title
NNSA[2013]176	10/15/13	Notification of Approving Nuclear and Radiation SAR for the UO_2 Pellet Transportation from Kazakhstan
NNSA[2013]188	10/25/13	Notification of Approving Nuclear and Radiation SAR for the Package (C) Domestic Highway Transportation of the Imported Heat Source of the National Lunar Exploration Project
NNSA[2013]209	12/23/13	Notification of Approving the Addition of Hanging Basket Design for the GY-20 Co Source Transport Container Design Approval
NNSA[2013]210	12/23/13	Notification of Issuing the FCC4-V1 Transport Container for New Fuel of Taishan Nuclear Power Joint Venture Co., Ltd.
NNSA[2013]218	12/31/13	Notification of Approving Nuclear and Radiation SAR for the Waste Co-60 Source of Yangzhou University
NNSA Notice [2013]3	01/08/13	Reply Letter of Related Issues of Approval to Use HI-STAR60 Spent Fuel Transport Container
NNSA Notice [2013]30	03/26/13	Reply to Initiation of the Container (IRS-I) to Transport Co-60 Source of Tongxing Company, CNNC
NNSA Notice [2013]43	04/22/13	Reply to Agree with the Additional Transport Vehicles (CN-101) to Transport Co-60 Source of Tongxing Company, CNNC
NNSA Notice [2013]86	08/13/13	Reply Letter to the Radioactive Materials Classification of Transportation for Fuel Rods Containing Gadolinium
NNSA Notice [2013]115	10/21/13	Reply to Agree with the Official Letter of the Additional Transport Vehicles (CN-101) to Transport Co-60 Source
MEPR Notice[2013]16	05/21/13	Official Letter of Transferring the Vehicles Presented by United States Department of Energy to Zhejiang Province Radiation and Environmental Monitoring Station

Table 72. Inspection Activities Related to Radioactive Waste Safety in 2013

Start Date	Item	Main Contents
03/26/13	Inspection for the Manufacturing Record Check of Transport Container for Radioactive Materials (II) (hydraulic component of main pump) of XAE Aerospace Ground Equipment Co., Ltd.	Nuclear safety inspection
05/17/13	Spent Fuel Transport Container Scale Model Test of CNPE	Container witness
06/18/13	Safety Inspection for the Radioactive Material Transportation of Tianjin Bo'an Co., Ltd.	Nuclear safety inspection
09/10/13	Witness of the UF_6 Transport Container Design Test of Xinneng Nuclear Engineering Co., Ltd., CNNC	Container witness
11/10/13	Witness of the FCTC10 Transport Container Test of China Institute for Radiation Protection	Container witness

8 Safety Regulation on Radioisotope and Irradiation Installations

Until December 31, 2013, there were 62,270 entities in total producing, selling or using radioisotope and irradiation installations in China. Among them, there were 12,366 entities producing, selling, and using radioisotope; the number of the radioactive sources in service was 111,767 (11,102 of category I, 13,572 of category II, 2,108 of category III, 84,985 of others). There were 49,904 entities, only producing, selling, or using irradiation devices. The total number of irradiation devices was 128,336. There were 28,821 waste radioactive sources, which were accepted by provincial level repositories, and 96,964 waste radioactive sources had been accepted by the national radioactive waste storage.

The number of entities (producing radioisotope, selling, and using radioactive sources of category I; selling, and using irradiation devices of category I, and the unsealed radioactive workplaces of Class A qualification) regulated by MEP was 806. 26 provincial level environmental protection bureaus had been commissioned by MEP with the work of issuing and regulating the category licenses for part of the entities, except for Beijing, Shanghai, Hainan, Xizang, and Qinghai. After the commissioning, the number of the entities, which were directly regulated by MEP was 229.

Actively and Steadily Push Forward Administrative Simplifying and Power Decentralizing

MEP (NNSA) suggested to decentralize the “Approval Authority of Radiation Safety Licenses for Users of Medical Radioactive Source of Category I, and Entities for Making Position Emission Tomography (PET) radio-pharmaceuticals (self-use only)”, to the provincial environmental protection department, and also put forward suggestion to modify relevant legal provisions. After strict demonstration and review, the use of iodine-125 radio-immunoassay in vitro diagnostic reagents is decided to implement conditional exemption, and the radiation source instruments produced by the 9 companies are also decided to implement exemption. It made thousands of entities exempt from the application of radiation safety license, and reduced their burden.

Strengthen Communication, and Standardize Management

In September, 2013, the National Radiation Safety Regulation Work Experience Exchange Meeting was held in Beijing. More than 170 delegates from provincial level environmental protection departments (bureaus), PLA Environmental Protection Bureau, and the relevant authority departments of MEP, nuclear and radiation safety regional offices of MEP, the Nuclear and Radiation Safety Center, and Environmental Radiation Monitoring Technology Center, attended the meeting. The work and achievements of the past year were fully affirmed and recognized in the meeting, and the complex situation and the challenge of standardized supervision of nuclear technology utilization were pointed out. The meeting achieved the objectives of summing up the work, affirming the achievements, finding out problems, seeking solutions, enhancing understanding, exchanging experiences, making clear the tasks, promoting the work.

The National Radiation Safety Regulation Work Experience Exchange Meeting

Licensing and Inspection

In 2013, radiation safety licenses for 13 nuclear technology utilization entities were issued, licenses of 42 entities were renewed, licenses of 24 entities were added new items, and licenses of 28 entities were modified (see Table 73).

Environmental impact assessment reports for decommissioning 10 nuclear utilization projects were reviewed and approved. Project completion acceptance tests for 5 new, modified, and extended projects were completed. The final environment protection tasks for decommissioning of 13 nuclear utilization projects were checked and accepted, and exempting management for 8 entities was approved (see Table 74).

Review and Approval of Radioisotope Import and Export

Totally 1,400 radioisotope imports and exports applications were approved in 2013, including 8,182 pieces of imported radioactive sources and 1,544 pieces of exported radioactive sources. The radioactivity of imported unsealed radioactive substance was 4.35E+15Bq.

Radiation Safety Training

The radiation safety and protection training program and quality control procedure was issued at the beginning of 2013. Quality controls and on-site supervisions for the intermediate and primary training courses of radiation safety and protection were undertaken continually, to urge and supervise training

institutions to undertake the work, strictly follow the plan and requirements of training to guarantee the quality of training. In 2013, 41 training courses of radiation safety and protection for different levels were held by 8 training institutions, including 12 intermediate classes of 1,148 trainees, 23 primary classes of 2,194 trainees, and 6 refreshment classes of 243 trainees. These programs contributed to improve personal quality of radiation staff in nuclear technology utilization entities, and to incubate nuclear safety culture.

In order to improve the use of national nuclear technology utilization radiation safety management system, and the professional ability of radiation safety supervision staff of the national environmental protection system, 2 training classes of nuclear technology utilization radiation safety management system were held respectively in July and October, 2013. About 220 people from provincial environmental protection departments, entities producing radioactive sources, operating units of radioactive waste repository, participated in the training.

Radiation Accidents and Emergency Response

In 2013, there were 9 radiation accidents. One of them belongs to relatively serious accident, which occurred in Anhui Province. It was one iridium-192 source of category II lost during transportation, which was found the next day with the tank unopened. The other 8 accidents were ordinary accidents; including 1 was the dropping-into-well of a source of category V, the other 7 accidents were loss of the radioactive sources, involving 8 pieces of category IV or V. Until December 31, 2013, 3 radioactive lost pieces were recovered. Up to then, all the accidents did not cause any personal injury or environmental contamination.

City Repositories

The city repositories were all in normal operation in 2013.

Promoting International Cooperation

Based on the PUNT (Peaceful Utilization of Nuclear Technology of China and the U.S.) agreement, China-US cooperation on radioactive source security was deepened. In April 2013, the 8th Meeting of the Joint Coordination Committee of Peaceful Utilization of Nuclear Technology of China and the U.S. was held in Beijing. China and the U.S. summarized and exchanged the cooperative work over the past year. In June 2013, China – US Radioactive Sources Security Cooperation Workgroup of MEP held a work group meeting in Beijing, which made clear the cooperative tasks and approaches of 2013 and 2014, and arranged the U.S. representatives pay return visits to the security upgrade projects of the 12 entities in Beijing , Guangxi, Shanghai, Liaoning, etc. The upgrading security of Hunan radioactive waste repository, included in the coordination projects, has been installed completely. Sichuan Jinhe irradiation technology Co., Ltd. was selected as the security

paradigm project. The introduction materials of China radioactive source supervision and the exchange materials of radioactive waste repository construction topic were submitted to the international meeting of radioactive source safety and security held by IAEA.

Promoting Waste Radioactive Source Recycling and Reusing

MEP (NNSA) was actively exploring the application of recycling economy to the field of nuclear technology utilization, and trying to promote setting up the scientific research projects related americium and beryllium neutron source recycling and reusing. MEP (NNSA) also organized to study the technical requirements and management solutions to the waste radioactive sources recycling.

Table 73. List of Radiation Safety Licenses Approved in 2013

No.	Organization	Type
1	Shanghai Shilong Hi-Tech Corp., Ltd.	New application
2	Guangxi Zhuang Autonomous Region Radiation Environment Regulation Office	New application
3	The 272 Uranium Co., Ltd., CNNC	New application
4	Anhui Union Radiation Chemical., Ltd.	New application
5	Zhongjin Irradiation Chengdu Incorporated Company	New application
6	Zhongjin Irradiation Wuhan Incorporated Company	New application
7	Siemens China	New application
8	The Xinjiang Technical Institute of Physics & Chemistry, CAS	New application
9	Nanjing Xiyue Irradiation Technology Co., Ltd.	New application
10	Shanghai Proton and Heavy Ion Hospital, Co., Ltd.	New application
11	The 309th Hospital of PLA	New application
12	Elekta (Shanghai) Medical Instruments, Co., Ltd.	New application
13	Xi'an ET Medical Technology Co., Ltd.	New application
14	Irradiation and Sterilization Co., Ltd., Shandong Feida Group	Renewal
15	Navy General Hospital of PLA	Renewal
16	Zhejiang Academy of Agricultural Sciences	Renewal
17	Beijing Radioactive Waste Management Center	Renewal
18	Guangxi Guilin Zhenghan Irradiation Center, Co., Ltd.	Renewal
19	Chengdu Gaotong Isotope Co., Ltd. (CNNC)	Renewal
20	Shanghai Institute of Applied Physics, CAS	Renewal
21	Tianjin Institute of Technical Physics	Renewal
22	Institute of Atomic Application, Chinese Academy of Agricultural Sciences	Renewal
23	Institute of Nuclear Physics and Chemistry, China Academy of Engineering Physics	Renewal

continued

No.	Organization	Type
24	The 306th Hospital of PLA	Renewal
25	The Northwest Institute of Nuclear Technology	Renewal
26	The King Radiation (Taizhou) Technology Co., Ltd.	Renewal
27	Shangai Gamma Knife Hospital	Renewal
28	Shanghai Institute of Measurement and Testing Technology	Renewal
29	China Nuclear Energy Industry Corporation	Renewal
30	CGNPC Uranium Resources Co., Ltd.	Renewal
31	Shandong Radiation Environment Regulation Office	Renewal
32	Jining Irradiation, Co., Ltd.	Renewal
33	Nuclear Power Institute of China	Renewal
34	The 455th Hospital of PLA	Renewal
35	Anhui Huajing New Materials Co., Ltd.	Renewal
36	Changzhou No.2 Electronic Instrument Co., Ltd.	Renewal
37	Institute of the Corn, Heilongjiang Academy of Agricultural Sciences	Renewal
38	Suzhou CNNC Huadong Radiation Co., Ltd.	Renewal
39	Institute of Atomic Agriculture Science, Shandong Academy of Agricultural Sciences	Renewal
40	Beijing Normal University	Renewal
41	The First Hospital of Fangshan District, Beijing	Renewal
42	Xinghua Meiquan Technology, Co., Ltd.	Renewal
43	Zibo Liyuan Hi-Tech Irradiation Technology, Co., Ltd.	Renewal
44	Lanzhou Weite Irradiation, Co., Ltd.	Renewal
45	Hefei Institutes of Physical Science, CAS	Renewal
46	Shanghai Jixing Irradiation Technology Development, Co., Ltd.	Renewal
47	The Hospital of Qinghai University	Renewal
48	Beijing Shijitan Hospital, Capital Medical University	Renewal
49	Institute of Isotope of Henan Academy of Sciences, Co., Ltd.	Renewal
50	Hunan Wanheyuan Irradiation Technology, Co., Ltd.	Renewal
51	Hefei Polymeric Radiation Technology Co., Ltd.	Renewal
52	Soochow University	Renewal
53	Lanzhou Luyuan Irradiation, Co., Ltd.	Renewal
54	Shanghai Institute of Applied Physics, CAS (Zhangjiangyuan)	Renewal
55	Zhengzhou Irradiation Center	Renewal
56	Baoding Heliyuan Nuclear Irradiation Co., Ltd.	Addition
57	Guang'anmen Hospital, China Academy of Chinese Medical Sciences	Addition

continued

No.	Organization	Type
58	Soochow University	Addition
59	The 404 Co., Ltd., CNNC	Addition
60	The 85th Hospital of PLA	Addition
61	China Institute for Radiation Protection	Addition
62	Tianjin Jinpengyuan Irradiation Technology, Co., Ltd.	Addition
63	China Institute of Atomic Energy	Addition
64	China Isotope & Radiation Corporation, CNNC	Addition
65	The 18th Institute, China Electronics Technology Group Corporation	Addition
66	The 404 Co., Ltd., CNNC	Addition
67	Peking University	Addition
68	China Institute of Atomic Energy	Addition
69	Elekta (Shanghai) Medical Instruments, Co., Ltd.	Addition
70	Ruijin Hospital Shanghai Jiao Tong University School of Medicine	Addition
71	The 411th Hospital of PLA	Addition
72	The Hospital of Qinghai University	Addition
73	Nuclear Power Institute of China	Addition
74	The 455th Hospital of PLA	Addition
75	Xinghua Meiquan Technology, Co., Ltd.	Addition
76	Hefei Institutes of Physical Science, CAS	Addition
77	Beijing Shijitan Hospital, Capital Medical University	Addition
78	China Nuclear Energy Industry Corporation	Addition
79	Renji Hospital Shanghai Jiaotong University School of Medicine	Addition
80	CNNC Tongxing (Beijing) Nuclear Technology, Co., Ltd.	Modification
81	Nantong Michael Irradiation Co., Ltd.	Modification
82	China Institute of Atomic Energy	Modification
83	Beijng Senke Medicine, Co., Ltd.	Modification
84	Raypoly of FSPG Hi-Tech Co., Ltd.	Modification
85	Shanghai Atom Kexing Pharmaceuticals Co., Ltd.	Modification
86	The First Hospital of Fangshan District, Beijing	Modification
87	Fujian Radiation Environment Regulation Office	Modification
88	Zhangjiagang CNNC Huakang Irradiation, Co., Ltd.	Modification
89	Shaanxi Radiation Environment Regulation Office	Modification
90	Peking Unversity	Modification
91	Lanzhou Luyuan Irradiation, Co., Ltd.	Modification

continued

No.	Organization	Type
92	Tibet Autonomous Region Radiation Environment Regulation Office	Modification
93	Inner Mongolia Autonomous Region Radiation Environment Regulation Office	Modification
94	Zhejiang Province Radiation Monitoring Technical Center	Modification
95	Beijing ZHIBO Bio-Medical Technology Co., Ltd.	Modification
96	Beijing Radioactive Waste Management Center	Modification
97	The Northwest Institute of Nuclear Technology	Modification
98	Shang Hai Gamma Knife Hospital	Modification
99	Shanghai Institute of Measurement and Testing Technology	Modification
100	CGNPC Uranium Resources Co., Ltd.	Modification
101	Anhui Huajing New Materials Co., Ltd.	Modification
102	Institute of Atomic Agriculture Science, Shandong Academy of Agricultural Sciences	Modification
103	Beijing Normal University	Modification
104	Lanzhou Weite Irradiation, Co., Ltd.	Modification
105	The 85th Hospital of PLA	Modification
106	The 411th Hospital of PLA	Modification
107	Liaoning Academy of Agricultural Sciences	Modification

Table 74. List of Environmental Protection Approvals and Acceptance Tests for the Projects in the Field of Radioisotope and Irradiation Installations Safety in 2013

Document No.	Approval Date	Organization	Title
MEP App[2013]109	04/18/13	Zhongshan Ruidi New Material Co., Ltd	Reply to the Environmental Impact Assessment Report for Decommissioning Irradiation Center Project of Zhongshan Ruidi New Material Co., Ltd.
MEP App[2013]116	04/24/13	Hefei Institutes of Physical Science (HIPS), China Academy of Science (CAS)	Reply to the Environmental Impact Assessment Report for Decommissioning the HT-7 Superconducting Tokamak Project of HIPS, CAS
MEP App[2013]125	05/22/13	Guangzhou Irradiation Technology Research and Development Center	Reply to the Environmental Impact Assessment Report for Decommissioning the Nuclear Technology Utilization Project of Guangzhou Irradiation Technology Research and Development Center
MEP App[2013]149	06/17/13	The 206th Hospital of PLA	Reply to the Environmental Impact Assessment Report for Decommissioning the Irradiation Installation of The 206th Hospital of PLA
MEP App[2013]150	06/17/13	The Institute of High Energy Physics (IHEP), CAS	Reply to the Environmental Impact Assessment Report for Decommissioning the 3.5 Me VRFQ Protons High Intensity Accelerators of IHEP, CAS

continued

Document No.	Approval Date	Organization	Title
MEP App[2013]153	06/24/13	Guangzhou South China Agricultural University Biotechnology Development Co., Ltd.	Reply to the Environmental Impact Assessment Report for Decommissioning the Irradiation Installation of Guangzhou South China Agricultural University Biotechnology Development Co., Ltd.
MEP App[2013]214	08/29/13	Peking University	Reply to the Environmental Impact Assessment Report for Decommissioning the Laboratory No.3-101, and Laboratory No. 3-108 of Technical Physics Building of Peking University
MEP App[2013]259	10/15/13	Soochow University	Reply to the Environmental Impact Assessment Report for Decommissioning the Cobalt Irradiation Installation of Zhuhui Street Campus of Soochow University
MEP App[2013]302	12/03/13	People's Government of Fuxin Qinghemen District	Reply to the Environmental Impact Assessment Report for Decommissioning the Irradiation Installation of Fuxin Nuclear Irradiation Center
MEP App[2013]329	12/23/13	Liaoning Academy of Agricultural Sciences	Reply to the Environmental Impact Assessment Report for Decommissioning the Xiongyue Irradiation Installation of Liaoning Academy of Agricultural Sciences
MEP Acc[2013]76	04/16/13	Hefei Radial Polymerization Technology Co., Ltd.	Official Letter of the Environment Acceptance Test Comments on Project Completion of Irradiation Center of Textile Dyeing and Printing Adhesive Series Products of Hefei Radial Polymerization Technology Co., Ltd.
MEP Acc[2013]105	05/17/13	Zhejiang University	Official Letter of the Environmental Acceptance Test Comments on Project Completion of the Decommissioning of Category I Co-60 Irradiation Installation and Level C Unsealed Radioactive Laboratory of Nuclear Agricultural Science Research Institute, Zhejiang University
MEP Acc[2013]107	05/20/13	Yangzhou Irradiation Center	Official Letter of the Environmental Acceptance Test Comments on Project Completion of Decommissioning the 100,000 Ci Cobalt Irradiation Installation of Yangzhou Irradiation Center
MEP Acc[2013]112	05/27/13	Hi Tech Atom (HTA) Co., Ltd.	Official Letter of the Environmental Acceptance Test Comments on Project Completion of Decommissioning the Beijing Milk Station of HTA Co., Ltd.
MEP Acc[2013]118	06/04/13	The 18th Institute of China Electronics Technology Group Co., Ltd.	Official Letter of the Environmental Acceptance Test Comments on Project Completion of Lunar Exploration Project (phase II) Detector System Radioisotope Heating Device and Temperature Difference Generator Development Necessary Conditions Project of The 18th Institute of China Electronics Technology Group Co., Ltd.

continued

Document No.	Approval Date	Organization	Title
MEP Acc[2013]127	06/13/13	The Hefei Institutes of Physical Science (HIPS), Chinese Academy of Sciences (CAS)	Official Letter of the Environmental Acceptance Test Comments on Final State of Project Completion of the Decommissioning of HT-7 Superconducting Tokamak Irradiation Installation of HIPS, CAS
MEP Acc[2013]157	07/19/13	The 206th Hospital of PLA	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning the Cobalt Irradiation Installation of The 206th Hospital of PLA
MEP Acc[2013]164	07/26/13	Institute of Atomic Energy Application, Jiangxi Academy of Agricultural Sciences	Official Letter of the Environmental Acceptance Test Comments on Final State of Project Completion of Decommissioning the Irradiation Center Co-60 Irradiation Installation of Institute of Atomic Energy Application, Jiangxi Academy of Agricultural Sciences
MEP Acc[2013]165	07/26/13	Ningbo Oriental Modern Agricultural Development Investment Co., Ltd.	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning the Irradiation Installation of Ningbo Oriental Modern Agricultural Development Investment Co., Ltd.
MEP Acc[2013]179	08/13/13	Institute of Nuclear and New Energy Technology, Tsinghua university	Official Letter of the Environmental Acceptance Test Comments on Project Completion of the Radioisotope and Irradiation Installation of Institute of Nuclear and New Energy Technology, Tsinghua University
MEP Acc[2013]180	08/14/13	The King Radiation (Taizhou) Technology Co., Ltd.	Official Letter of the Environmental Acceptance Test Comments on Project Completion of Irradiation Installation for 2 million Ci Co-60 of The King Radiation (Taizhou) Technology Co., Ltd.
MEP Acc[2013]185	09/03/13	Guangzhou Irradiation Technology Research and Development Center	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning the Irradiation Installation of Guangzhou Irradiation Technology Research and Development Center
MEP Acc[2013]207	09/24/ 13	Peking University	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning the Small Room Cobalt Irradiation Installation of Peking University
MEP Acc[2013]224	10/21/13	Soochow University	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning the Cobalt Irradiation Installation of Zhuhui Street Campus, Soochow University
MEP Acc[2013]247	11/15/13	Guangzhou South China Agricultural University Biotechnology Development Co., Ltd.	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning Irradiation Installation of Guangzhou South China Agricultural University Biotechnology Development Co., Ltd.

continued

Document No.	Approval Date	Organization	Title
MEP Acc[2013]248	11/15/13	Soochow University	Official Letter of the Environmental Acceptance Test Comments on Project Completion of Irradiation Installation for 300,000 Ci Co-60 and Co-60 Therapy Unit Construction of Soochow University
MEP Acc[2013]299	12/18/13	People's Government of Fuxin Qinghemen District	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning the Irradiation Installation of Liaoning Fuxin Cobalt Irradiation Center
MEP Acc[2013]300	12/18/13	Institute of High Energy Physics, Chinese Academy of Sciences	Official Letter of the Environmental Acceptance Test Comments on the Final State of Project Completion of Decommissioning the 3.5MeVRFQ High Current Proton Accelerator of Institute of High Energy Physics, Chinese Academy of Sciences
MEP Off[2013]69	06/24/13	Hangzhou JieDao Technology Co., Ltd.	Reply to Exemption Management Comments on Ni-63 Radioactive Source in GC1690 Type Gas Chromatograph of Hangzhou JieDao Technology Co., Ltd.
MEP Notice[2013]812	07/18/13	Tengzhou Jingluweiye Scientific Instrument Co., Ltd.	Reply Letter of Exemption Management of Ni-63 Radioactive Source in GC7800 and GC6890 Gas Chromatograph of Tengzhou Jingluweiye Scientific Instrument Co., Ltd.
MEP Notice[2013]823	07/18/13	Shanghai Technology Development Co., Ltd.	Reply Letter of Exemption Management of Ni-63 Radioactive Source in SIM-MAX E2008 Portable Explosives Detector of Shanghai Technology Development Co., Ltd.
MEP Notice[2013]1228	10/25/13	Xiamen POWERTECH Co., Ltd.	Reply Letter of Exemption Management of Ni-63 Radioactive Source in Lonestar Highly Efficient Ion Mobility Spectrometer of Xiamen POWERTECH Co., Ltd.
MEP Notice[2013]1234	10/28/13	Beijing Dongxi Analytical Instrument Co. Ltd	Reply Letter of Exemption Management of Ni-63 Radioactive Source in GC-4009A, GC-4011A, and GC-4012A Gas Chromatograph of Beijing Dongxi Analytical Instrument Co., Ltd.
MEP Notice[2013]1407	12/03/13	Thermo Fisher Scientific (China) Co., Ltd.	Reply Letter of Exemption Management of Ni-63 Radioactive Source in Trace 1300, Trace 1310 Gas Chromatograph of Thermo Fisher Scientific (China) Co., Ltd.
MEP Notice[2013]1408	12/03,/13	Focused Photonics (Hangzhou) Ins.	Reply Letter of the Official Letter of Exemption Management of Ni-63 Radioactive Source in GC-2000 Gas Chromatograph of Focused Photonics (Hangzhou) Inc.
MEP Notice[2013]1457	12/10/13	NUTECH Co., Ltd.	Reply to Exemption Management of Ni-63 Radioactive Source in TR1000 Explosives Drug Detector etc. (4 types) of NUTECH Co., Ltd.

9 Nuclear Material Control and Physical Protection for Nuclear Installations

In 2013, according to nuclear safety related laws and regulations including the “Law of the People’s Republic of China on the Prevention and Control of Radioactive Pollution”, “Safety Regulation on Civil Nuclear Installations of P. R. China”, “Regulation on Nuclear Material Control of P. R. China”, MEP (NNSA) executed its responsibilities of regulatory inspections, technical reviews and nuclear material licenses verification for nuclear material control and physical protection of nuclear installations. MEP (NNSA) continued to enhance drafting and revising of the related laws, regulations, and guides.

Nuclear Material License Verification

MEP (NNSA) undertook review on the applications of nuclear material license of Fujian Fuqing Nuclear Power Co., Ltd, and the technical evaluation and on-site inspections for reviewing the comments of the nuclear material control office of CAEA thus completed the approval process.

Review and Inspection on Physical Protection for Nuclear Installations

MEP (NNSA) undertook inspection to the nuclear material control and physical protection system of Qinshan NPP, CNNC; completed review of physical protection for Hongyanhe NPP unit 3 and unit 4 at FSAR Stage; completed review of physical protection of Yangjiang NPP unit 5 and unit 6 at PSAR Stage; completed review of physical protection of the Safety Technical Reform Project of Equivalent Natural Uranium Fuel Bundle Manufacture of China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC at PSAR Stage, and physical protection review of AP1000 Fuel Production Line and the construction of the PWR Nuclear Fuel Production Line of China Northern Nuclear Fuel Co., Ltd., CNNC at FSAR Stage; completed physical protection review of the Energy Conservation and Emissions Reduction and Infrastructure Renovation Project at PSAR Stage, the SAR of the Nuclear Facility Safety Technical Renovation and the SAR of the TVS-2M Fuel Assembly Production Line Technical Renovation Project of China

Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC; reviewed the upgrading modification of physical protection of Qinshan NPP Phase II, Yangjiang NPP, and Ningde NPP; revised the Nuclear Safety Guide "Nuclear Facility Physical Protection (trial)"; approved procedure of the Nuclear Safety Guide "Video Monitoring System for Nuclear Facility Physical Protection (draft for approval)".

The statistics of official documents of nuclear material control in 2013 is shown in Table 75.

Table 75. Official Documents of Nuclear Material Control in 2013

Document No.	Issuance Date	Title
NNSA Notice [2013]49	5/13/13	Reply Letter of Issuing Nuclear Material License to Fujian Fuqing Nuclear Power Co., Ltd.
NNSA Notice [2013]60	6/17/13	Official Letter of Issuing the "Regulatory Inspection Report on the Nuclear Material Control of Nuclear Power Operation and Management Co., Ltd., CNNC"
NNSA Notice [2013] 117	10/25/13	Reply Letter to Agree the Additional New Temporary Entrances of Ningde NPP Phase I Unit 4
NNSA Notice [2013]167	12/30/13	Notification of the Reapplication for Nuclear Material License for Fangjiashan NPP

10 Regulation on Safe Transport of Radioactive Material

MEP (NNSA) implemented "Regulations for the Safe Transport of Radioactive Material", basically established the regulatory system for safe transport of radioactive material. MEP (NNSA) also carried out the review and approval of the container design and manufacturing certificates and activities for radioactive material transport, and completed the complementary files related to the "Regulations for the Safe Transport of Radioactive Material". MEP (NNSA) prepared the "Supervision and Management Rules for Safe Transport of Radioactive Material (draft for comments)". In 2013, the transport activities of radioactive material were safely implemented without the occurrence of nuclear and radiation accidents or incidents.

In 2013, MEP (NNSA) replied to 15 SARs of radioactive material transport; approved 2 designs of radioactive material transport containers; issued 1 license of manufacture; approved utilization of 3 imported containers.

Transport Test of Nuclear Fuel Assembly by Sea

11 Regulation on Civil Nuclear Safety Equipment

Regulatory Review and Approval

In 2013, 62 applications for the civil nuclear safety equipment license were received and reviewed, none of them was denied after the preliminary review of the applications. MEP (NNSA) approved 33 applications in 2013, of which 10 for new licenses (see Table 76), 8 for renewal (see Table 78), and 15 for extension (see Table 77). At the same time, MEP (NNSA) completed the technical review of change requests about licensees' activities and technical ability, etc. By the end of 2013, 193 licensees were issued for the design, manufacture, installation and NDT of nuclear safety equipment, including 140 for mechanical equipment, 48 for electrical equipment, 4 for non-destructive examination, and 13 for installation. Licensees holding civil nuclear safety equipment licenses are shown in Table 79.

In 2013, 70 applications for registration of imported civil nuclear safety equipment were received and reviewed, 17 of which were accepted and approved (see Table 80), and none had been denied or suspended. Till the end of 2013, the total number of the entities having registration confirmation for design, manufacture or NDT service of nuclear safety equipment reached 229, among which 6 are comprehensive registration, 160 are for mechanical equipment, 59 are for electrical equipment, and 4 are for NDT service.

Vice Administrator of NNSA, Director General of Nuclear and Radiation Safety Regulation Department I of MEP Guo Chengzhan Inspected the Front Line of Dongfang Heavy Machinery Co., Ltd.

Table 76. New Issuances of Licenses for Civil Nuclear Safety Equipment in 2013

Document No.	Issuance Date	Title
NNSA [2013]87	03/27/13	Notification of Issuing Design and Manufacture License for Civil Nuclear Equipment of China Nuclear Control System Engineering Co., Ltd.
NNSA [2013]98	05/03/13	Notification of Issuing Design and Manufacture License for Civil Nuclear Equipment of Anhui A-Line Pumps Co., Ltd.
NNSA [2013]104	05/15/13	Notification of Issuing Design and Manufacture License for Civil Nuclear Equipment of Jiangsu Haishi Pump Manufacturing Co., Ltd.
NNSA [2013]105	05/15/13	Notification of Issuing Manufacture License for Civil Nuclear Equipment of Wuxi Hua'ertai Machine Manufacturing Co., Ltd.
NNSA [2013]106	05/15/13	Notification of Issuing Manufacture License for Civil Nuclear Equipment of Sichuan Huadu Nuclear Equipment Manufacture Co., Ltd.
NNSA [2013]107	05/15/13	Notification of Issuing Design and Manufacture License for Civil Nuclear Equipment of China-Kinwa High Technology Co., Ltd.
NNSA [2013]108	05/15/13	Notification of Issuing Manufacture License for Civil Nuclear Equipment Manufacture of Qingdao Lanshi Heavy Machinery Co., Ltd.
NNSA [2013]151	08/13/13	Notification of Issuing Manufacture License for Civil Nuclear Equipment of Shandong Beichen Mechanical & Electrical Equipment Co., Ltd.
NNSA [2013]192	11/01/13	Notification of Issuing Design and Manufacture License for Civil Nuclear Equipment of Yangzhou Shuguang Cable Co., Ltd.
NNSA [2013]193	11/07/13	Notification of Issuing Manufacture License for Civil Nuclear Equipment Manufacture of Harbin Boiler Company Co., Ltd.

Table 77. Approvals of License Extension for Civil Nuclear Safety Equipment in 2013

Document No.	Issuance Date	Title
NNSA [2013] 22	01/17/13	Notification of Approving Design License Extension for Civil Nuclear Safety Equipment of the 719th Research Institute of China Shipbuilding Industry Corporation
NNSA [2013] 23	01/17/13	Notification of Approving Design License Extension for Civil Nuclear Safety Equipment of Nuclear Industry Engineering Research and Engineering Co., Ltd.
NNSA [2013]24	01/17/13	Notification of Approving Design License Extension for Civil Nuclear Safety Equipment of Zhejiang Jiuli Special Material Technology Co., Ltd.
NNSA [2013]25	01/17/13	Notification of Approving Design License Extension for Civil Nuclear Safety Equipment of Jiangsu Biaoxin Kubota Industrial Co., Ltd.
NNSA [2013]26	01/17/13	Notification of Approving Design License Extension for Civil Nuclear Safety Equipment of China Nuclear 22 Construction Co., Ltd.
NNSA [2013]27	01/17/13	Notification of Approving Design and Manufacture License Extension for Civil Nuclear Safety Equipment of Jiangsu Shentong Valve Co., Ltd.
NNSA [2013]72	03/12/13	Notification of Approving Design License Extension for Civil Nuclear Safety Equipment of Taiyuan Heavy Industry Co., Ltd.
NNSA [2013]86	03/27/13	Notification of Approving Design and Manufacture License Extension for Civil Nuclear Safety Equipment of China Techenergy Co., Ltd.

continued

Document No.	Issuance Date	Title
NNSA [2013]119	06/03/13	Notification of Approving Design and Manufacture License Extension for Civil Nuclear Safety Equipment of Anhui Province Cable Co., Ltd.
NNSA [2013]120	06/03/13	Notification of Approving Design and Manufacture License Extension for Civil Nuclear Safety Equipment of Jilin Sino-Italy Nuclear Piping Components Manufacturing Co., Ltd.
NNSA [2013]121	06/03/13	Notification of Approving Design and Manufacture License Extension for Civil Nuclear Safety Equipment of China Nuclear Power Technology Research Institute
NNSA [2013]122	06/03/13	Notification of Approving Design and Manufacture License Extension for Civil Nuclear Safety Equipment of Anhui Yingliu Group Huoshan Casting Co., Ltd.
NNSA [2013]123	06/03/13	Notification of Approving Design and Manufacture License Extension of Civil Nuclear Safety Equipment for Shanghai Apollo Machinery Co., Ltd.
NNSA [2013]152	08/23/13	Notification of Approving Design and Manufacture License Extension for Civil Nuclear Safety Equipment of Yantai Taihai Manoir Nuclear Power Equipment Co., Ltd.
NNSA [2013]191	11/01/13	Notification of Approving Design and Manufacture License Extension of Civil Nuclear Safety Equipment for Taian Shankou Forging and Casting Co., Ltd.

Table 78. Renewal Approvals of License for Civil Nuclear Safety Equipment in 2013

Document No.	Issuance Date	Title
NNSA [2013]19	01/17/13	Notification of Approving Manufacture License Extension of Civil Nuclear Safety Equipment for Dongfang Electric Corporation Dongfang Boiler Co., Ltd.
NNSA [2013]20	01/17/13	Notification of Approving Manufacture License Extension of Civil Nuclear Safety Equipment for Jiangsu Huayang Steel Pipe Fittings Co., Ltd.
NNSA [2013]21	01/17/13	Notification of Approving Design and Manufacture License Extension of Civil Nuclear Safety Equipment for Shanghai Valve Factory Co., Ltd.
NNSA [2013]73	03/12/13	Notification of Approving Manufacture License Extension for Civil Nuclear Safety Equipment of Tianding Nuclear Power Equipment Co., Ltd., AVIC Xi'an Aviation Engine Group
NNSA [2013]112	05/22/13	Notification of Approving Design License Renewal for Civil Nuclear Safety Equipment of China Institute of Atomic Energy
NNSA [2013]113	05/22/13	Notification of Approving Equipment Installation License Renewal for Civil Nuclear Safety Equipment of Tianjin Electric Power Construction Co., Ltd.
NNSA [2013]144	07/30/13	Notification of Approving Manufacture License Renewal for Civil Nuclear Safety Equipment of Wuxi Xinfeng Pipelien Co., Ltd.
NNSA [2013]145	07/30/13	Notification of Approving Manufacture License Renewal for Civil Nuclear Safety Equipment of Shanghai Electric Power Generation Equipment Co., Ltd.

Table 79. List of Licensees Holding Civil Nuclear Safety Equipment Licenses

No.	Licensee	Type (s) of License
1	China Institute of Atomic Energy	Mechanical design, electrical design, and mechanical manufacture
2	China (Shenzhen) Nuclear Power Design Co., Ltd.	Mechanical design, electrical design
3	Nuclear Industry Engineering Research and Engineering Co., Ltd.	Mechanical design
4	China Nuclear Power Engineering Company	Mechanical design, electrical design
5	Shanghai Nuclear Power Engineering and Design Institute	Mechanical design, electrical design
6	Nuclear Power Institute of China	Mechanical design, electrical design, electrical manufacture, NDT
7	Institute of Nuclear and New Energy Technology, Tsinghua University	Mechanical design, electrical design
8	China Nuclear Power Operation Technology Co., Ltd.	Mechanical design, NDT
9	The 719th Research Institute of China Shipbuilding Industry Corporation	Mechanical design, electrical design, electrical manufacture
10	China Nuclear Industry 23 Construction Co., Ltd.	Installation, and mechanical manufacture
11	China Nuclear Industry Fifth Construction Company	Installation, and mechanical manufacture
12	China Nuclear Industry Huaxing Construction Co., Ltd.	Installation
13	China Nuclear Industry 22 Construction Company	Installation
14	China Nuclear Industry 24 Construction Company	Installation
15	Guangdong Power Engineering Corporation	Installation
16	Zhejiang Thermal Power Company, CEEC	Installation
17	Jiangsu Electric Power Construction Company 3, CEEC	Installation
18	Anhui No.2 Electric Power Engineering & Construction Corporation, CEEC	Installation
19	Hunan Provincial Thermal Power Construction Company, CEEC	Installation
20	Hebei No.1 Electric Power Engineering & Construction Corporation, CEEC	Installation
21	China Construction Second Engineering Bureau Ltd.	Installation
22	Shanghai Automation and Instrument Co., Ltd.	Electrical design, electrical manufacture, mechanical design, mechanical manufacture
23	Shanxi North MTU Engine Co., Ltd.	Electrical design, electrical manufacture
24	Baoding Tianwei Baobian Electric Co., Ltd.	Electrical design, electrical manufacture
25	Xi'an XD Transformer Co., Ltd.	Electrical design, electrical manufacture
26	TBEA Shenyang Transformer Co., Ltd.	Electrical design, electrical manufacture
27	Baosheng Science & Technology Innovation Co., Ltd.	Electrical design, electrical manufacture

continued

No.	Licensee	Type (s) of License
28	TBEA Hengyang Transformer Co., Ltd.	Electrical design, electrical manufacture
29	Changzhou Bayi Cable Co., Ltd.	Electrical design, electrical manufacture
30	Jiangsu Huaguang Cable and Electrical Equipment Co., Ltd.	Electrical design, electrical manufacture
31	Jiangsu Shangshang Cable Group Co., Ltd.	Electrical design, electrical manufacture
32	Shaanxi Diesel Engine Heavy Industry Co., Ltd.	Electrical design, electrical manufacture
33	Shanghai Power Equipment Research Institute	Electrical design, electrical manufacture
34	Anhui Cable Co., Ltd.	Electrical design, electrical manufacture
35	Jiangsu Changyan Cable Co., Ltd.	Electrical design, electrical manufacture
36	Suzhou East-Instrument Automation Control Equipment Coy., Ltd.	Electrical design, electrical manufacture
37	CNNC Xi'an Nuclear Equipment Co., Ltd.	Electrical design, electrical manufacture
38	CNNC Beijing Instrument Factory	Electrical design, electrical manufacture
39	China Nuclear Power Technology Research Institute	Electrical design, electrical manufacture
40	Changzhou Electric Power Station Auxiliary Equipment Works Ltd.	Electrical design, electrical manufacture
41	Kiamusze Electric Machine Co., Ltd.	Electrical design, electrical manufacture, mechanical design, mechanical manufacture
42	Nanyang Explosion Protection Group Co., Ltd.	Electrical design, electrical manufacture
43	Shanghai Cable Factory Co., Ltd.	Electrical design, electrical manufacture
44	Shenyang Northeast Accumulator Co., Ltd.	Electrical design, electrical manufacture
45	Yangzhou Electric Power Equipment Manufacture Factory, CEEC	Electrical design, electrical manufacture
46	Shanghai Foxboro Co., Ltd.	Electrical design, electrical manufacture
47	Shanghai Electric Group Shanghai Electric Machine Factory	Electrical design, electrical manufacture
48	Shanghai Guanghua Instrument Co., Ltd.	Electrical design, electrical manufacture
49	Chongqing Chuanyi Automation Co., Ltd.	Electrical design, electrical manufacture
50	China Techenergy Co., Ltd.	Electrical design, electrical manufacture
51	Shanghai Welltech Automation Co., Ltd.	Electrical design, electrical manufacture
52	Yantai Cable Factory	Electrical design, electrical manufacture
53	Far East Cable Co., Ltd.	Electrical design, electrical manufacture
54	Sichuan Star Cable Co., Ltd.	Electrical design, electrical manufacture
55	Hoppecke Power System (Wuhan) Co., Ltd.	Electrical design, electrical manufacture
56	Shanghai East Heavy Machinery Co., Ltd., CSSC	Electrical design, electrical manufacture
57	Shenyang Cable Industry Corporation	Electrical design, electrical manufacture

continued

No.	Licensee	Type (s) of License
58	Jiangsu Xinyuancheng Cable Co., Ltd.	Electrical design, electrical manufacture
59	The 719th Research Institute of China Shipbuilding Industry Corporation	Electrical design, electrical manufacture
60	State Nuclear Power Plant Service Company	NDT
61	China Guangdong Nuclear Inspection Technology Co., Ltd.	NDT
62	China First Heavy Industries Co., Ltd.	Mechanical manufacture
63	China Erzhong Group (Deyang) Heavy Industries Co., Ltd.	Mechanical manufacture
64	Shanghai Heavy Machinery Factory Co., Ltd.	Mechanical manufacture
65	Dongfang Electric Corporation Dongfang Turbine Co., Ltd.	Mechanical manufacture
66	Dongfang Electric Corporation (Wuhan) Nuclear Equipment Co., Ltd.	Mechanical manufacture
67	Zhongxing Energy Equipment Co., Ltd.	Mechanical manufacture
68	Dalian Sulzer Pump & Compressor Co., Ltd.	Mechanical design, mechanical manufacture
69	Guizhou Hangtian Xinli Forging & Casting Co., Ltd.	Mechanical manufacture
70	Shenyang Xintong Power Station Equipment Manufacture Co., Ltd.	Mechanical design, mechanical manufacture
71	Suzhou Hailu Heavy Industry Co., Ltd.	Mechanical manufacture
72	Wuxi Xitang Petro & Chemical Mechanical Co., Ltd.	Mechanical manufacture
73	CNNC Xi'an Nuclear Equipment Co., Ltd.	Mechanical design, mechanical manufacture
74	Dongfang Electric Corporation Dongfang Boiler Co., Ltd.	Mechanical manufacture
75	Dalian Baoyuan Nuclear Equipment Co., Ltd.	Mechanical manufacture
76	Dongfang Electric Corporation (Guangzhou) Heavy Machinery Co., Ltd.	Mechanical manufacture
77	Harbin Electric Corporation (QHD) Heavy Equipment Co., Ltd.	Mechanical manufacture
78	Shenyang Shengshi High & Middle Pressure Valve Co., Ltd.	Mechanical design, mechanical manufacture
79	Shijiazhuang Valve 1st Factory Co., Ltd.	Mechanical design, mechanical manufacture
80	Shanghai Kaiquan Pump Co., Ltd.	Mechanical design, mechanical manufacture
81	Qinhuangdao Nuclear and Wind Equipment Co., Ltd.	Mechanical manufacture
82	Dalian Teikoku Canned Motor Pump Co., Ltd.	Mechanical design, mechanical manufacture
83	Changshou Huaxin Special Steel Co., Ltd.	Mechanical manufacture
84	Shenyang Blower Works Group Nuclear Pump Co., Ltd.	Mechanical design, mechanical manufacture
85	Jiangsu Haina Mechanical Motor Co., Ltd.	Mechanical manufacture

continued

No.	Licensee	Type (s) of License
86	Jiangsu New Hengji Special Equipment Co., Ltd.	Mechanical manufacture
87	Shanghai Electric Corporation Nuclear Equipment Company	Mechanical manufacture
88	Shenjiang Valve Co., Ltd.	Mechanical design, mechanical manufacture
89	Wuhan Heavy Machinery Casting & Forging Co., Ltd., CSIC	Mechanical manufacture
90	Tianding Nuclear Power Equipment Co., Ltd., AVIC Xi'an Aviation Engine Group	Mechanical manufacture
91	Hu'nan Xcmc Changsha Pump Works Co., Ltd.	Mechanical design, mechanical manufacture
92	Jiangnan Valve Co., Ltd.	Mechanical design, mechanical manufacture
93	Jiangsu Huayang Steel Pipe Fittings Co., Ltd.	Mechanical manufacture
94	Jiangsu Xingyang Pipe Fitting Co., Ltd.	Mechanical manufacture
95	Shanghai Kate Valve Manufacture Co., Ltd.	Mechanical design, mechanical manufacture
96	Sichuan Sanzhou SCMP Nuclear Equipment Manufacture Incorporation (ASS. ANEM)	Mechanical manufacture
97	Shanghai Eho Valve Manufacture Co., Ltd.	Mechanical design, mechanical manufacture
98	Shanghai Valve Factory Co., Ltd.	Mechanical design, mechanical manufacture
99	Dalian Hermetic Pump Co., Ltd.	Mechanical design, mechanical manufacture
100	Wuxi Xinfeng Pipe-Fittings Corp.	Mechanical manufacture
101	Shanghai Electric Power Generation Equipment Co., Ltd.	Mechanical design, mechanical manufacture
102	Shanghai Morimatsu Pressure Vessel Co., Ltd.	Mechanical manufacture
103	Yangzhou Dongfang Hanging Bracket Co., Ltd.	Mechanical manufacture
104	Yantai Taihai Marnoir Nuclear Equipment Co., Ltd.	Mechanical manufacture
105	Anhui Yingliu Group Huoshan Casting Co., Ltd.	Mechanical manufacture
106	Bao Steel Group Corporation	Mechanical manufacture
107	Dongfang Areva Nuclear Pump Co., Ltd.	Mechanical manufacture
108	Nanjing Aerosun-Tola Co., Ltd.	Mechanical design, mechanical manufacture
109	Shanghai Apollo Machinery Co., Ltd.	Mechanical design, mechanical manufacture
110	Shanghai Xinmin Duty Forging Co., Ltd.	Mechanical manufacture
111	Suzhou High and Middle Pressure Valve Factory	Mechanical design, mechanical manufacture
112	Wuxi Flange Forging Co., Ltd.	Mechanical manufacture
113	China Nuclear Gansu Jiahua Nuclear Equipment Manufacture Co., Ltd.	Mechanical manufacture
114	Jiangsu Shentong Valve Co., Ltd.	Mechanical design, mechanical manufacture
115	China Nuclear Power Equipment Co., Ltd.	Mechanical manufacture
116	Beijing Jingcheng Compressor Co., Ltd.	Mechanical design, mechanical manufacture

continued

No.	Licensee	Type (s) of License
117	Nanfang Ventilator Co., Ltd.	Mechanical design, mechanical manufacture
118	Grand-Resistant Pump Co., Ltd.	Mechanical design, mechanical manufacture
119	Harbin Electric Machinery AC/DC Machine Co., Ltd.	Mechanical manufacture
120	Zhejiang Jiuli Special Material Technology Co., Ltd.	Mechanical manufacture
121	Hebei Hongrun Heavy Industry Group Co., Ltd.	Mechanical manufacture
122	Jiangsu Yinhuan Precision Steel Piping Co., Ltd.	Mechanical manufacture
123	Jiangsu Haida Pipe Fitting Ltd	Mechanical manufacture
124	Wujiang Dongwu Machine Co., Ltd.	Mechanical design, mechanical manufacture
125	Jiangsu Electric Power Equipment Co., Ltd., CEEC	Mechanical design, mechanical manufacture
126	Shandong Nuclear Power Equipment Manufacture Co., Ltd.	Mechanical manufacture
127	Shenyang Kejin Special Material Co., Ltd.	Mechanical manufacture
128	Zhejiang Shangfeng Industry Co., Ltd.	Mechanical design, mechanical manufacture
129	Zhejiang Hanyuan Electric Power Manufacture Co., Ltd.	Mechanical manufacture
130	Chongqing Pump Factory Ltd.	Mechanical design, mechanical manufacture
131	Suzhou Neway Valve Co., Ltd.	Mechanical design, mechanical manufacture
132	Citic Heavy Industries Co., Ltd.	Mechanical manufacture
133	Shanghai Shenjiang Forging Co., Ltd.	Mechanical manufacture
134	Baoyin Special Steel Piping Co., Ltd.	Mechanical manufacture
135	Dalian Deepblue Pump Co., Ltd.	Mechanical design, mechanical manufacture
136	Hunan Xcmc Changsha Pump Casting Co., Ltd.	Mechanical manufacture
137	Sichuan Greatwall Steel Piping Co., Ltd.	Mechanical manufacture
138	Jiangsu Xinghe Valve Co., Ltd.	Mechanical design, mechanical manufacture
139	Bohai Shipbuilding Factory Group Co., Ltd., CISC	Mechanical manufacture
140	Angang Heavy Machine Co., Ltd.	Mechanical manufacture
141	Xi'an Shangu Power Co., Ltd.	Mechanical design, mechanical manufacture
142	Yangzhou Huayu Pipe Fitting Co., Ltd.	Mechanical manufacture
143	Zhejiang Sanfang Group Co., Ltd.	Mechanical design, mechanical manufacture
144	Lanzhou Lanshi Heat-exchanger Equipment Co., Ltd.	Mechanical design, mechanical manufacture
145	Dalian Dagao Valve Co., Ltd.	Mechanical design, mechanical manufacture
146	Shanghai First Machine Tool Co., Ltd.	Mechanical manufacture
147	Sufa Technology Industry Co., Ltd., CNNC	Mechanical design, mechanical manufacture
148	Gelin (Changzhou) Electrical Power Machine-building Co., Ltd.	Mechanical design, mechanical manufacture

continued

No.	Licensee	Type (s) of License
149	Zhejiang Jindun Fans Holding Co., Ltd.	Mechanical design, mechanical manufacture
150	Fangda Carbon New Material Technology Co., Ltd.	Mechanical manufacture
151	Shanghai Neles-Jamesbury Valve Co., Ltd.	Mechanical manufacture
152	Shanghai Electric KSB Nuclear Pump & Valve Co., Ltd.	Mechanical design, mechanical manufacture
153	Pangang Group Chengdu Iron & Vanadium Co., Ltd.	Mechanical manufacture
154	Dalian Hitachi Mechanical Equipment Co., Ltd.	Mechanical manufacture
155	Shanghai No. 5 Valve Factory Co., Ltd.	Mechanical design, mechanical manufacture
156	Shanghai Lianggong Valve Factory Co., Ltd.	Mechanical design, mechanical manufacture
157	Jilin Zhongyi Nuclear Piping Manufacture Co., Ltd.	Mechanical manufacture
158	Dongfang Electric Co., Ltd.	Mechanical manufacture
159	Siping THT Plate Heat Transfer Co., Ltd.	Mechanical design, mechanical manufacture
160	Sichuan Kexin Mechanical Equipment Co., Ltd.	Mechanical manufacture
161	Pall Filter (Beijing) Co., Ltd.	Mechanical manufacture
162	Tyco Fluid Control (Shanghai) Co., Ltd.	Mechanical design, mechanical manufacture
163	Nantong Dart-Pollrich Fan Co., Ltd.	Mechanical design, mechanical manufacture
164	Lisega Pipeline Bearer Technology (Shanghai) Co., Ltd.	Mechanical manufacture
165	Taiyuan Heavy Industry Co., Ltd.	Mechanical manufacture
166	Tai'an Shankou Forging and Casting Co., Ltd.	Mechanical manufacture
167	Jiangsu Biaoxin Kubota Industry Co., Ltd.	Mechanical manufacture
168	Shanghai Toyo Tanso Carbon Material Co., Ltd.	Mechanical manufacture
169	Zhangjiagang Chemical Equipment Co., Ltd.	Mechanical manufacture
170	Shandong Hongda Technology Group Co., Ltd.	Mechanical manufacture
171	Shangyu Special Fan Co., Ltd.	Mechanical design, mechanical manufacture
172	Inner Mongolia North Heavy Industries Group Co., Ltd.	Mechanical manufacture
173	Bohai Heavy Industry Pipeline Co., Ltd.	Mechanical manufacture
174	Nantong China International Marine Containers Co., Ltd.	Mechanical manufacture
175	Henan Kaifeng High Pressure Valve Co., Ltd.	Mechanical design, mechanical manufacture
176	Shanghai Ruiniu Machinery and Equipment Manufacturing Co., Ltd.	Mechanical design, mechanical manufacture
177	Dalian Shipbuilding Heavy Industry Group Co., Ltd.	Mechanical manufacture
178	Anshan Electro-Valve Co., Ltd.	Mechanical design, mechanical manufacture
179	Zhejiang Zhongda Special Steel Co., Ltd.	Mechanical manufacture
180	Jiangsu Wujin Stainless Steel Pipe Group Co., Ltd.	Mechanical manufacture

continued

No.	Licensee	Type (s) of License
181	Hengyang Valin Steel Tube Co., Ltd.	Mechanical manufacture
182	Jiangsu Runyang Pipe Fitting Co., Ltd.	Mechanical manufacture
183	Tianjin Electric Power Construction Co., Ltd., CEEC	Installation
184	Qingdao Lanshi Heavy Machinery Co., Ltd.	Mechanical manufacture
185	China-Kinwa High Technology Co., Ltd.	Electrical design, electrical manufacture
186	Sichuan Huadu Nuclear Equipment Manufacture Co., Ltd.	Mechanical manufacture
187	Wuxi Huatex Machinery Manufacture Co., Ltd.	Installation
188	Jiangsu Haishi Pump Manufacturing Co., Ltd.	Mechanical design, mechanical manufacture
189	Anhui A-Line Electric Pumps Co., Ltd.	Mechanical design, mechanical manufacture
190	China Nuclear Control System Engineering Co., Ltd.	Electrical design, electrical manufacture
191	Harbin Boiler Co., Ltd.	Mechanical manufacture
192	Yangzhou Shuguang Cable Co., Ltd.	Electrical design, electrical manufacture
193	Shandong Beichen Mechanical & Electrical Equipment Co., Ltd.	Mechanical manufacture

Table 80. Confirmation of the Foreign Entity Registration for the License for Civil Nuclear Safety Equipment in 2013

Document No.	Issuance Date	Title
NNSA[2013]157	09/02/2013	Notification of Issuing Civil Nuclear Safety Equipment Foreign Entity Registration Confirmation for HEW-KABEL GmbH, and other 16 German Entities

Safety Inspection of Imported Equipment

In 2013, MEP (NNSA) undertook inspections on the imported nuclear safety equipment according to related regulations. In the field of applied inspection at the Customs, applications of 724 batches of imported equipment were reviewed, including 521 batches of mechanical equipment, while 203 batches of electrical equipment. Among the applications, 704 batches were signed for releasing, 20 batches were rejected. In the field of open package inspection, applications of 692 batches were received, including 506 batches of mechanical equipment, and 186 batches of electrical equipment. Among the inspections, 682 batches were accepted, while 10 batches were rejected, and 121 batches were taken open package inspection.

Regulation and Inspection for Civil Nuclear Safety Equipment

In 2013, according the surveillance plan, MEP (NNSA) undertook comprehensive inspections for 39 times on domestic factories, and 2 times on foreign factories. MEP (NNSA) undertook

special inspections for 7 times on domestic factories, and nuclear safety comprehensive inspections on 10 key entities. MEP (NNSA) also undertook special inspections for 40 times on illegal repair welding, and point inspections on the 890 key processes (including 513 on-the-spot witness). Supervision and inspection activities for civil nuclear safety equipment in 2013 are shown in Table 81. Until now, 9 in-factory inspection offices were established in China, United States, and Russia, and permanent inspectors were assigned there for routine inspection. Through the inspections, renovation requirements were raised in time for the problems discovered and expert reviews and special inspections were fulfilled to major unqualified items related to nuclear safety. In general, the qualities of design, manufacture, installation, and NDT of civil nuclear safety equipment were under control in 2013.

Table 81. Inspection Activities for Civil Nuclear Safety Equipment in 2013

No.	Start Date	Item
1	01/16/13	The Special Inspection on Fake Renovation of Water Quality Analysis of Dalian Baoyuan Nuclear Equipment Co., Ltd.
2	01/21/13	The Special Inspection on Quality Problems of Shenyang Blower Works Group Nuclear Pump Co., Ltd.
3	03/12/13	The Comprehensive Inspection on CNNC Beijing Nuclear Instrument Factory
4	03/19/13	The Comprehensive Inspection on Jiangsu Changyan Cable Co., Ltd.
5	03/20/13	The Comprehensive Inspection on China Erzhong Group (Deyang) Heavy Industry Co., Ltd.
6	03/26/13	The Special Inspection on Nuclear Power Institute of China
7	03/27/13	The Comprehensive Inspection on Dongfang Electric Corporation Dongfang Turbine Co., Ltd.
8	04/08/13	The Comprehensive Inspection on Shanghai Apollo Mechanical Co., Ltd.
9	03/26/13 04/09/13	The Comprehensive Inspection on Baoding Tianwei Baobian Electric Co., Ltd.
10	04/11/13	The Comprehensive Inspection on China Nuclear Industry Fifth Construction Company
11	04/15/13	The Comprehensive Inspection on Shanghai Guanghua Instrument Co., Ltd.
12	04/17/13	The Comprehensive Inspection on Citic Heavy Industries Co., Ltd.
13	04/24/13	The Comprehensive Inspection on Dalian Deepblue Pump Co., Ltd.
14	05/07/13	The Comprehensive Inspection on Dongfang Electric Corporation (Guangzhou) Heavy Machinery Co., Ltd.
15	05/08/13	The Comprehensive Inspection on Jilin Zhongyi Nuclear Piping Manufacture Co., Ltd.
16	05/14/13	The Comprehensive Inspection on Nanyang Explosion Protection Group Co., Ltd.
17	05/21/13	The Comprehensive Inspection on Shanghai Valve Factory Co., Ltd.
18	05/21/13	The Comprehensive Inspection on Shanghai Automation and Instrument Co., Ltd.
19	05/27/13	The Comprehensive Inspection on Institute of Nuclear and New Energy Technology, Tsinghua University
20	05/29/13	The Special Inspection on Renovation and Implementation of Comprehensive Inspection in 2012, and Nuclear Grade Valve Repair Activities of Dalian Dagao Valve Co., Ltd.

continued

No.	Start Date	Item
21	06/17/13	The Comprehensive Inspection on Yangzhou Electric Power Equipment Factory
22	06/18/13	The Comprehensive Inspection on China Nuclear Power Technology Research Institute
23	06/23/13	Investigation on the Process Missing Checkpoints at Shanghai Electric Corporation Nuclear Equipment Company
24	07/10/13	The Comprehensive Inspection on Wuxi Flange Forging Co., Ltd.
25	07/10/13	The Non-routine Inspection on Illegal Repair Welding Event of Tubing Safe End after the Hydrostatic Test for the RPV of Taishan NPP Unit 2 of Dongfang Electric Corporation (Guangzhou) Heavy Machinery Co., Ltd.
26	07/15/13	The Comprehensive Inspection on the 719th Research Institute of China Shipbuilding Industry Corporation
27	07/22/13	The Comprehensive Inspection on Lanzhou Lanshi Heat-exchanger Equipment Co., Ltd.
28	07/29/13	The Non-routine Special Inspection on a Large Number of Defects on Casting Pump Body of Anhui Yingliu Group Huoshan Casting Co., Ltd.
29	08/05/13	The Comprehensive Inspection on TBEA Hengyang Transformer Co., Ltd.
30	08/06/13	The Comprehensive Inspection on Nuclear Safety of Xi'an Nuclear Equipment Co., Ltd.
31	08/11/13	The Comprehensive Inspection on Nuclear Safety of China First Heavy Industries Co., Ltd.
32	08/12/13	The Comprehensive Inspection on China Techenergy Co., Ltd.
33	08/20/13	The Comprehensive Inspection on Nuclear Safety Dalian Dagao Valve Co., Ltd.
34	08/26/13	The Comprehensive Inspection on Nuclear Safety of Shanghai Nuclear Power Engineering and Design Institute
35	08/28/13	The Comprehensive Inspection on Nuclear Safety of Design and Manufacture Activities for Primary Pump of Fuqing and Fangjiashan Projects, Including ANDRITZ (China) Ltd. and Harbin Electric Power Equipment Co., Ltd.
36	09/02/13	The Comprehensive Inspection on Nuclear Safety of Shenyang Blower Works Group Nuclear Pump Co., Ltd.
37	09/02/13	The Comprehensive Inspection on INVENSYS
38	09/03/13	The Comprehensive Inspection on Nuclear Safety of Shanghai Heavy Machinery Factory Co., Ltd.
39	09/03/13	The Comprehensive Inspection on Nuclear Safety of Shanghai Electric Corporation Nuclear Equipment Company
40	09/10/13	The Comprehensive Inspection on Nuclear Safety of Shanghai First Machine Tool Co., Ltd.
41	09/10/13	The Comprehensive Inspection on Nuclear Safety of Harbin Electric Corporation (QHD) Heavy Equipment Co., Ltd.
42	09/23/13	The Comprehensive Inspection on Shaanxi Diesel Heavy Engine Industry Co., Ltd.
43	10/09/13	The Comprehensive Inspection on the 718th Research Institute of China Shipbuilding Industry Corporation
44	10/10/13	The Non-routine Inspection on Violations of Dalian Dagao Valve Co., Ltd.
45	10/12/13	The Non-routine Inspection on NDT Violations of Beijing Jingcheng Compressor Co., Ltd.

continued

No.	Start Date	Item
46	10/15/13	The Comprehensive Inspection on China Guangdong Nuclear Power Services (CGNPS) Inspection Technology Co., Ltd.
47	10/16/13	The Non-routine Inspection on Illegal Repair Welding Event on Drilling of Skirt Component Support Plate of 4 RHR Heat Exchanger of Fangchenggang Project, and Ningde Project of Xi'an Nuclear Equipment Co., Ltd.
48	10/23/13	The Environmental Acceptance Test on Shutdown for Renovation of Dongfang Electric Corporation (Guangzhou) Heavy Machinery Co., Ltd.
49	10/28/13	The On-spot Witness on License Renewal Approval for Yangzhou Dongfang Hanging Bracket Co., Ltd.
50	10/29/13	The Comprehensive Inspection on China Nuclear Power Operation Technology Corporation
51	10/29/13	The Comprehensive Inspection on Hoppecke Power System (Wuhan) Co., Ltd.
52	10/30/13	The Comprehensive Inspection on Shanghai Morimatsu Pressure Vessel Co., Ltd.
53	11/03/13	The Comprehensive Inspection on Tyco Fluid Control (Shanghai) Co., Ltd.
54	11/12/13	The Comprehensive Inspection on Changzhou Electric Power Station Auxiliary Equipment Works Ltd.
55	11/17/13	The Comprehensive Inspection on German AREVA Company
56	12/03/13	The Comprehensive Inspection on China Nuclear Power Engineering Company
57	12/09/13	The Comprehensive Inspection on Shanxi North MTU Engine Co., Ltd.
58	12/09/13	The Comprehensive Inspection on Kiamusze Electric Machine Co., Ltd.
59	12/10/13	The Special Inspection on Illegal Repair Welding Event of Jiangsu Shentong Valve Co., Ltd.
60	12/10/13	The Special Inspection on Illegal Repair Welding Event of Dongfang Boiler Co., Ltd.
61	12/10/13	The Special Inspection on Illegal Repair Welding Event of Nanfang Ventilator Co., Ltd.
62	12/10/13	The Special Inspection on Illegal Repair Welding Event of Dongfang Turbine Co., Ltd.
63	12/10/13	The Special Inspection on Illegal Repair Welding Event of Suzhou Neway Valve Co., Ltd.
64	12/10/13	The Special Inspection on Illegal Repair Welding Event of Dalian Keikoku Canned Motor Pump Co., Ltd.
65	12/12/13	The Special Inspection on Illegal Repair Welding Event of China Nuclear Industry Fifth Construction Company (precast yard)
66	12/12/13	The Special Inspection on Illegal Repair Welding Event of Lisega Pipeline Bearer Technology (Shanghai) Co., Ltd.
67	12/13/13	The Special Inspection on Illegal Repair Welding Event of Dongfang Areva Nuclear Pump Co., Ltd.
68	12/13/13	The Special Inspection on Illegal Repair Welding Event of Suzhou Hailu Heavy Industry Co., Ltd.
69	12/13/13	The Special Inspection on Illegal Repair Welding Event of Dalian Deepblue Pump Co., Ltd.
70	12/15/13	The Special Inspection on Illegal Repair Welding Event of Guizhou Hangtian Xinli Forging & Casting Co., Ltd.
71	12/16/13	The Special Inspection on Illegal Repair Welding Event of Dalian Hitachi Mechanical Equipment Co., Ltd.

continued

No.	Start Date	Item
72	12/16/13	The Special Inspection on Illegal Repair Welding Event of Shanghai Apollo Mechanical Co., Ltd.
73	12/16/13	The Special Inspection on Illegal Repair Welding Event of Yantai Taihai Marnoir Nuclear Equipment Co., Ltd.
74	12/16/13	The Special Inspection on Illegal Repair Welding Event of Dalian Hermetic Pump Co., Ltd.
75	12/16/13	The Special Inspection on Illegal Repair Welding Event of China Nuclear Power Equipment Ltd.
76	12/16/13	The Special Inspection on Illegal Repair Welding Event of Shanghai Electric KSB Nuclear Pump & Valve Co., Ltd.
77	12/16/13	The Special Inspection on Illegal Repair Welding Event of Shijiazhuang Valve 1st Factory Co., Ltd.
78	12/16/13	The Special Inspection on Illegal Repair Welding Event of China Erzhong Group (Deyang) Heavy Industry Co., Ltd.
79	12/17/13	The Special Inspection on Illegal Repair Welding Event of No.7 Factory Of Shanghai Automation and Instrument Co., Ltd.
80	12/17/13	The Special Inspection on Illegal Repair Welding Event of Nantong China International Marine Container Co., Ltd.
81	12/17/13	The Comprehensive Inspection on Jiangsu Shangshang Cable Group Co., Ltd.
82	12/18/13	The Special Inspection on Illegal Repair Welding Event of Dalian Baoyuan Nuclear Equipment Co., Ltd.
83	12/18/13	The Special Inspection on Illegal Repair Welding Event of Shandong Nuclear Power Equipment Manufacture Co., Ltd.
84	12/18/13	The Special Inspection on Illegal Repair Welding Event of Dongfang Electric Corporation (Wuhan) Nuclear Equipment Co., Ltd.
85	12/18/13	The Special Inspection on Illegal Repair Welding Event of Lanzhou Lanshi Heat-exchanger Equipment Co., Ltd.
86	12/19/13	The Special Inspection on Illegal Repair Welding Event of Dalian Sulzer Pump & Compressor Co., Ltd.
87	12/19/13	The Special Inspection on Illegal Repair Welding Event of Shanghai Lianggong Valve Factory Co., Ltd.
88	12/19/13	The Special Inspection on Shanghai Electric Power Equipment Research Institute
89	12/21/13	The Special Inspection on Illegal Repair Welding Event of Chongqing Pump Factory Ltd.
90	12/23/13	The Special Inspection on Illegal Repair Welding Event of China Nuclear Industry 23 Construction Co., Ltd (precast yards in Qinshan, Huizhou)
91	12/23/13	The Special Inspection on Illegal Repair Welding Event of Shanghai Electric Power Generation Equipment Co., Ltd.
92	12/23/13	The Special Inspection on Illegal Repair Welding Event of Sichuan Sanzhou SCMP Nuclear Equipment Manufacture Corporation
93	12/23/13	The Special Inspection on Illegal Repair Welding Event of Anhui Yingliu Group Huoshan Casting Co., Ltd.

continued

No.	Start Date	Item
94	12/23/13	The Special Inspection on Illegal Repair Welding Event of Zhejiang Shangfeng Industry Co., Ltd.
95	12/23/13	The Special Inspection on Illegal Repair Welding Event of Sufa Technology Industry Co., Ltd., CNNC
96	12/23/13	The Comprehensive Inspection on JSC Machine-Building Plant ZIO-PODOLSK, Russian Federation
97	12/24/13	The Special Inspection on Illegal Repair Welding Event of Nanjing Aerosun Tola Bellows Co., Ltd.
98	12/25/13	The Special Inspection on Illegal Repair Welding Event of Wuhan Heavy Machinery Forging & Casting Co., Ltd.
99	12/26/13	The Special Inspection on Illegal Repair Welding Event of Zhejiang Sanfang Group Co., Ltd
100	12/26/13	The Special Inspection on Illegal Repair Welding Event of Wujiang Dongwu Mechanical Co., Ltd.
101	12/30/13	The Special Inspection on Illegal Repair Welding Event of Pall Filter (Beijing) Co., Ltd.

12 Environmental Regulation on Electromagnetic Radiation

MEP (NNSA) finished the "Control Limits of Public Exposure in Electromagnetic Environment (draft for approval)", "Technical Guidance of Environmental Impact Assessment: Power Transmission and Transform Project (draft for approval)", and "Technical Acceptance Test Guidance of Environmental Protection of Construction Completion: Power Transmission and Transform Project (draft for approval)". They are in processes for approval.

MEP (NNSA) organized MEP Radiation Monitoring Technical Center, MEP Nuclear and Radiation Safety Center, and Power System Electromagnetic Compatibility Laboratory jointly developed "Power Grid Environmental Protection ABC".

The environmental impact assessment reports for 20 electric power transmission and transform projects were reviewed and approved, including the Ningdong-Zhejiang ± 800kV UHV DC power transmission project. The environmental acceptance tests of project completion for 38 electric power transmission and transform projects were completed, including the Xining-Xining 2-Ulan-Golmud ± 750kV DC power transmission project (see Table 82).

Table 82. Administrative Approvals in the Field of Electromagnetic Radiation Environmental Monitoring in 2013

Document No.	Approval Date	Title
MEP App[2013]8	01/07/13	Reply to the Environmental Impact Assessment Report for Jinping 500kV Output Power Transmission and Transformation Project (adjustment)
MEP App[2013]11	01/08/13	Reply to the Environmental Impact Assessment Report for Ningxia Wuzhong Helan Mountain 750kV Substation Extension Project
MEP App[2013]13	01/08/13	Reply to the Environmental Impact Assessment Report for Ningxia Zhongwei Yellow River 750kV Substation Extension Project
MEP App[2013]25	01/28/13	Reply to the Environmental Impact Assessment Report for Xinjiang Zhundong Wucai Bay 750kV Power Transmission and Transformation Project
MEP App[2013]26	01/28/13	Reply to the Environmental Impact Assessment Report for Ya'an-Wuhan 1000kV AC UHV Power Transmission and Transformation Project

continued

Document No.	Approval Date	Title
MEP App[2013]73	03/11/13	Reply to the Environmental Impact Assessment Report for Gaoling-Tianma the 3rd Circuit of 500kV Power Transmission and Transformation Project
MEP App[2013]98	04/02/13	Reply to the Environmental Impact Assessment Report for Baoji-Xi'an South-Weinan 750kV Power Transmission and Transformation Project
MEP App[2013]101	04/02/13	Reply to the Environmental Impact Assessment Report for Shaanxi Xinyi 750kV Substation Extension Project
MEP App[2013]148	06/14/13	Reply to the Environmental Impact Assessment Report for the Transmission and Transformation Project of Interconnection between Tibet Changdu and Sichuan Grid
MEP App[2013]165	07/18/13	Reply to the Environmental Impact Assessment Report for Xinjiang Kuqa-Aksu 750kV Power Transmission and Transformation Project
MEP App[2013]167	07/18/13	Reply to the Environmental Impact Assessment Report for Xishui Erlang Power Plant Export Project
MEP App[2013]168	07/18/13	Reply to the Environmental Impact Assessment Supplementary Report for Sino-Russian DC Back-to-back Network Project
MEP App[2013]169	07/18/13	Reply to the Environmental Impact Assessment Report for Hexi (Jinchang) 750kV Substation Extension Project
MEP App[2013]170	07/18/13	Reply to the Environmental Impact Assessment Report for Yongdeng (Wusheng) 750kV Substation Extension Project
MEP App[2013]171	07/18/13	Reply to the Environmental Impact Assessment Report for Jiuquan 750kV Substation Extension Project
MEP App[2013]172	07/18/13	Reply to the Environmental Impact Assessment Report for Ningxia Helan Mountain-Yellow River #2 750kV Line Project
MEP App[2013]173	07/18/13	Reply to the Environmental Impact Assessment Report for Ili-Kuqa 750kV Power Transmission and Transformation Project, as Part of the Ili-Kuqa-Bayingolin Power Transmission and Transformation Project
MEP App[2013]216	09/02/13	Reply to the Environmental Impact Assessment Report for Ningdong-Zhejiang ±800kV AC UHV Power Transmission Project
MEP App[2013]261	10/16/13	Reply to the Environmental Impact Assessment Report for Ningxia Sand Lake 750kV Power Transmission and Transformation Project
MEP App[2013]299	11/28/13	Reply to the Environmental Impact Assessment Report for Aksu-Bachu-Kash 750kV Power Transmission and Transformation Project
MEP Acc[2013]3	01/04/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of 330kV East Beach Power Transmission and Transformation Project
MEP Acc[2013]4	01/04/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of the Three Gorges Underground Power Station to Jingmen 500kV Line Project (the Three Gorges Underground Power Station Output Project)
MEP Acc[2013]5	01/04/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Ge-Shanghai DC Comprehensive Renovation Project

continued

Document No.	Approval Date	Title
MEP Acc[2013]6	01/04/13	Official Letter of the Environment Protection Acceptance Test Comments on Project Completion of 330kV Huayuan-Xining Double-circuit Line Power Transmission and Transformation Project
MEP Acc[2013]7	01/04/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Qinghai 330kV Ganhe Park Power Transmission and Transformation Project
MEP Acc[2013]64	03/27/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Guangyuan 500kV Power Transmission and Transformation Project
MEP Acc[2013]65	04/01/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Jiangsu 500kV Xuzhou Dai Mount Power Transmission and Transformation with Booster Substations Project
MEP Acc[2013]66	04/01/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of 500kV Beilun Power Plant-Guancheng Power Transmission Line Project
MEP Acc[2013]67	04/01/13	Official Letter of the Environment Acceptance Comments on Project Completion of Jiangsu 500kV Jintan (Yinzhuang) Boost Power Transmission and Transformation Project
MEP Acc[2013]86	05/03/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of 750kV Xining-Xining2-Ulaan-Golmud Power Transmission and Transformation Project
MEP Acc[2013]97	05/13/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of 500kV Xinhui (Keisuke Peak) Power Transmission and Transformation Project
MEP Acc[2013]119	06/05/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Anci 500kV Power Transmission and Transformation Project
MEP Acc[2013]120	06/05/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Lintao 330kV Substation #2 Major Transformer Extension Project
MEP Acc[2013]121	06/05/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Lanzhou West 330kV Substation #2 Major Transformer Extension Project
MEP Acc[2013]191	09/04/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Xingdong (Zongzhou) 500kV Power Transmission and Transformation Project and Qingyuan 500kV Substation Extension Project
MEP Acc[2013]208	09/26/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of 750kV Binchang Power Plant-Qian County Transmission Line Project
MEP Acc[2013]209	09/26/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Sanying (Qingshui River) 330kV Power Transmission and Transformation Project

continued

Document No.	Approval Date	Title
MEP Acc[2013]210	09/26/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Qian County-Baoji 750kV Power Transmission and Transformation Project
MEP Acc[2013]220	10/15/13	Official Letter of the Environment Acceptance Comments on Project Completion of the Project Transmission Line from Double Bifurcation Solutions Point on 500kV Jiangmen to Maoming Line into Wuyi Substation
MEP Acc[2013]221	10/15/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Anhui 500kV Xiangshuijian Pumped Storage Power Station Output Project
MEP Acc[2013]236	11/01/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Luan County (Tang Mountain East) 500kV Power Transmission and Transformation Project
MEP Acc[2013]251	11/21/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Xihe (Shaijin) 330kV Power Transmission and Transformation Project
MEP Acc[2013]252	11/21/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Wudu 330kV Power Transmission and Transformation Project
MEP Acc[2013]253	11/21/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of the Major Transformer Extension Project and Matching Line Project of Yellow River 750kV Substation
MEP Acc[2013]254	11/21/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Guangdong Zhuhai 500kV Power Transmission and Transformation Project
MEP Acc[2013]267	11/28/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Tangshan North 500kV Power Transmission and Transformation Project
MEP Acc[2013]273	12/03/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of the Network Engineering of China Southern Power Grid and Hainan Power Grid (inland part)
MEP Acc[2013]277	12/09/13	Official Letter of the Environment Acceptance Test Project Comments on Project Completion of 500kV Shajiang Line A and Line B with Bifurcation Solutions Point to Guangnan Power Station Transmission Line Project
MEP Acc[2013]278	12/09/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Haimen Power Plant 500kV Access System Power Transmission and Transformation Project
MEP Acc[2013]280	12/10/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Xichang 500kV Power Transmission and Transformation Project
MEP Acc[2013]281	12/10/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Taoyuan 330kV Power Transmission and Transformation Project

continued

Document No.	Approval Date	Title
MEP Acc[2013]324	12/24/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Lingwu Power Plant Phase Ⅱ-Yinchuan East 750kV Power Transmission and Transformation Project
MEP Acc[2013]325	12/24/13	Official Letter of the Environment Acceptance Comments on Project Completion of Shuidonggou Power Plant-Yinchuan East 750kV Power Transmission and Transformation Project
MEP Acc[2013]326	12/24/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Leigong Mountain (Ganzhou South) 500kV Power Transmission and Transformation Project
MEP Acc[2013]327	12/24/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Mianyang 500kV Power Transmission and Transformation Project
MEP Acc[2013]328	12/24/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Nanchong 500kV Substation Extension Project
MEP Acc[2013]329	12/24/13	Official Letter of the Environment Acceptance Test Comments on Project Completion of Ningxi Helan Mountain 750kV Substation #2 Major Transformer Project
MEP Acc[2013]330	12/24/13	Official Letter of Environment Acceptance Test Comments on Project Completion of Sino-Russian DC Back-to-back Network Project

750 kV Phoenix-Usu-Ili Power Transmission and Transformation Project

13 Radiation Environment Monitoring

In 2013, the nationwide radiation environment quality was generally good. The environmental ionizing radiation levels remained stable within the swing range of natural background. The environmental ionizing radiation overall level adjacent to nuclear facilities and nuclear technology application projects did not show significant changes. The overall environmental electromagnetic radiation level was fine, the overall environmental electromagnetic radiation level adjacent to electromagnetic radiation emitting facilities did not show significant changes.

Radiation Environment Monitoring

MEP (NNSA) completed the radiation environmental monitoring ability assessment at the provincial level on schedule, and it effectively promoted the qualified capacity construction of radiation monitoring organizations in each province. In 2013, the monitoring ability assessment for the rest 17 provinces was completed on the spot as planned, therefore, the radiation environmental monitoring capability assessment for the nationwide 31 provinces (regions, cities) was completed successfully, and the assessment general report was issued to provincial environmental protection departments to guide them to undertake ability construction work precisely in the future. Evaluation results show that, at present, the radiation monitoring abilities of most provinces basically meet the needs of radiation environmental quality monitoring, regulatory monitoring of important nuclear and radiation facilities, and radiation environmental emergency monitoring. However, there are still gaps between the monitoring ability and the demand of the development for nuclear energy and nuclear technology utilization. Nationwide radiation environmental monitoring capacity needs to speed up. A small number of provinces have insufficient understanding of the importance of radiation monitoring work. They did not complete to form effective policy system to retain and encourage talents. Through this work, MEP (NNSA) have improved the provincial environmental protection departments/bureaus to attach importance to the radiation monitoring work, and have effectively promoted the ability construction of the provincial radiation station.

MEP (NNSA) will continue to work on ability construction of hardware for radiation monitoring and emergency preparedness,

and to promote the capacity construction work. The central governmental emission reduction projects started in 2011 have been basically completed, the central governmental emission reduction projects started in 2012 are undertaken in process, and the 2013 central emission reduction projects have been officially launched. The technical requirements and operation management measures of the regulatory monitoring system on nuclear power plant have been developed. The replies to the technical reviews and approvals for construction proposals of new nuclear power plant have been basically completed.

MEP (NNSA) issued the "12th Five-Year Plan Work Plan of Nationwide Radiation Environmental Monitoring System Construction", to guide the provincial environmental protection departments to undertake the radiation environmental monitoring capacity construction, and organized to prepare the construction scheme of the state-controlled radiation environment automatic monitoring station and the state-level radiation environmental monitoring capacity construction projects. MEP (NNSA) issued the "2013 Nationwide Radiation Environmental Monitoring Scheme", improved the state-controlled monitoring spots and monitoring content of all provinces, and completed the summary, evaluation, feedback, and report writing of the state-controlled network monitoring data.

MEP (NNSA) completed the 2013 nationwide radiation environmental monitoring training task. There were 41 comprehensive and skills training programs have been implemented, and 560 people were trained.

Environmental Ionizing Radiation

The nationwide environmental ionizing radiation levels remained stable within the swing range of natural background. The real-time continuous gamma radiation air-absorbed dose rates (see Figure 1) from radiation environment automatic monitoring station were all within the swing of the natural background. Aerosols, total alpha and beta activity concentration of the fallout, and tritium activity concentration in the air were all under normal investigation environmental level. Artificial radionuclide activity concentrations in Yangtze river, Yellow River, Pearl River, Songhua River, Huai River, Hai River, Liao River, rivers in Zhejiang and Fujian, rivers in the Southwest, rivers in the Northwest, and major lakes (reservoirs) had no obvious changes, compared with those in previous years. Natural radionuclide activity concentration and the investigation results of nationwide environmental natural radioactive level from 1983 to 1990 were at the same level. The total alpha and beta activity concentrations in potable groundwater and water from centralized drinking water source in capital cities which were in surveillance were all under specified limits in the "Drinking Water Health Standard" (GB 5749-2006). Artificial radionuclide strontium-90 and cesium-137 activity levels (see Figure 2) in seawater adjacent to shoreline were under specified

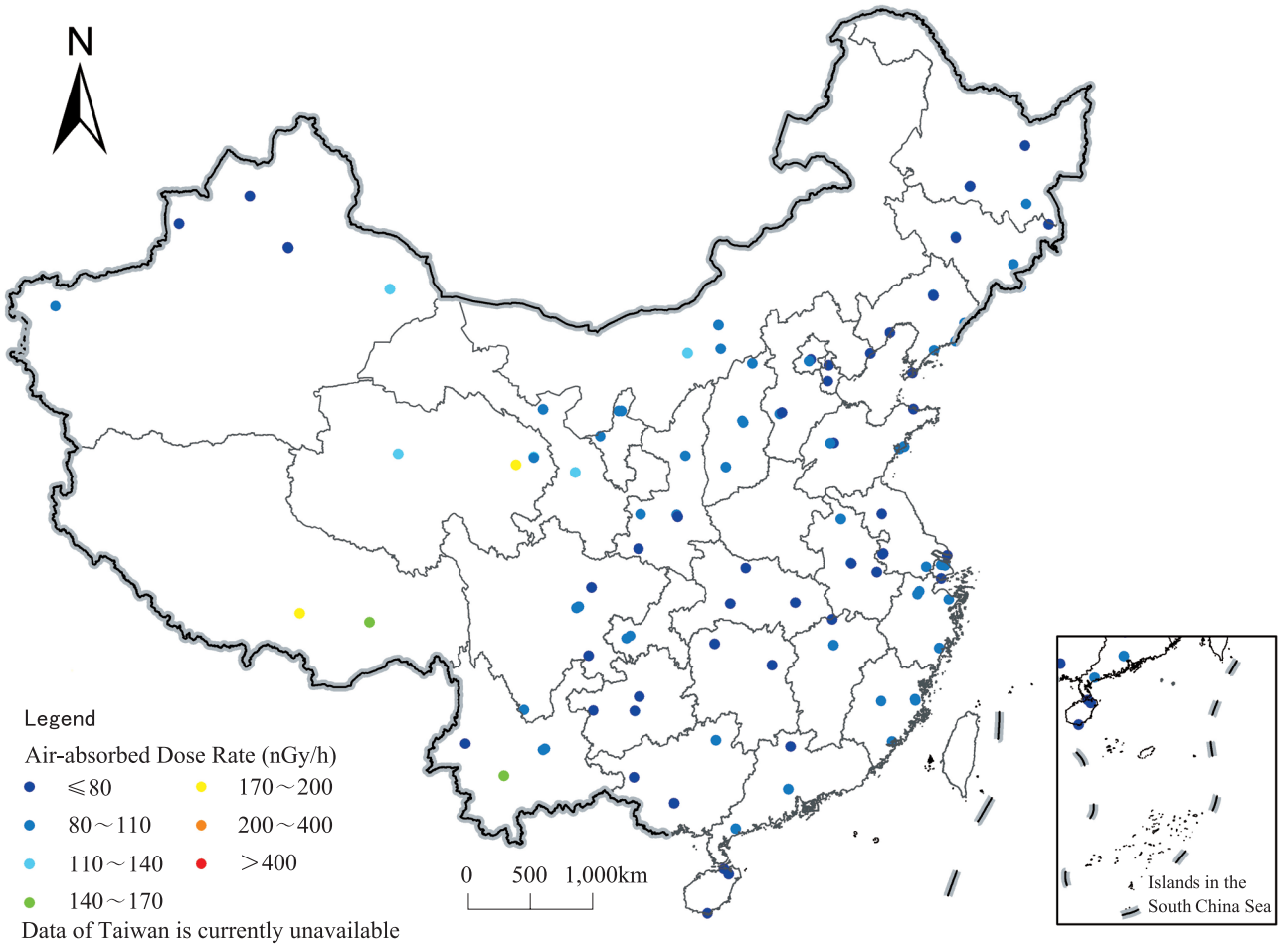


Figure 1. Distribution Map of Radiation Environment Automatic Monitoring Stations for Real-time Continuous Gamma Radiation Air-absorbed Dose Rate in China

limits in the "Seawater Quality Standard" (GB 3097-1997). Artificial radionuclide strontium-90 and cesium-137 activity levels in earth had no obvious changes, compared with those of previous years, natural radionuclide activity concentration and nationwide environmental natural radioactive level investigation results from 1983 to 1990 were at the same level.

Environment Ionizing Radiation around Nuclear Power Plants in Operation

The annual average values of gamma radiation air-absorbed dose rates (including cosmic ray response values) of radiation environmental automatic monitoring stations around Qinshan Nuclear Power Plant, Daya Bay/Ling'ao Nuclear Power Plants, Tianwan Nuclear Power Plant, Hongyanhe Nuclear Power Plant, and Ningde Nuclear Power Plant were 100.8nGy/h, 123.7nGy/h, 99.9nGy/h, 76.8nG/y, and 98.1nG/y respectively, within the swing range of local natural background level. The activity concentration of radionuclides other than tritium in the environmental media like aerosols, fallout, surface water, groundwater, and soil

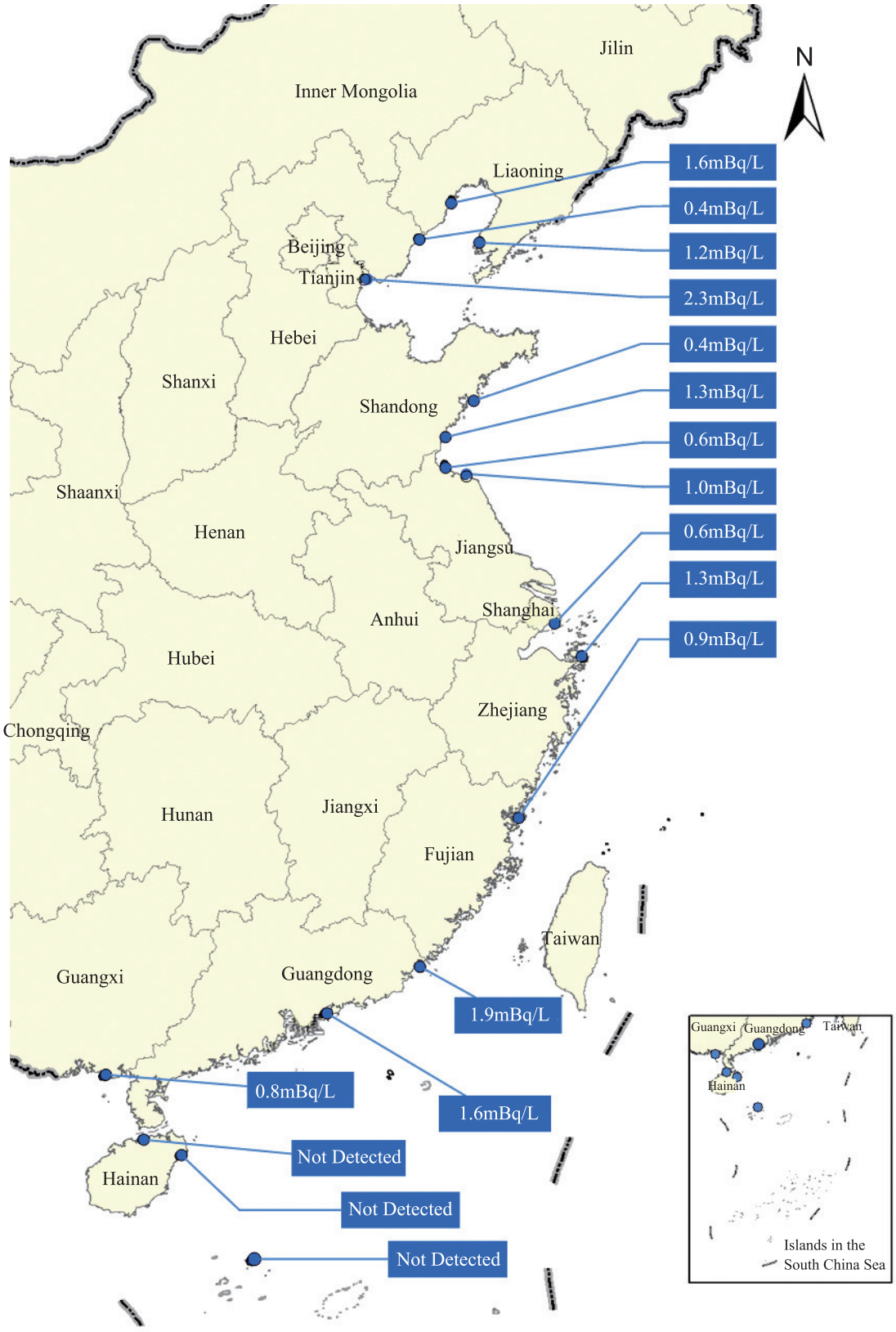


Figure 2. Cesium-137 Activity Concentration in Offshore Marine Areas in China in 2013

outside of the nuclear power plants had no significant changes, compared with those of the past years. The tritium activity concentrations in air, precipitation, surface water, well water, and some biological samples around Qinshan Nuclear Power Plant, and in sea water around the discharge outlets of Guangdong Daya Bay/Ling'ao Nuclear Power Plants had risen, compared with the background values before the operation of the nuclear power plants, but the radiation doses for the public were much lower than regulatory limits.

Environmental Ionizing Radiation around Civil Research Reactors

The environmental gamma radiation air dose rates and radionuclide activity concentrations in aerosol, fallout, surface water, groundwater, and soil outside micro reactors and other research facilities from China Institute of Atomic Energy, Institute of Nuclear and New Energy Technology, Tsinghua University, and Nuclear Power Institute of China, and Shenzhen University had no significant changes compared with those of past years. Total alpha and beta radioactive activity concentrations of drinking groundwater were all lower than the limits regulated in "Sanitary Standard for Drinking Water".

Environment Ionizing Radiation around Nuclear Fuel Cycle Facilities and Waste Disposal Facilities

For Lanzhou Uranium Co., Ltd., CNNC, Shaanxi Uranium Co., Ltd., CNNC, China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC, Jianzhong Nuclear Fuel Co., Ltd., CNNC, The 404 Co., Ltd, CNNC, and Northwest Low and Intermediate Level Solid Radioactive Waste Repository, Beilong Low and Intermediate Level Solid Radioactive Waste Repository, and Qinghai State-owned 221 Factory Radioactive Waste Pit, the ambient environment gamma radiation dose rates had no significant changes, compared with those of the past years, and the increase of activity concentrations of radionuclide due to manufacturing, fabricating, storing and transporting work was not monitored in environmental media.

Surrounding Environmental Ionizing Radiation of the Uranium Mining and Metallurgy Facilities

The radioactive environmental qualities around uranium mining and metallurgy facilities were generally stable. The activity concentrations of radon in air, total alpha activity concentration in aerosols, and radionuclides of uranium and radium-226 in surface water and groundwater had no significant changes, compared with those of the past years.

Electromagnetic Radiation

The nationwide electromagnetic radiation environmental quality was overall good. The comprehensive environmental electromagnetic field intensity was much lower than the public exposure derived limits specified in "Regulation for Electromagnetic Radiation Protection" (GB 8702-88). The surrounding

environmental electromagnetic radiation levels of the electromagnetic radiation facilities had no significant changes, compared with those of the past years. The electromagnetic radiation levels of the monitored environmental sensitive sites around mobile communication base station antennas were lower than the public exposure derived limits specified in “Regulation for Electromagnetic Radiation Protection”; the work frequency electric field intensities and magnetic induction intensities of the monitored environmental sensitive sites around electric transmission and transform facilities were all lower than the work frequency field evaluation standard for residential area and all day radiation for the public specified in “Technical Regulations on Environment Impact Assessment of Electromagnetic Radiation Produced by 500 kV Ultra-high Voltage Transmission and Transform Electric Power Project”.

14 Emergency Management for Nuclear and Radiation Accidents

In accordance with the regulations, in 2013 MEP (NNSA) valuated and reviewed the on-site emergency response plans of civil nuclear facilities, and inspected the conditions of the routine emergency preparation, and evaluated the on-site comprehensive emergency exercises. Thus MEP (NNSA) effectively enhanced the regulation of nuclear facility emergency preparedness. MEP (NNSA) continued to strengthen its emergency preparedness and emergency response capability, and have accomplished many nuclear and radiation emergency response tasks to keep emergency response capability of high efficiency.

Regulation on Nuclear Facility Emergency Preparedness

The special inspection of the on-site emergency response on nuclear accident, and regulation and evaluation of comprehensive emergency exercise before the first fuel loading of Guangdong Yangjiang NPP were completed. The regulation and evaluation of comprehensive emergency exercises of nuclear accidents for Daya Bay NPP, The 404 Co., Ltd., CNNC, Institute of Nuclear and New Energy Technology, Tsinghua University, Lanzhou Uranium Co., Ltd., CNNC, China Institute of Atomic Energy, China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC, Shaanxi Uranium Enrichment Co., Ltd., CNNC, and Nuclear Power Institute of China were completed. The inspection reports were issued. Issuance conditions of inspection reports on on-site nuclear emergency comprehensive exercises are shown in Table 83.

Emergency Plan Approval

In 2013, MEP (NNSA) reviewed and approved the on-site emergency plans before the first fuel loading of Guangdong Yangjiang NPP. MEP (NNSA) also reexamined and approved the nuclear emergency plans of Tianwan NPP, The 404 Co., Ltd., CNNC, China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC, and Nuclear Power Institute of China (see Table 84).

Nuclear and Radiation Emergency Preparedness, Anti-terrorist and Security Guarding

According to the unified deployment, MEP

(NNSA) smoothly implemented radiation environmental emergency response actions on the Sichuan Ya'an 7.0 earthquake. During the Third Nuclear Test by North Korea, the special action of radiation environment emergency on Northeast border was successfully completed (nearly 60 days). Before the response action, MEP (NNSA) carefully formulated emergency special plan and implementation proposals, and transferred large mobile laboratories and other radiation environmental emergency monitoring equipments with high precision to the default location. During the response action, MEP (NNSA) scientifically undertook the early-warning monitoring of the radiation environment, and intensively implemented the automatic monitoring of radiation environment. MEP (NNSA) also paid attention to collect public opinions for judgment and response, and strengthened the reporting system in order to release official radiation environmental monitoring data to the social public and conduct public information and involvement at the first time. After the response action, MEP (NNSA) focused on experience feedback to effectively improve the ability and level of dealing with all kinds of nuclear and radiation and environmental emergency accidents.

Compilation and Revision of Nuclear and Radiation Emergency Regulations, Standards and Plans

MEP (NNSA) basically completed regulatory review processes on nuclear safety guides "Nuclear Accident Emergency Exercise of Nuclear Power Plant" and the "Formulation of PWR Nuclear Power Plant Emergency Action Level", and revised and issued "MEP (NNSA) Nuclear Accident Response Plan" and "MEP (NNSA) Radiation Accident Response Plan" and their implementation procedures. MEP (NNSA) published "Scene Design for Nuclear and Radiation Emergency Exercise of Provincial Environmental Protection Departments", and issued the normative document "Form and Content of Nuclear and Radiation Emergency Plan of Provincial Environmental Protection Departments".

Effectively Maintaining the Emergency Response Capability

MEP (NNSA) kept to do nuclear and radiation accident emergency response well, and an emergency 24-hour on duty system was implemented. Effective operation of the nuclear and radiation emergency duty system and smooth communication channel were ensured. The system of nuclear and radiation emergency decision support and command dispatch and the emergency monitoring dispatch platform were integrated. The video display terminal and the video conference function of MEP (NNSA) emergency command room were updated. MEP (NNSA) scientifically conducted emergency training of the MEP nuclear and radiation safety regulation system, and effectively implemented linkage comprehensive emergency exercise.

Table 83. Inspection Reports on On-Site Nuclear Emergency Comprehensive Exercises

Document No.	Issuance Date	Title
NNSA Notice [2013]12	01/21/13	Official Letter of Issuing the "Inspection Report of On-site Comprehensive Nuclear Emergency Exercise of Nuclear Power Operation Management Co., Ltd., CNNC, in 2013"
NNSA Notice [2013]47	05/02/13	Official Letter of Issuing the "Inspection Report of Comprehensive Nuclear Emergency Exercise and Nuclear Emergency Preparation of China Institute of Atomic Energy"
NNSA Notice [2013]80	07/26/13	Official Letter of Issuing the "Inspection Report of On-site Comprehensive Nuclear Emergency Exercise and Nuclear Emergency Preparation before the First Fuel Loading of Yangjiang NPP Unit 1"
NNSA Notice [2013]131	11/07/13	Official Letter of Issuing the "Inspection Report of Comprehensive Nuclear Emergency Exercise of Lanzhou Uranium Co., Ltd., CNNC, in 2013"
NNSA Notice [2013]132	11/07/13	Official Letter of Issuing the "Inspection Report of On-site Comprehensive Nuclear Emergency Exercise of Ling'ao NPP in 2013"
NNSA Notice [2013]137	11/20/13	Official Letter of Issuing the "Inspection Report of Comprehensive Nuclear Emergency Exercise of The 404 Co., Ltd., CNNC, in 2013"
NNSA Notice [2013]150	11/29/13	Official Letter of Issuing the "Inspection Report of Comprehensive Nuclear Emergency Exercise of Institute of Nuclear and New Energy Technology, Tsinghua University in 2013"
NNSA Notice [2013]165	12/23/13	Official Letter of Issuing the "Inspection Report of Comprehensive Nuclear Emergency Exercise of Shaanxi Uranium Enrichment Co., Ltd., CNNC, in 2013"
NNSA Notice [2013]166	12/23/13	Official Letter of Issuing of "Inspection Report of Comprehensive Nuclear Emergency Exercise of Nuclear Power Institute of China in 2013"
NNSA Notice [2013]168	12/30/13	Official Letter of Issuing the "Inspection Report of Comprehensive Nuclear Emergency Exercise of China Northern Nuclear Fuel Co., Ltd. (CNNFC), CNNC, in 2013"

Table 84. Nuclear Emergency Plan Approvals in 2013

Document No.	Issuance Date	Title
NNSA Notice [2013]7	01/16/13	Reply Letter of the Agreement about "Emergency Plan of Power Reactor Fuel Element Processing Pilot Plant (Rev. C)" of The 404 Co., Ltd., CNNC
NNSA Notice [2013]19	02/22/13	Reply Letter of the Agreement about "On-site Emergency Plan of Tianwan NPP (Rev. C)"
NNSA Notice [2013]76	07/26/13	Reply Letter of the Agreement about "Nuclear Accident Emergency Plan of China Jianzhong Nuclear Fuel Co., Ltd. (CJNFC), CNNC"
NNSA Notice [2013]120	10/25/13	Reply Letter of the Agreement about Comments on "On-site Emergency Plan of Yangjiang NPP Unit 1 and Unit 2"
NNSA Notice [2013]121	10/28/13	Reply Letter of the Agreement about "Civil Nuclear Facility Emergency Plan of China Institute of Atomic Energy"

15 Personnel Qualification

By the end of 2013, a total number of 6 nuclear safety training courses for NNSA new employees were held. 354 staff members graduated from the courses, and obtained the graduation certificate. Among them, 349 members came from the national level entities. A total number of 7 training courses of nuclear power (intermediate level training of nuclear and radiation safety) were held. 224 members participated in the training, and obtained the graduation certificate. 218 members among them came from organizations at national level (see Table 85).

Table 85. Training Statistics of Nuclear and Radiation Safety Regulation Staff

(from organizations at national level, as of December 2013)

Entities	Number of Inspectors	Passed the Primary Training	Passed the Intermediate Training
NNSA (Administration)	50	21	21
North China Regional Office of NNSA	36	34	34
South China Regional Office of NNSA	17	22	26
East China Regional Office of NNSA	25	39	30
Northwest China Regional Office of NNSA	8	12	13
Northeast China Regional Office of NNSA	12	11	10
Southwest China Regional Office of NNSA	13	9	6
Nuclear and Radiation Safety Center	–	201	78
Total	161	349	218

In order to improve the knowledge and regulation capability and to enhance the quality of the team, the Engineering Master Program of nuclear power and nuclear technology engineering field, radiation protection and environment protection major, has been undertook in Tsinghua University since 2005. Until the end of 2013, five classes were held, and 107 students completed the courses, including 17 students from national level entities (see Table 86).

Table 86. Statistics of Engineering Master Class of Environment Protection System (as of December 2013)

Class	Year of Program	Number of Students
1st class	2005	24
2nd class	2006	23
3rd class	2009	18
4th class	2011	17
5th class	2013	25

Qualification of Welders and Non-destructive Testers for Civilian Nuclear Safety Equipment

MEP (NNSA) authorizes the examination entities to hold the examinations for welder and welding operator for civilian nuclear safety equipment. MEP (NNSA) regulates the examinations, and issues or authorizes the certificates in accordance with related regulations. In 2013, 14 welder examination entities held a total of 192 examinations, 2,850 welders took part in the examinations, and a total number of 5,413 examination items (see Table 87) were qualified. A number of 5 NDT examination entities held a total of 102 NDTs, including a total number of 7 methods: RT, UT, MT, PT, VT, LT, and ET (see Table 88).

Table 87. Statistics of Examinations for Welders in 2013

Examination Entities	Batches	Number of Attendees	Number of Examination Courses
China Nuclear Industry 23 Construction Co., Ltd.	68	1,428	2,462
Dongfang Electric Corporation Dongfang Boiler Co., Ltd.	11	111	217
Jiangsu Electric Power Construction Company 1, CEEC	5	91	183
China Nuclear Industry 24 Construction Co., Ltd.	4	59	118
Shanghai Electric Corporation Nuclear Equipment Company	7	113	226
Jiangsu Electric Power Construction Company 3, CEEC	7	12	40
CNNC Xi'an Nuclear Equipment Co., Ltd.	4	112	240
China First Heavy Industries Co., Ltd.	10	210	503
Shanghai Electric Power Generation Equipment Co., Ltd.	43	189	428
China Nuclear Industry Huaxing Construction Co., Ltd.	6	131	237
Dalian Baoyuan Nuclear Equipment Co., Ltd.	4	65	126
China Nuclear Industry Fifth Construction Company	12	239	503
China Nuclear Industry 22 Construction Co., Ltd.	2	28	48
Harbin Electric Corporation (QHD) Heavy Equipment Co., Ltd.	9	62	82
Total	192	2,850	5,413

Table 88. Statistics of Examinations of NDT Personnel in 2013

NDT	NDT Level	State Nuclear Power Plant Service Company	Nuclear Power Institute of China	CGNPC Inspection Technology Co., Ltd.	China Nuclear Power Operation Technology Corporation Co., Ltd.	China Nuclear 23 Construction Co., Ltd.	Subtotal
RT	I/II	–	–	–	4	4	8
	III	–	–	–	2	–	2
PT	I/II	4	3	3	4	3	17
	III	1	–	–	1	–	2
UT	I/II	5	3	3	4	2	17
	III	2	–	–	1	–	3
ET	I/II	3	–	2	4	–	9
	III	1	–	–	1	–	2
MT	I/II	4	–	2	3	–	9
	III	1	–	–	–	–	1
VT	I/II	5	2	3	4	4	18
	III	2	–	–	–	–	2
LT	I/II	3	2	1	2	2	10
	III	1	–	–	1	–	2
Total		32	10	14	31	15	102

Regulation of Operating Personnel Qualification for Civilian Nuclear Facility

Operating personnel for civilian nuclear facility are entrusted by relevant entities or operation entities to organize examinations. MEP (NNSA) carried out inspection to the examinations, and approved the “Operator’s License for Civilian Nuclear Facility” in accordance with related regulations. By the end of 2013, 1,470 nuclear power plant operators hold the licenses, in which 543 operators hold the senior operator’s licenses, 927 operators hold the operator’s licenses (see Table 89). And 340 operators hold research reactor operator’s licenses, in which 143 operators hold the senior operator’s licenses, 197 operators hold operator’s licenses (see Table 90).

Table 89. Statistics of Operator Licenses for Civilian Nuclear Power Plants (as of December 2013)

Operation Organization	Nuclear Facilities	Senior Operator	Senior Operator in Non-operation post	Operator	Operator in Non-operation post	Subtotal
Nuclear Power Operation Management Co., Ltd., CNNC	Qinshan NPP	23	2	89	–	114
	Qinshan NPP Phase II unit 1 and unit 2	56	4	42	6	108
	Qinshan NPP Phase II unit 3 and unit 4	40	3	64	–	107
	Qinshan NPP Phase III	42	6	50	–	98
CNNP Jiangsu Nuclear Power Co., Ltd.	Tianwan NPP unit 1 and unit 2	61	14	58	2	135
Daya Bay Nuclear Power Operation and Management Co., Ltd.	Daya Bay NPP unit 1 and 2	48	19	62	1	130
	Ling'ao NPP unit 1 and unit 2	52	20	58	4	134
	Ling'ao NPP unit 3 and unit 4	52	32	97	8	189
Fujian Ningde Nuclear Power Co., Ltd.	Ningde NPP unit 1 and unit 2	21	1	113	–	135
Liaoning Hongyanhe Nuclear Power Co., Ltd.	Hongyanhe NPP unit 1 and unit 2	23	2	130	–	155
Yangjiang Nuclear Power Co., Ltd.	Yangjiang NPP unit 1 and unit 2	21	1	78	–	100
Fujian Fuqing Nuclear Power Co., Ltd.	Fuqing NPP unit 1 and unit 2			65	–	65
Total		439	104	906	21	1,470

Table 90. Statistics of Operator Licenses for Civilian Research Reactor (as of December 2013)

Operation Organization	Nuclear Facilities	Senior Operator	Operator	Subtotal
CIAE	Swimming Pool Reactor (SPR)	12	7	19
	DF-VI Fast Neutron Criticality Facility (DF-VI CFFR)	4	2	6
	Reprocessing Pilot Plant Uranium Solution Criticality Facility	3	5	8
	Miniature Reactor Zero Power Facility (CFMNSR)	–	3	3
	China Experimental Fast Neutron Reactor (CEFR)	20	17	37
	China Advanced Research Reactor	14	14	28
	In-hospital Neutron Irradiator (IHNI)	–	3	3

continued

Operation Organization	Nuclear Facilities	Senior Operator	Operator	Subtotal
NPIC	High Flux Engineering Test Reactor (HFETR)	15	22	37
	Minjiang Test Reactor (MJTR)	4	3	7
	China Burst Reactor (CRP)	1	6	7
	High Flux Engineering Test Reactor Experimental Facility (HFETR)	1	3	4
	18-5 Critical Facility	3	1	4
INET/TU	5MW Experimental Low Temperature Nuclear Heating Reactor (5MW-NHR)	13	14	27
	10MW High Temperature Gas-cooled Reactor (10MW-HTGR)	37	85	122
	Shielding Experimental Reactor	5	4	9
CNCT	Xi'an Burst Reactor	11	8	19
Total		143	197	340

The "Nuclear Power Plant Personnel Recruitment, Training and Authorization" (HAD103/05 - 2013) was issued, and the "Basic Contents and Requirements of 'Nuclear Power Plant Operation Personnel Training, Authorization and Training Program" has been finished, based on in-depth investigation and views from the nuclear facilities operation entities. Related operation entities were required to use this documentation to prepare the "Nuclear Power Plant Operation Personnel Training, Authorization and Training Program", in order to further strengthen the operation personnel training, and standardize operation personnel qualification management.

The Regulation of Registered Nuclear Safety Engineer Qualification

In 2013, a total number of 2,629 applicants signed up the Registered Nuclear Safety Engineer Test, and 1,884 applicants actually took the test, 444 applicants were qualified after passing 4 subjects. By the end of 2013, there are a total number of 17,280 applications for the examination nationwide, a total number of 3,129 individuals successfully acquired practice qualification certificate of Registered Nuclear Safety Engineer.

In 2013, 1,146 Nuclear Safety Engineer registrations were made, in which 1,132 were new applications or renewal, 14 were modification.

Until April of 2014, there is a total number of 421 nuclear safety certified entities, in which 233 entities have Registered Nuclear Safety Engineers. There is a total number of 2,143 Registered Nuclear Safety Engineers in these 233 certified entities.

Knowledge Management

Knowledge management proceeded as planned in 2013. “Registered Nuclear Safety Engineer Guidebook” was published. MEP (NNSA) also developed “Nuclear and Radiation Safety Terms and Definitions (draft for comments)” and “Nuclear Safety Equipment Identification”. Textbooks under progress included the “Continuing Education Textbooks for Registered Nuclear Safety Engineer: Radiation Protection”, “Nuclear Safety Regulation Personnel Training Textbook”, “Nuclear Safety Culture Training Courses”, etc.

Construction of Regulation Information System for Personnel Qualification

In 2013, the Personnel Qualification Regulation Information System of MEP (NNSA) was launched after the early development and trial and now functioning well. Registration work of a total 1,264 people has been completed by the Registered Nuclear Safety Engineer Management Module in two times. The informationization of Registered Nuclear Safety Engineer registration management, including the registration, renewal, modification, certificate printing, has been generally realized. The welder theory test function of Civilian Nuclear Safety Equipment Welders Management Module has been implemented now, other functions such as welding examination, continuous operation records report, welders electronic certificate management is under active development. The next step is to enhance operation maintenance and develop new modules of the information system.

16 International Cooperation

International Cooperation Plan

Issue and Implementation of "The Twelfth Five-Year Work Program of International Cooperation in Nuclear and Radiation Safety"

MEP (NNSA) prepared and issued "The Twelfth Five-Year Work Program of International Cooperation in Nuclear and Radiation Safety", in accordance with "The Twelfth Five-Year Work Outline of International Cooperation in Environmental Protection", as well as in combination with "The Twelfth Five-Year Plan of State Environmental Protection" and "The 12th Five-Year Plan and 2020 Long-term Goals on Nuclear Safety and Radioactive Pollution Prevention and Control", thus providing a clear direction and a detailed plan for further implementing the work outline of international cooperation in environmental protection, creating the working mechanism for coordination of all departments and promoting the enhancement of domestic nuclear safety regulation capabilities by international cooperation, and pushing forward the work development such as the implementation of international conventions, bilateral cooperation, and multilateral cooperation in nuclear safety field.

Work on the Implementation of Convention

Convention on Nuclear Safety

As the chairman of the fifth review meeting of "Convention on Nuclear Safety", Vice Minister of MEP, Administrator of NNSA Li Ganjie communicated with officers of the sixth review meeting, and shared important events and the experience in implementing the convention at the period of the fifth review meeting by the means of president letters, thus achieving the successful transition of the work on the implementation of convention, and laying a good foundation for holding the sixth review meeting.

The sixth national report under the "Convention on Nuclear Safety" was finished and was submitted to the International Atomic Energy Agency (IAEA) for deliberations of other contracting parties. The report provides the comprehensive information on improvement actions in China after the Fukushima nuclear accident and the good practice on implementing the Nuclear Safety Action Plans of IAEA.

MEP (NNSA) participated in the working group meeting of "Effectiveness and Transparency" on the "Convention on Nuclear Safety", made all-

round acquaintance with all contracting parties' proposals to revise the convention and the guidance documents, and actively participated in the negotiations and declared the stand to safeguard China's interests.

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

MEP (NNSA) dispatched staff to attend the first meeting between two sessions and the topic working seminar of the "Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management", and fully sorted out proposals of all contracting parties.

On the basis of forming a new reviewing and editing board of the China's national report, MEP (NNSA) held an initial meeting of the board to review achievements of implementing the convention since the fourth review meeting, and to determine the frame and the task division of the national report prepared for the fifth review meeting, thus getting ready for the implementation of convention.

Multilateral Cooperation in Nuclear Safety

Actively Enhancing the Cooperation with IAEA

From April. 7 to 12, 2013, the International Conference on Effective Nuclear Regulatory Systems was held in Canada. Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua led a delegation attending the meeting, and sharing the regulation experience with nuclear safety regulation authorities, operating organizations of nuclear facilities, and nuclear suppliers from all over the world, thus making a contribution to building the effective global regulation system of nuclear safety and security.

From September 16 to 20, 2013, the 57th Annual Regular Session of the IAEA General Conference and the Senior Regulators Meeting on Nuclear Safety took place in Vienna, Austria. Vice Administrator of NNSA, Director General of Nuclear and Radiation Safety Regulation Department Ⅱ of MEP Wang Zhongtang led a delegation attending the meeting, participating in the plenary session and group meeting, and actively getting involved in the communication of all topics. During the session, the delegation met with Deputy Director General of IAEA, OECD Nuclear Energy Agency, and the nuclear safety regulatory agencies of other countries such as France, Republic of Korea (ROK), and the United Arab Emirates, presented the China's progress in nuclear safety regulation to the foreign delegations, and exchanged views on issues such as the improvement measures after the Fukushima nuclear accident, the Multinational Design Evaluation Programme, the bilateral mechanism of training and communication, and the bilateral agreement on cooperation, thus further promoting substantive cooperation in the multilateral arena.

MEP (NNSA) dispatched staff to participate in meetings held by the IAEA's Committee and Sub-committees on Safety Standards, caught up with latest development in international

nuclear safety regulations and standards, and participated in the establishment and revision of international safety standards. MEP (NNSA) dispatched staff to attend the third Global Nuclear Safety and Security Network (GNSSN) steering committee meeting to understand the overall network deeply, and put forward the proposal of establishing a strategy. MEP (NNSA) dispatched staff to attend the 17th and 18th Asian Nuclear Safety Network (ANSN) steering committee meetings and the 10th meeting of Information Technology Support Team, laid down a work plan for China's deep involvement in activities of ANSN, and decided to undertake the regional workshop on the Best Estimation plus Uncertainty Safety Analysis (BEPU). MEP (NNSA) undertook many IAEA programs of cooperation in technology, publicized good practices on China's nuclear safety regulation, and enhanced the exchange and sharing of experience with international peers, to play a bigger role in the international arena of nuclear safety, and to create favorable conditions for the export of nuclear power technology.

Continuing Cooperation with OECD Nuclear Energy Agency

MEP (NNSA) was involved in Multinational Design Evaluation Programme (MDEP), dispatched staff to attend the policy group meeting, the steering committee meeting, and the work group meetings on AP1000, EPR, and digital I&C etc., and held work group meetings on EPR and AP1000 in China. The cooperation mechanism with OECD Nuclear Energy Agency provided experience feedback for China's nuclear power plants in operation and under construction, thus raising the reference and the supporting effect to China's nuclear safety regulation from this mechanism, meanwhile, showing China's good practices.

Regional Cooperation

The 6th Northeast Asian Top Regulators Meeting on Nuclear Safety

On November 28, 2013, the 6th Northeast Asian Top Regulators Meeting on Nuclear Safety was held in Hangzhou, China. Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua led a delegation attending the meeting. The meeting focused on issues such as the experience feedback on Fukushima nuclear accident, the information disclosure and disposal technique of radioactive contaminated water leakage. At the meeting, Chinese delegation showed achievements in the nuclear safety regulation, and proposed enhancing the cooperation in the mechanism of exchanging technologies in the frame of Top regulators meeting, thus embodying the China's contribution to the mechanism of Top regulators meeting. The implementation plan and the meeting summary of China-Japan-ROK action program on nuclear safety cooperation were passed at the meeting, thus demonstrating that the three countries concentrate efforts with practical attitude on giving priority to the cooperation in the fields of exchanges of information and the emergency response capability building.

On November 30, 2013, the 7th China-Japan Meeting for Exchange of Information on Nuclear Safety was convened between Nuclear and Radiation Safety Center, MEP and Japan Nuclear Energy Safety Organization (JNES), sharing the updated regulatory information after the Fukushima nuclear accident.

Bilateral Cooperation in Nuclear Safety

China-US Cooperation in Nuclear Safety

On July 11, 2013, Vice Minister of MEP, Administrator of NNSA Li Ganjie went to the U.S. for the China-US Strategic and Economic Dialogue, and renewed the "China-US Protocol of Cooperation in Nuclear Safety" with United States Nuclear Regulatory Commission (U.S. NRC), thus consolidating the foundation of bilateral cooperation, and providing backing and safeguards to the follow-up communication.

Vice Minister of MEP, Administrator of NNSA Li Ganjie met with Deputy Secretary of Commerce Mr. Francis Juan Sanchez of the U.S. on May 20, and met with Deputy Chairman of U.S. NRC Mr. George Apostolakis on July 26, to exchange views on strengthening bilateral cooperation in nuclear safety.

On May 6, 2013, the China-US nuclear safety cooperation steering committee meeting was held in Beijing, and the Vice Administrator of NNSA, Director General of Nuclear and Radiation Safety Regulation Department II of MEP Wang Zhongtang attended and presided over the meeting. The two parties approached the cooperation in nuclear power plants in operation, exchanges of personnel, training on software, nuclear emergency response, nuclear fuel cycle, radioactive waste management, the safety of radioactive sources and other fields. Two sides also drew up an annual cooperation plan around China's AP1000 nuclear power program, thus bringing about learning from each other, complementing each other with advantages, and sharing the experience.

In the cooperation framework of China-US Peaceful Uses of Nuclear Technology Agreement, MEP (NNSA) further strengthened the cooperation with United States Department of Energy and its Labs & Technology Centers in the security upgrade of radioactive wastes.

China-France Cooperation in Nuclear Safety

On December 2, 2013, Vice Minister of MEP, Administrator of NNSA Li Ganjie met with Asia-Pacific President of AREVA Mr. Autebert, and exchanged views on the development of EPR construction in China, which was the issue of common concern.

According to the summary of the 2012 China-France nuclear safety cooperation steering committee meeting, MEP (NNSA) organized to hold the China-France Technological Exchange Meeting on EPR Commissioning Inspection, the Workshop on Ten-Year Periodical Overhaul of Nuclear Power Plants, the China-France Nuclear Safety Regulations Workshop, the China-France Workshop on the Capability Building of Nuclear Emergency and Quick Response, and

the China-France Workshop for Strengthening the safety of nuclear reactor core, in June, September, and November, respectively.

On December 6, 2013, Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua met with the senior representative of French Nuclear Safety Authority (Autorite Surete Nucleaire, ASN), and exchanged views on strengthening personnel exchanges and cooperation in technology, in the China-France High-Level Forum on the 30th Anniversary of the Nuclear Energy Cooperation.

Every year, MEP (NNSA) and ASN exchange their inspectors to learn and communicate from each other. In August 2013, MEP (NNSA) assigned five inspectors to visit Lyon regional regulation office of France for inspection exchange, thus playing an active role in strengthening safety regulation on EPR nuclear power project.

China-Japan Cooperation in Nuclear Safety

From February 20 to March 15, 2013, 10 assignees were sent to Japan for nuclear safety technical exchange. The activity included nuclear safety legislation and nuclear safety regulation experience of Japan. During the training period, operation training of simulator was done as well. In August 2013, MEP (NNSA) assigned staff to Japan for research and studies on radioactive waste management through the communication project with Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan.

China-Pakistan Cooperation in Nuclear Safety

On February 17, 2013, Vice Minister of MEP, Administrator of NNSA Li Ganjie met with Pakistan Atomic Energy Commission President Ansar Parvez and his colleagues. The two sides exchanged and discussed on issues about the lessons learned from the Fukushima nuclear accident and the ways to expand bilateral cooperation area of nuclear safety, thus consolidating the foundation of further cooperation between China and Pakistan in the future and creating favorable conditions for the export of a new generation of Chinese nuclear reactor technology.

From March 11 to 18, 2013, Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua led a delegation visiting Pakistan. The two parties discussed the preparation of Integrated Regulatory Review Service (IRRS) to Pakistan and exchanged nuclear safety technologies.

China-EU Cooperation in Nuclear Safety

The China-EU development and cooperation program “Enhancing the Capabilities of China’s National Nuclear Regulatory Agency and the Technical Support Organization” was promoted in the year. In October, 2013, MEP (NNSA) sent staff to the EU to participate in completing project bidding. MEP (NNSA) discussed and coordinated the project startup with Ministry of Commerce, EU, Nuclear and Radiation Safety Center of MEP.

17 Memorabilia

On January 8, 2013, “Construction License of Uranium Enrichment Phase Ⅳ” was issued to Uranium Enrichment Co., Ltd., CNNC.

From January 14 to February 20, 2013, the radiation emergency response action on China’s Northeast border was fully completed.

On February 4, 2013, “Notification of Issuing the Directory of Radiation Environment Regulation on the Development and Utilization of Mineral Resources (the first list)” was issued.

On February 6, 2013, “Construction License of the Fuel Element Production Line of HTGR nuclear power demonstration project” was issued to China North Nuclear Fuel Co., Ltd.

On April 20, 2013, a 7.0-magnitude earthquake hit Ya’an, Sichuan. The emergency response was launched immediately by MEP (NNSA), and the nuclear facilities, radioactive sources, and irradiation installations in the earthquake region were in control.

On June 14, 2013, the transport cask of radioactive material in category I made by Russian state-operated nuclear fuel company was permitted to use in China.

From July to October, 2013, the nuclear and radiation safety inspection was carried out.

On July 8, 2013, a symposium was held in the Great Hall of the People to commemorate the 10th anniversary of the issue of “Law of the People’s Republic of China on the Prevention and Control of Radioactive Pollution”. Vice Chairman of NPC Standing Committee Chen Changzhi and ShenYueyue attended the symposium.

On July 11, 2013, Vice Minister of MEP, Administrator of NNSA Li Ganjie went to the U.S. for the China-US Strategic and Economic Dialogue, and renewed the “China-US Protocol of Cooperation in Nuclear Safety” with U.S. NRC, thus laying a good foundation for the next step of cooperation.

On August 1, 2013, NNSA organized and held a national on-the-spot meeting on the experience feedback of civilian nuclear safety related equipment in Dongfang (Guangzhou) Heavy Machinery Co., Ltd.

On August 28, 2013, the TYK-39M1 transport cask of a Kazakhstan’s company was permitted to use in China.

On September 2, 2013, the "(Approval Notice) Instrument of Ratification for the First Fuel Loading" was issued to the unit 2 of Liaoning Hongyanhe Nuclear Power Plant.

On September 16, 2013, the Construction License was issued to the unit 5 and unit 6 of Guangdong Yangjiang Nuclear Power Plant.

On September 24, 2013, the control point of the FCD placing the first foundation concrete of nuclear island of Tianwan Nuclear Power Plant unit 4 was permitted to release.

From September 28 to 29, 2013, the National Meeting to Exchange the Radiation Safety Regulation Experience was held, Vice Minister of MEP, Administrator of NNSA Li Ganjie attended the meeting and addressed, and Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua made some closing remarks.

From October 8 to 11, 2013, the International Expert Review Meeting on the Project, which will be establishing jointly by NNSA and IAEA as International Cooperation Center of Nuclear and Radiation Safety, was held in Beijing, and Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua attended the meeting and addressed.

On October 15, 2013, the First Meeting of Leading Group for Radiation Environment Status Investigation and Assessment of Nationwide Nuclear Bases and Nuclear Facilities was held, and Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua attended the meeting and made an important speech.

On October 25, 2013, the "Instrument of Ratification for the First Fuel Loading (Approval Notice)" was issued to the unit 1 of Guangdong Yangjiang Nuclear Power Plant.

On October 30, 2013, the legislation programs of the Standing Committee of the Twelfth National People's Congress was published, and the "Act of Nuclear Safety" was classified into the II category of legislation program.

On November 8, 2013, the "Instrument of Ratification for the First Fuel Loading (Approval Notice)" was issued to the unit 2 of Fujian Ningde Nuclear Power Plant.

On November 12, 2013, the Initial Meeting of the reviewing editors board of China's National Report for the Fifth review meeting of Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was held in Beijing, and Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua attended the meeting and addressed.

On November 20, 2013, the National Experience Feedback Meeting of Civilian Nuclear Safety Related Equipment and the Mobilization Meeting of Targeted Clean-up Campaign for Patching Welding against the Rules were held, and the targeted clean-up campaign was initiated.

On November 28, 2013, the 6th Northeast

Asian Top regulators Meeting on Nuclear Safety and the 8th China-Japan- ROK Information Exchange Meeting were held in Hangzhou, China, and Chief Engineer on Nuclear Safety of MEP, Vice Administrator of NNSA Liu Hua headed a delegation to the meeting. The implementation plan of China-Japan-ROK action program on nuclear safety cooperation and the meeting summary were passed at the meeting.

On December 9, 2013, the "Notice of Implementing Conditional Exemption Management of In-Vitro Diagnostic Reagent Usage of ^{125}I Radio-Immunity" was issued.

On December 16, 2013, Nuclear and Radiation Safety Center, MEP and Fangshan Sub-Center of Beijing Land Arrangement and Reserve Center signed the "Compensation Agreement on Land Utilization of China's Technology R&D Base for Nuclear and Radiation Safety Regulation".

On December 19, 2013, the control point of the FCD of nuclear island foundation of Guangdong Yangjiang Nuclear Power Plant unit 6 was permitted to release.

On December 25, 2013, the change of Experts Committee of Nuclear Safety and Environment, MEP (NNSA) was conducted.

On December 30, 2013, the "Rules on Credentials Management of Nuclear and Radiation Safety Inspectors" (the 24th decree of the MEP) was issued.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