



Egyptian Nuclear and Radiological Regulatory Authority (ENRRA)

Infrastructure for Licensing and
oversight the NPP in Egypt

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**AFCONE - IAEA Workshop from 30 to 31 May 2022 on Promoting Effective Interaction Among
Nuclear Industry and Regulatory Body in Countries Introducing Nuclear Power Programmes**

Peaceful Applications of Atomic Energy

For more than 60 years, Egypt has benefited from the peaceful applications of atomic energy

Nuclear Facilities

- Egypt First Research Reactor (2 MW)
- Egypt Second Research Reactor (22 MW)
- Fuel Manufacturing Pilot Plant (FMPP)

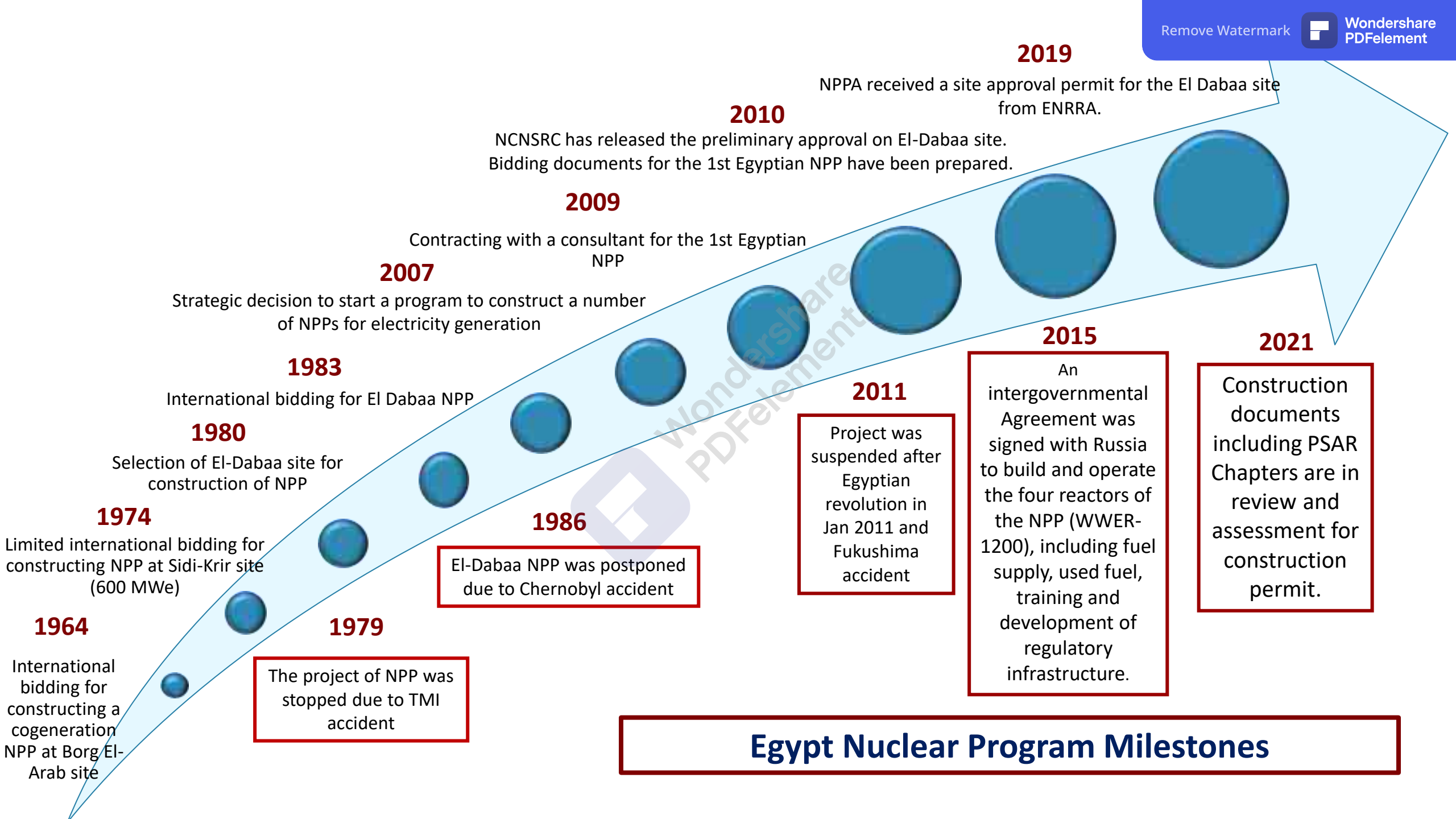
Radiation Facilities

- Two Gamma Irradiators in operation
- Electron beam accelerator
- Radio Isotope Production Facilities (RPF)

Radioactive Sources

- Medical Applications
- Industrial uses
- Oil and Gas exploration and development
- Agricultural Applications
- Research applications

Over 6000 radioactive sources are used in Egypt



Egypt Nuclear Program Milestones

2019

NPPA received a site approval permit for the El Dabaa site from ENRRA.

2010

NCNSRC has released the preliminary approval on El-Dabaa site. Bidding documents for the 1st Egyptian NPP have been prepared.

2009

Contracting with a consultant for the 1st Egyptian NPP

2007

Strategic decision to start a program to construct a number of NPPs for electricity generation

1983

International bidding for El Dabaa NPP

1980

Selection of El-Dabaa site for construction of NPP

1974

Limited international bidding for constructing NPP at Sidi-Krir site (600 MWe)

1964

International bidding for constructing a cogeneration NPP at Borg El-Arab site

1979

The project of NPP was stopped due to TMI accident

1986

El-Dabaa NPP was postponed due to Chernobyl accident

2011

Project was suspended after Egyptian revolution in Jan 2011 and Fukushima accident

2015

An intergovernmental Agreement was signed with Russia to build and operate the four reactors of the NPP (WWER-1200), including fuel supply, used fuel, training and development of regulatory infrastructure.

2021

Construction documents including PSAR Chapters are in review and assessment for construction permit.

ENRRA as Independent Regulatory Authority



Wondershare
PDFelement



National Legal framework

- In 2010 the Law Regulating Nuclear and Radiological Activities was promulgated (law No. 7)

This law aims at setting a legal framework to regulate all the nuclear and radioactive activities in the Arab Republic of Egypt in a way that ensures the safety and protection of human beings, property and environment against the radioactive hazards.

- Law No. 211 promulgated in 2017 to amend Law No. 7 to reinforce ENRRA independence and effectiveness.
- Executive regulations (No. 1326) of law No.7 promulgated in 2011.



ENRRA Vision and Mission

Vision

To be a distinguished regulatory authority at the national, regional and international levels for Nuclear and Radiation 3Ss

Mission

ENRRA shall carry out its regulatory mandate, related to Nuclear and Radiation activities; to ensure that atomic energy is used for peaceful purposes and to protect humans, property and the environment from the harmful effects of ionizing radiation



ENRRA Mandate



Law 7 of 2010 : Article 12 (2nd Chapter) stipulates ENRRA assigned responsibilities as follows:

- Developing and Issuing regulatory requirements and rules.
- Issuing , Modifying, Suspending, Renewing, Withdrawal & Rescinding of all types of Licenses & Permits.
- Reviewing and Assessment of the licensing safety related documents.
- Conducting Regulatory Inspection on all Nuclear & Radioactive activities at all stages.
- Carrying out Safeguard Inspection for Nuclear Materials.
- Control of Transportation of Radioactive Materials.
- Co-ordination of Emergency Response.
- Coordinating with governmental & non governmental bodies.
- Issuing of Quarter and Annual report to the Public.



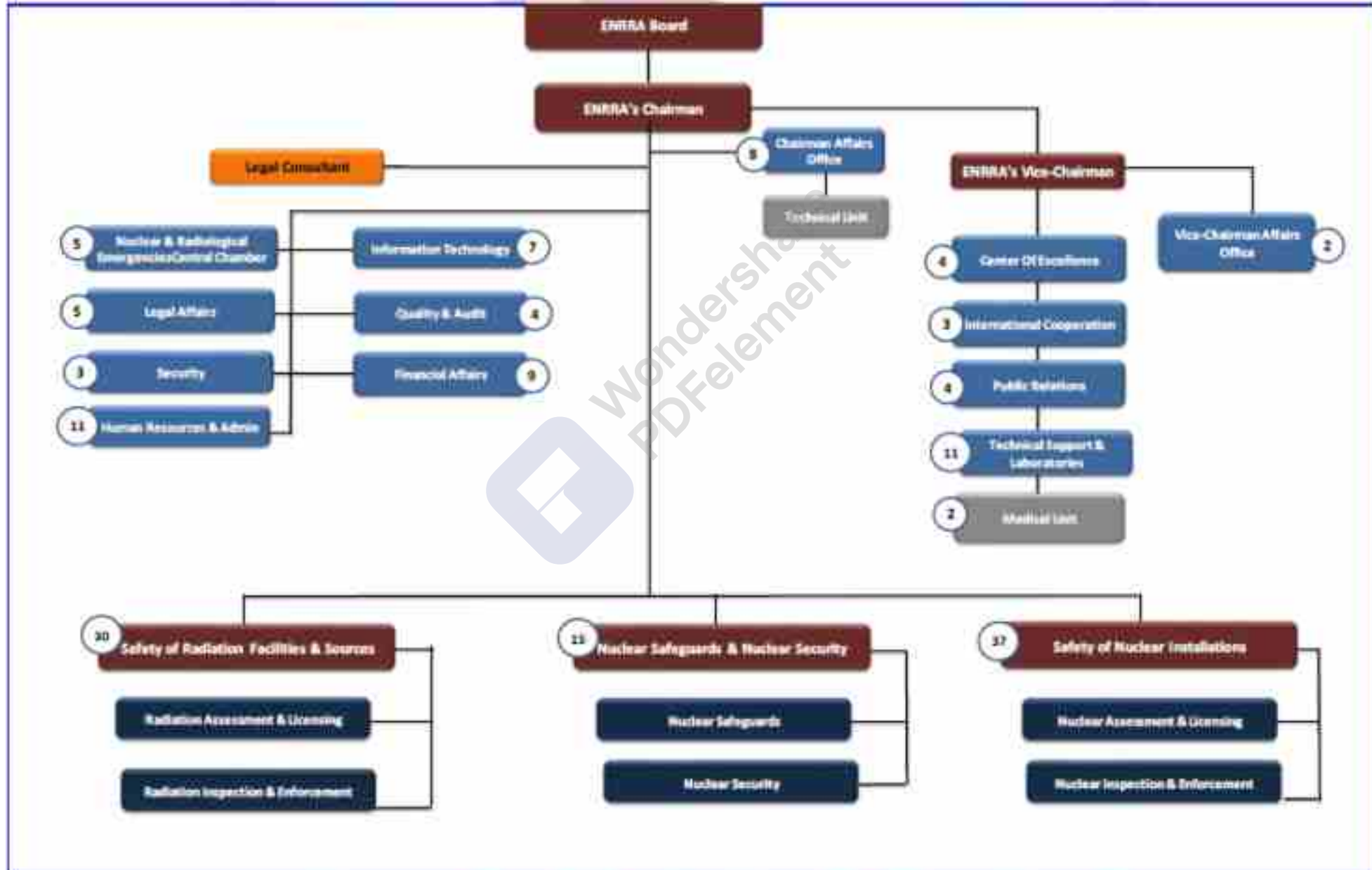
ENRRA Policy

- Ensuring Compliance with applicable Laws and Regulations
- Promoting Operational Efficiency and Reduce Bureaucracy
- Strong and Transparent Engagement with all the Partners and Interested Parties
- **Dealing with Employees as the key Priority to ENRRA**

Developments at ENRRA



New Organizational Structure approved by ENRRA Board in 2019



Issuance of the ENRRA's Employees Regulation no. 348 in 2019



International TSOs



Vo Safety from Russia, the Vendor Country Signed in Feb. 2019 Performance Schedule (10-11 years)



ENRRA signed a contract with **UJV** from Czech Republic as ITSO in 23 Nov 2021 (7 years)

Areas of Cooperation

1. Development of the Regulatory Framework
2. Development of ENRRA Integrated Management System (IMS)
3. Capacity Building of ENRRA
4. El Dabaa Nuclear Power Plant Authorization Process
5. Planning and Implementation of ENRRA Regulatory Inspection
6. SSC Conformity Assessment for the El Dabaa Nuclear Power Plant
7. Situation and Analytical Centre (SAC)
8. Electronic management system (EMS)



Capacity Building of ENRRA personnel

Recruitment was done for specialists and seniors covering various areas of assessment and inspection of Mech., Elec., Civil, Inst. and Control, PSA, Sever Accidents, Nuclear Safety, License Coordinator, neutronic, T/H, Radiation Protection, and waste management, organizational aspects, and Human Factor Eng. (**IAEA-TECDOC-1794**)

Licensing Coordinator	Specialist in Severe Accident Analysis	Assessor of Instrumentation and Control system safety	Specialist in Human Factors Engineering	Senior Inspector of Instrumentation and Control systems
Senior Specialist in Nuclear safety	Specialist in Radiation Protection	Assessor of Civil Eng. and Structure Safety	Site Coordinator for Engineering Inspections	Senior Inspector of Management System
Specialist in Thermo-hydraulic Assessment	Specialist in Radioactive Waste Management	Specialist in Materials Science	Senior Inspector of Mechanical systems	Specialist in Organizational Aspects and Safety Culture
Specialist in Neutronic Assessment	Assessor of Mechanical System Safety	Specialist in Natural and Human-Induced Event Analysis	Senior Inspector of Civil and Structure	Site Inspector of Mechanical Systems
Specialist in Probabilistic Safety Assessment	Assessor of Electrical System Safety	Assessor of internal flooding and fire Systems	Senior Inspector of Electrical Systems	Site Inspector of Civil works



Establishment of Center of Excellence

With the mandate of utilizing human capital as a tangible asset ,
ENRRA establishes Center of Excellence to support its functions.



Training Facilities

**1. Constructing and maintaining
Capacity Building Process**

**2. Establishment of Knowledge
Management System**

**3. Support Restructuring of ENRRA
Organizational Structure**

4. Tailored Training Program

**5. Conducting the Competences Gap
Analysis**

**6. Development Plan for each
Employee**



Training Providers Pool

- The training providers' pool is updated by the Center of Excellence in coordination with other sectors and departments to ensure the availability of the training in time.
- The training pool is linked to employees profiles to reveal the available training to enhance competencies level.
- IAEA Integrated Work Plan is a part of ENRRA training plan to ensure receiving of the required training that matches the schedule of capacity building plan and conducted activities.
- Cooperation **with RTN** in capacity building though:
 - On the Job Training on main Regulatory Functions;
 - Participation as observer during inspection of Russian NPP at construction;
 - Conducting joint inspection;
 - Conducting workshops to Exchange Experience and lessons learned on General and Specific issues.
- Updating and preparing the e-learning portal for distance learning of ENRRA personnel.

Situation Analysis Center (SAC)



- Enabled by a tailored/most advanced/Int. Standards Software and Hardware System (SHS) to ascertain accuracy and real-time Nuclear Safety Analysis of El Dabaa NPP.
- Computational codes for safety review:
 - Thermohydraulic systems calculation including design basis analysis and accidents with the core degradation (design extension conditions);
 - Codes for core neutronic analysis and fuel burn up calculations;
 - PSA codes for the analysis of initiating events as well as internal and external hazards;
 - codes for calculation of dispersion of radioactive release .
 - To perform specific task, routine work or participation in Benchmark.



- interface SW ensuring joint integrated use of the listed computational codes necessary for performing the SAC functions (including visualization of the processes and assessment results)
- Equipped with an automated Radiation Monitoring System all over Egypt.
- Used in ENRRA response for convex 3.



Development of ENRRA Integrated Management System (IMS) and EMS

1. Finalizing 80% of IMS

2. Finalizing ENRRA CORE PROCESSES

3. Finalizing ENRRA SUPPORTING PROCESSES

4. Establishment of more than 60% of Procedures

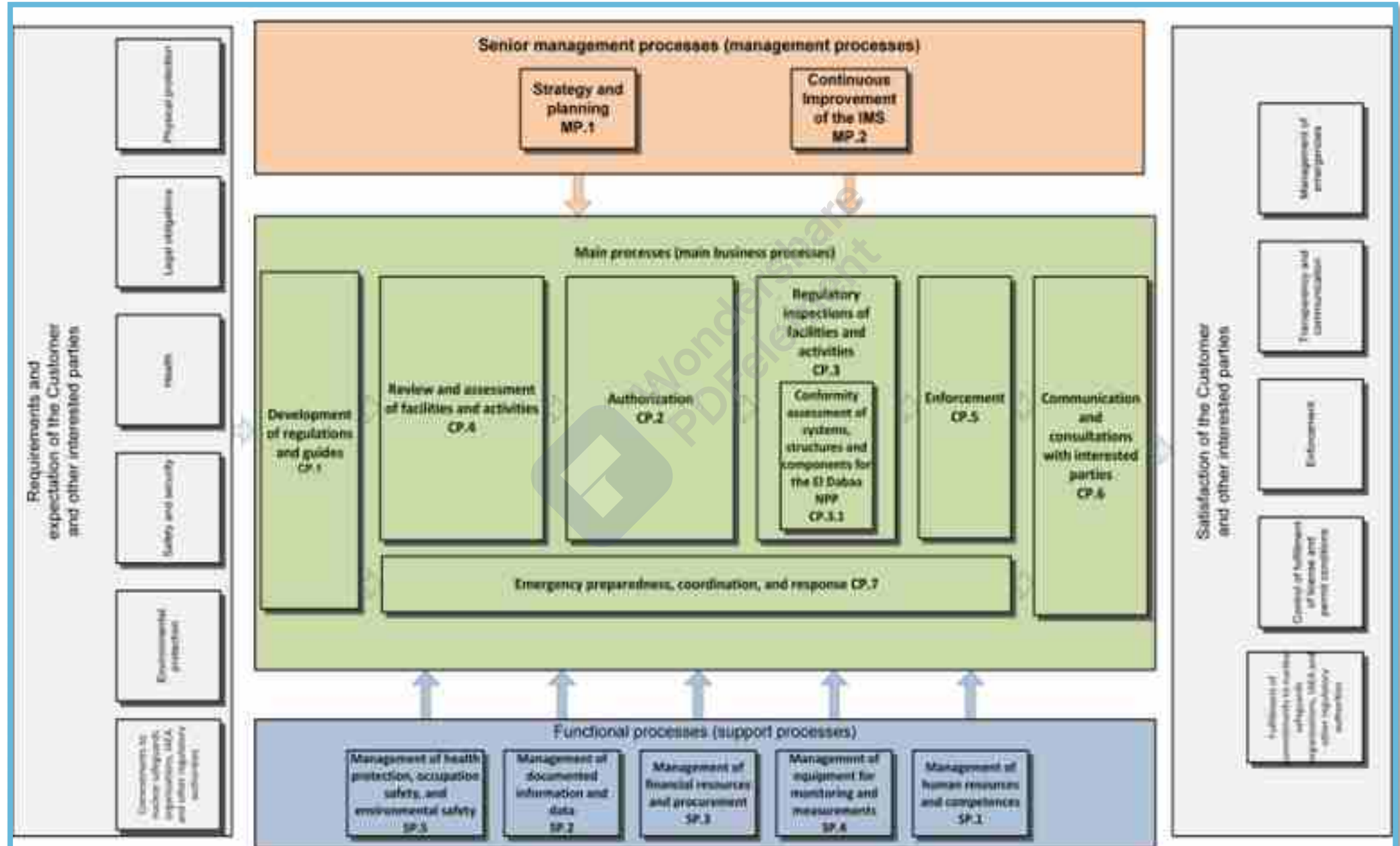
5. Conducting ENRRA Risk Management

6. Establishment of 50% of EMS

IMS Awareness Session
Provided to all ENRRA employees,
describing IMS process.



Integrated Management System Process





ENRRA New Premises

Full Digitalization of all ENRRA administrative procedures

Providing information system best solutions (e.g. servers, switches, firewall, connections, operating system, etc.)

Providing ENRRA services electronically through its Website

Making the submittal of Applicants' requests affordable as well as fixing appointments for submitting the needed docs to benefit from ENRRA services



Specific Activities Regarding the Licensing and Oversight of EI-Dabaa NPP



Development of ENRRA regulations and guides

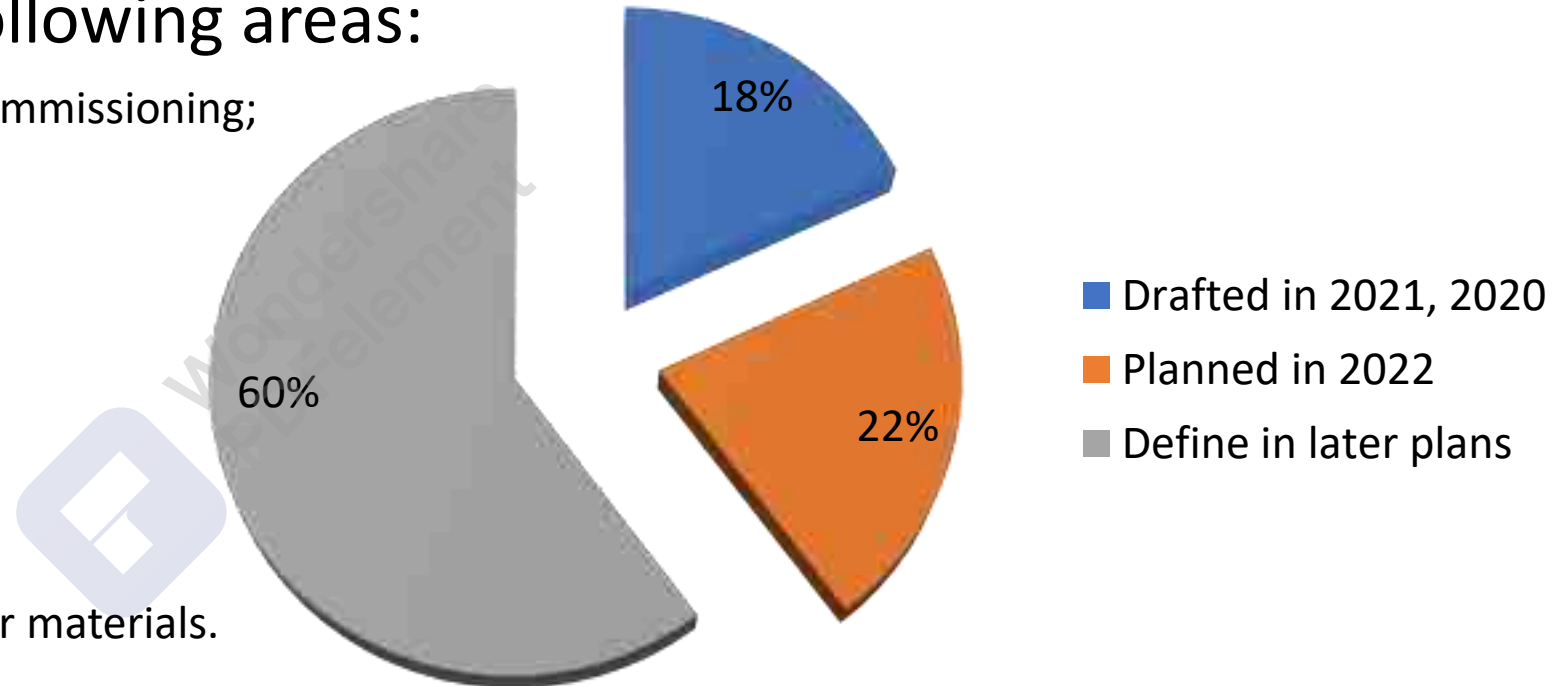
- ENRRA carried out a review for Gap Analysis of the preliminary legal and regulatory framework of Egypt.
- Based on this review the additional regulations (requirements and rules) and guides were identified and scheduled for development. This will cover the whole NPP life time.
- ENRRA Internal steering committee approved the Proposals for Issuing and Updating Regulations and Guides for the Period 2021 (according to the related IMS procedure).
- Several regulations were developed according to the annual plan of 2021 related to the Authorization rules and inspection during construction phase of NPP. Annual Plan (2022) for Issuing and Updating Regulations and Guides was developed.



Regulatory Documents Current Status

ENRRA 2022 plan contains 36 Regulatory documents covering the following areas:

- Design, construction and operation, decommissioning;
- Nuclear safety;
- equipment manufacture;
- Quality assurance/management system;
- Regulatory inspection and enforcement;
- Conformity assessment of SSCs;
- RW safety management ;
- transportation and safe storage of nuclear materials.



Cooperation with International organizations



International Atomic Energy Agency (IAEA)

Nuclear Safety Standards Committee (NUSSC)

10 NISS members participated in reviewing:

- **15 drafts** of IAEA safety standards in 2021;
- **Various areas** (Commissioning , Maintenance, Periodic Testing and Inspection, Core Management and Fuel Handling, Operational Limits and Conditions, The Operating Organization and the Recruitment, Training and Qualification of Personnel, Radiation Protection and Radioactive Waste Management, Ageing Management, Instrumentation and Control Systems.

Integrated work Plan (IWP)

IAEA experts mission will review ENRRA Draft regulations regarding **Radioactive Waste Management** to complete the RWM infrastructure issue.

Cooperation with International organizations



Rostekhnadzor (RTN)

- Permission (rights) to use and copy Russian regulations and standards and guides.
- Joint **Rostekhnadzor – ENRRA** Virtual Workshop on Organization of the Regulatory Body Activities on Issuing the Permits for Performing of Works in the Field of Atomic Energy Use (17 February 2022).
- Workshop to discuss the approaches to the development of regulatory document establishing requirement for nuclear and radiation safety assurance including incorporation of recommendations of international organizations (28 March 2022).



EL Dabaa NPP site permit

- **EL Dabaa NPP site permit** of EI Dabaa NPP was granted on 10/3 /2019.
- Regarding to site activities of EI Dabaa NPP,
 - _ ENRRA conducted periodic inspections (2019, 2020),
 - _ ENRRA conducted Follow up inspection on June 2021.
- Next inspection planned to be conducted to inspect the site readiness for NPP construction.
- **The Russian consultant VO Safety participated with ENRRA team in the inspection works.**



El Dabaa NPP construction permit (1/2)

PSAR review of units 1 and 2

- ENRRA treated the review of the PSAR of EL Dabaa NPP as a project (according to the related IMS procedure) using project management principles and tools.
- Performing the review project includes formation of review teams, plan, **training of the team members**, interaction with TSOs (Russian and Czech Republic) and applicant (NPPA) during the review process and clear roles and responsibilities of the involved teams and individuals.
- Training was provided to involved ENRRA team and individuals on:
 - **Global Nuclear Safety Regime;**
 - **NPP General Overview. VVER reactor;**
 - **VVER technological processes. VVER structures, systems and components;**
 - **On The Job training on Review of PSAR;**
 - **Training on PSA Code (Risk Spectrum);**
 - **Training on calculation of atmospheric radioactive release (RECASS Express software).**



EI Dabaa NPP construction permit (2/2)

PSAR review of units 1 and 2

- Completeness of the PSAR Introduction and Chapters 1-18 for Units 1, 2 of the EI Dabaa NPP was checked.
- Conclusions were made based on the results of the completeness checking, and additional documents were requested for the review.

Development of the method statement

- Method Statements were developed for the review of PSAR Chapters for Unit 1 of the EI Dabaa NPP

Review and assessment the PSAR

- Review and assessment of the PSAR, including “Introduction” and Chapter 1-18 of the PSAR for Unit 1 of the EI Dabaa NPP are in process **with the support of TSOs.**

SSC Conformity Assessment for El Dabaa NPP



- ENRRA conducted inspection 25-30 July 2021 to check the readiness of the production facilities of JSC Tyazhmash for the manufacture of the core catcher (1st long lead componets) for the El Dabaa NPP as per Quality Plans: Casing; Filler; Bottom plate; Maintenance Platform; Cantilever Truss; Valve for water supply.
- ENRRA conducted inspection on 25-29 April 2022 to check the readiness of AEM Special Steels branch of JSC AEM TECHNOLOGY as per Quality Assurance Program for Manufacturing of Blanks of pressure vessel for El dabba NPP unit 1.

The Russian consultant VO Safety participated with ENRRA team in the inspection works.



El Dabaa NPP

SNF Storage Facility review

- **Site Evaluation Report (SER)** was reviewed within the scope of a permit for the SNF SF siting. **ON The Job training on SER Review was provided to ENRRA reviewers.**
- Review and Assessment report of the SER of SNF SF prepared by VO Safety (TSO) and ENRRA reviewers, and submitted the report to NPPA. The response of NPPA received and discussed.
- An Inspection to the site has been conducted to verify the information submitted with the application (June 2021).
- Permit conditions were developed for the SNF SF siting based on discussion of the review and inspection report and The **Environmental Affairs Agency** approval of the Environmental Impact Assessment Report as one of the requirements for permission.
- **On 28 Feb 2022 the sit permit of SNF SF of El Dabba NPP was granted by ENRRA Board.**

A photograph of a large, modern building with a curved facade and a prominent archway. The building is light-colored with some darker accents. The word "ENRRA" is visible on the top part of the building. The image is slightly blurred and has a watermark.

THANK YOU



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