

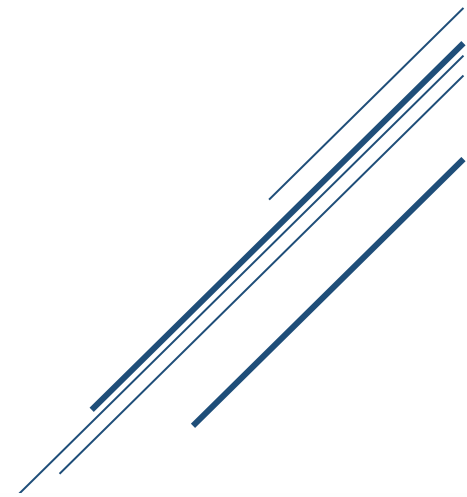
PERFORMANCE of REVIEW and ASSESSMENT in TÜRKİYE

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Contents

- Establishing the Basis for Licensing
- Scope of Review and Assessment
- Human Resources used in Review and Assessment
- Tools used in Review and Assessment
- Records and Reports of Review and Assessment
- Lessons Learnt from licensing of Akkuyu NPP



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The Licensing Basis

- A list of mandatory regulations to be used during the authorization process
 - Also, the set of requirements for which the design is to be developed and modified
- Established at early stages of project right after the Letter of Intent
- The list includes
 - Turkish legislation and regulations
 - IAEA Safety Requirements
 - Regulatory documents proposed by the applicant, mainly of the vendor country, may include third party regulations
- Approved by the Nuclear Regulatory Board
- Compliance with the provisions of these documents are mandatory

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The Licensing Basis

- The Licensing Basis is supported by a list of guides, codes and standards
- The list includes
 - IAEA guides that NDK uses for review and assessment
 - Turkish codes that are requested to be complied with
 - Codes and standards used in design, proposed by the applicant
- The list is kept separately from the Licensing Basis on mutual agreement without approval of the Board
- The compliance is not mandatory
 - Non-compliance with the provisions of these documents are questioned but alternative solutions for satisfying the safety requirements are acceptable

Licensing Basis for ANS

Turkish Regulations, about 35% of total
IAEA requirements, about 5% of total
Russian regulations, about 60% of total

Codes and Standards, 90 % Russian

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The Scope of Application

- Main information needed for each authorization for each category of nuclear installation listed in the relevant regulation
- Lists of application documents including supplementary ones are listed in Project Management Plan (PMP) for each authorization for a specific facility
- Format and content of submissions
 - High quality of application documents to facilitate R&A
 - Predefined format requirements to ensure version control and to avoid repetition in R&A
 - Predefined content to facilitate the preparation of the document by applicant and to ensure demonstration of safety to our own understanding

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Tiers Approach to R&A

Level 1 – Completeness Check of Application

- Missing documents in submission
- Quality of documents
 - Compliance with relevant guidelines of NDK
 - Authenticity of documents and copies
 - Adequacy of language for understanding
 - Use of SI system, legibility of the figures, charts, etc.
- Content of each documents, usually defined by regulations listed in licensing basis
- *NDK would not initiate next step unless the application is deemed to be sufficient to perform a R&A*

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Level 2 – Review and assessment for validation of compliance with licensing basis

- Adequate presentation of the installation and its SSC's
- Utilization of general safety principles, such as redundancy, etc., in design
- Adequacy of safety functions of SSC
- Ability of SSC's, to provide for its designated safety function
- Compliance of submitted information with licensing basis (safety principles, requirements and acceptance criteria)
- Full compliance with content regulations
- Consistency of provided information in all submission

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Tiers Approach to R&A

Level 3 – Review and assessment for verification of information provided for SSCs

- Safety, seismic and quality classifications
- Technical properties and adequacy
- Environmental qualification
- Compliance with standards
- Test results, if applicable

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Tiers Approach to R&A

Level 3 – Review and assessment for verification of information provided for analyses

- Aptness and adequacy of initiating events and scenarios
- Aptness and adequacy of methods and tools used in analyses
- Aptness and adequacy of assumptions, inputs and outputs
- Adequacy of scope of analyses
- If deemed necessary;
 - Verification of software used
 - Independent analyses (audit calculations), sensitivity and uncertainty analyses (Mostly by the technical support organization)

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Licensing Basis

Scope of R&A

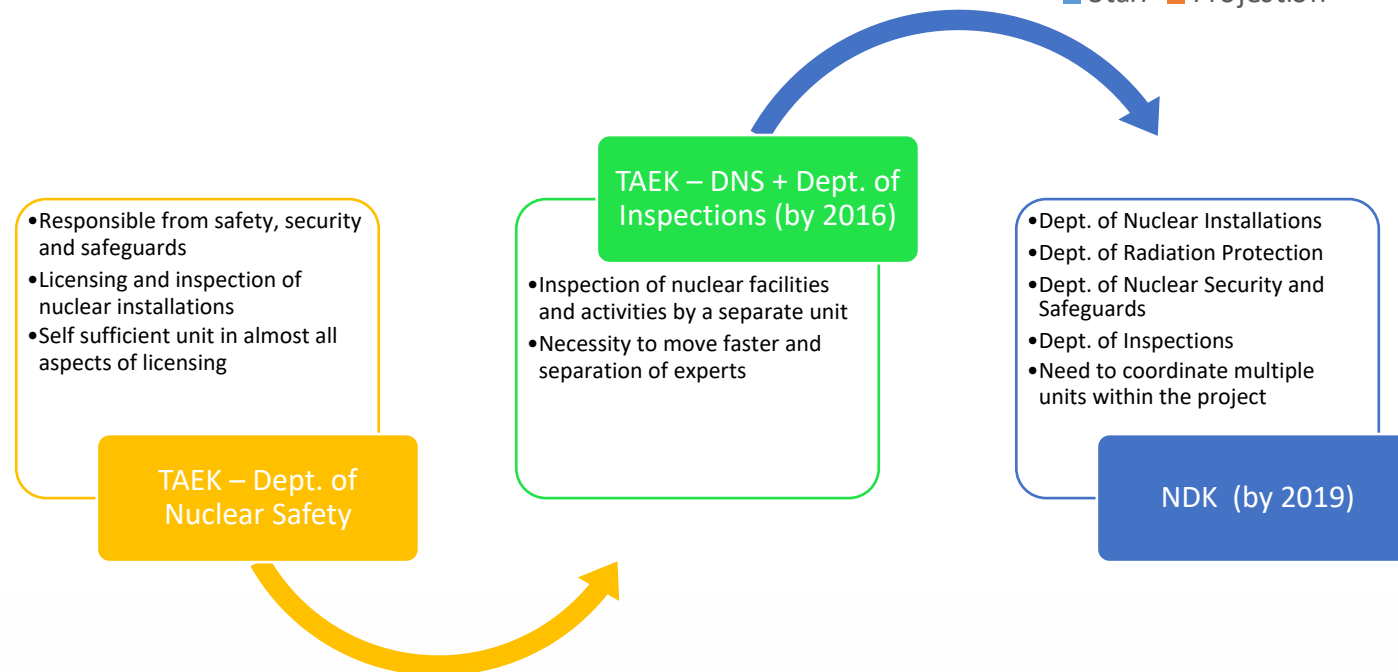
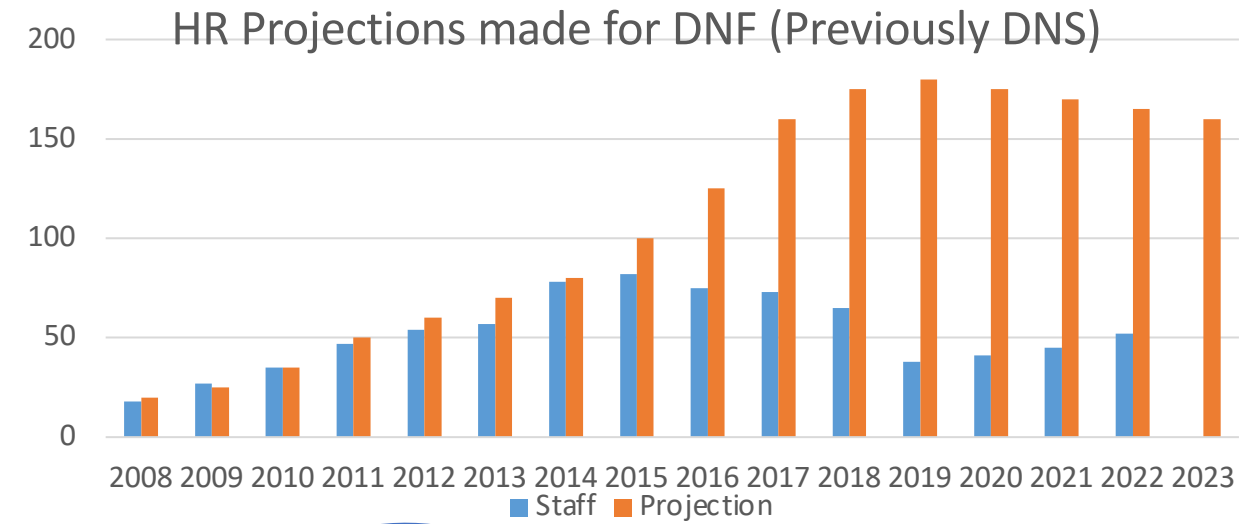
Human Resources
used in R&A

Tools used in R&A

Records and
Reports of R&A

Lessons Learnt

- Human resource management planned from 2010 to 2030
- Planning based on existing structure is underway
- Initial conditions are changed when the NDK is established



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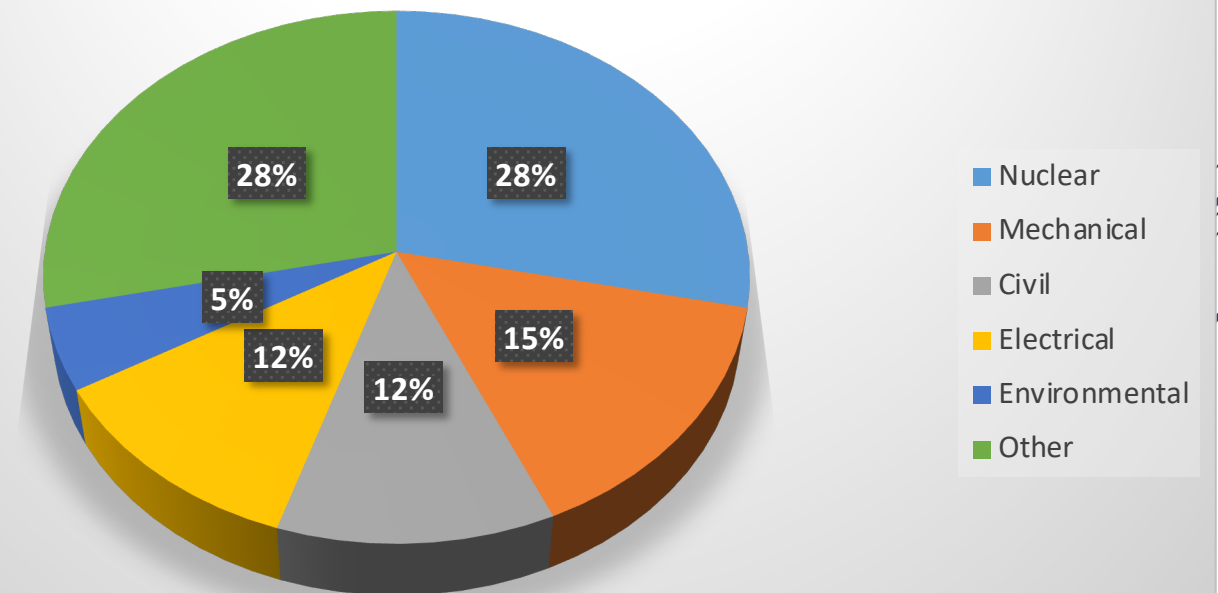
Project Team

Around 60 experts

- 1/3 is core group, regulators for >10 years
- 1/3 is trained experts, 5-8 years of experience
- Rest newly hired
- Vast majority is technical

Other experts are metallurgical, chemical, industrial and software engineers, physicists, biologists, legal experts, etc.

Technical Staff, about 60 experts



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Project Groups

Project Steering Committee		
Project Manager		
		Support Services; document management, admin, HR, legal, etc.
Ad Hoc Groups	R&A on Siting	R&A on Construction
Licensing Basis Long lead items TSO	Site License EIA	Management Systems Nuclear Systems Mechanical Systems Electronic and Electric Systems Radiation Protection and Radwaste Civil Engineering and Fire Protection Physical Protection Personnel

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Project Groups R&A Goals

- Level 2 R&A in minimum
 - To understand system
 - To understand Technical Evaluation Report of TSO
 - To be able to compile reviewer's reports and group's reports
- Level 3 R&A
 - For better understanding of TSO output
 - Decision is of the team
 - Boundaries are time and competence of the team

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Technical Support Organizations

- Scope of use of TSO is specific to project, to be defined in PMP
- Detailed R&A of application documents, level 3 including audit calculations if deemed necessary
- Performing independent analyses (audit calculations) of scenarios defined by project team, and sensitivity and uncertainty analyses if deemed necessary
- Limited with compiling technical evaluation reports
- Need for TSO support
 - Limited in-house human resources
 - Inexperience in proposed design
 - Inexperience in licensing basis, particularly on vendor country regulations

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Technical Support Organizations

- Targeting to minimize need and scope as
 - Gaining experience while licensing
 - Enhancing human resources
- Available (and utilized) options
 - National
 - In-house expertise, research centers of TAEK and NUTED after 2020
 - National organizations, mainly universities
 - National experts, experts on specific areas
 - International
 - IAEA missions on specific issues or services like SEED or TSR
 - Cooperation with other RBs, vendor country or other competent authorities such as STUK, NRC, etc.
 - Expert companies/organizations (external TSO)

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Tools to carry out R&A

- Project Management
 - For managing matrix type task assignments to the staff
 - For defining and assigning tasks
 - Developing work breakdown structure and schedule to determine critical paths
 - To resolve interactions between the R&S groups
- Technical level communication with applicant and their experts
 - Working groups on areas needed
 - To ensure mutual understanding on
 - Expectations of regulator
 - Actions that can be taken by applicant in response to additional questions
 - Used even before the application is made

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Tools to carry out R&A

- Compliance management system
 - To ensure all provisions are met
 - May request a compliance report from the applicant
- Issue Recording and Tracking
 - Formal identification of issues and recording
 - Formal additional requests for information
 - Follow-ups of issues and ARIs
- Inspection of premises and/or activities
 - Inspection of premises for certain type of authorizations, such as authorization of manufacturers, if applicable
 - Inspection of authorized activities to establish input for next authorization application, such as commissioning inspections
 - Inspection of investigations which produce input information for application documents, such as site investigations

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Tools to carry out R&A

- Reference plant concept
 - Applicant to propose a reference plant
 - Of similar design licensed at least for construction elsewhere
 - Reference system if reference plant use different
 - Applicant to provide NDK with main documents used for licensing application
 - NDK seeks SER from licensing authority, but applicant must provide for necessary permits if SER is not public
 - Reference plant's documents are used as preliminary information of proposed design
 - Differences of proposed plant from reference and their impact on safety is among the application documents
 - Reference plant's SER is another input to SER to be written by NDK, no further consideration of its existing license

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Records to be kept during R&A

- Receipt of application
- Acceptance of application
- Task assignments for review groups and reviewers
- Issues determined
 - Findings
 - Issue tracking records
- ARIs
 - Further information requested to resolve some of issues
 - Responses to ARIs
- The Authorization Document
 - Who is authorized
 - What is authorized
 - What are the conditions for the authorization

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Reports produced during R&A

- Technical Evaluation Reports (TERs and ITER)
 - TERs are reports compiled by TSO experts on findings of R&A of a specific document or a chapter
 - ITER was an integrated report compiled by TSO incorporating TERs to establish a basis for SER
- Reviewer Reports
 - Report produced by project staff based on their own R&A
 - TERs may be used as an additional input
 - A report for each recorded assignment
- Review Reports
 - Report compiled by team leader on a specific documents or a chapter based on reviewer reports
 - TERs and inspection reports may be used as additional input

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Reports produced during R&A

- Safety Evaluation Report (SER)
 - Report compiled by project manager to establish a basis for decision making on authorization
 - Based on review reports
 - TERs and ITER may be used as an additional input
 - SER of reference plant may be used as input
 - A report for each authorization
- An “Executive Summary” for submission for the decision making of the Board

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The Lessons Learnt from Licensing Akkuyu NPP

- The number of codes and standards documents increases rapidly as the project implemented, too fast to be approved by the Board every time, so it kept separate
- Format and Content guidance on application should not be too restrictive to the applicant, who may have its own system of documentation
- Collaboration with other regulators is not easy, they are usually busy with their own workload, plan accordingly
- Clear definitions of purpose of authorization, for provide guidance for
 - RB staff for review and assessment, and
 - Applicant to prepare the documents
- Compliance Management is strongly advised

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The Lessons Learnt from Licensing Akkuyu NPP

- Need a strong recording and tracking system for issues and/or non-compliances
- The use and control of TSO activities takes considerable amount of time
- Reference plant concept proved to be difficult to implement
 - Difficulties to receive documentation from outsources (reference plant belongs to another company, asks for considerable money for documents)
 - Many modifications, additional work to keep track
 - Pressure on reliance to licenses granted to the reference plant

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THE END...

Thanks for your patience!...

