



BADAN PENGAWAS TENAGA NUKLIR
Nuclear Energy Regulatory Agency



BAPETEN Chairman Regulation No.5/ 2012 on Utilization and Modification Safety on Non Power Reactor

By: Azizul Khakim

Nuclear Energy Regulatory Agency of Indonesia (BAPETEN)

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Utilization and Modification

- Utilization or modification of non power reactor that affect the safety has to be approved by BAPETEN chairman.
- Utilization or modification affects the safety, if it
 - changes the OLC,
 - affects the SSCs important to safety,
 - potentially causes danger in different way or its probability is higher than that written on SAR.
- The licensee shall establish utilization or modification program and management system of utilization or modification.
- The program consists of:
 - Introduction,
 - Description
 - Design requirements,
 - Design, fabrication and installation,
 - Safety analysis,
 - Radiation protection,
 - Nuclear emergency,
 - Organization and responsibility,
 - Implementation and scheduling



Utilization and Modification

- The organization consists of:
 - Project manager,
 - Personnel,
 - Reactor manager,
 - Quality assurance unit.
- The licensee is responsible for the safety aspects of the preparation and implementation, which cover
 - Conducting safety analyses,
 - Providing resources,
 - Complying OLCs,
 - Preventing and controlling the safety of people and environment,
 - Implementing management system at all level,
 - Updating documents related to the reactor safety characteristics after the implementation of utilization or modification.

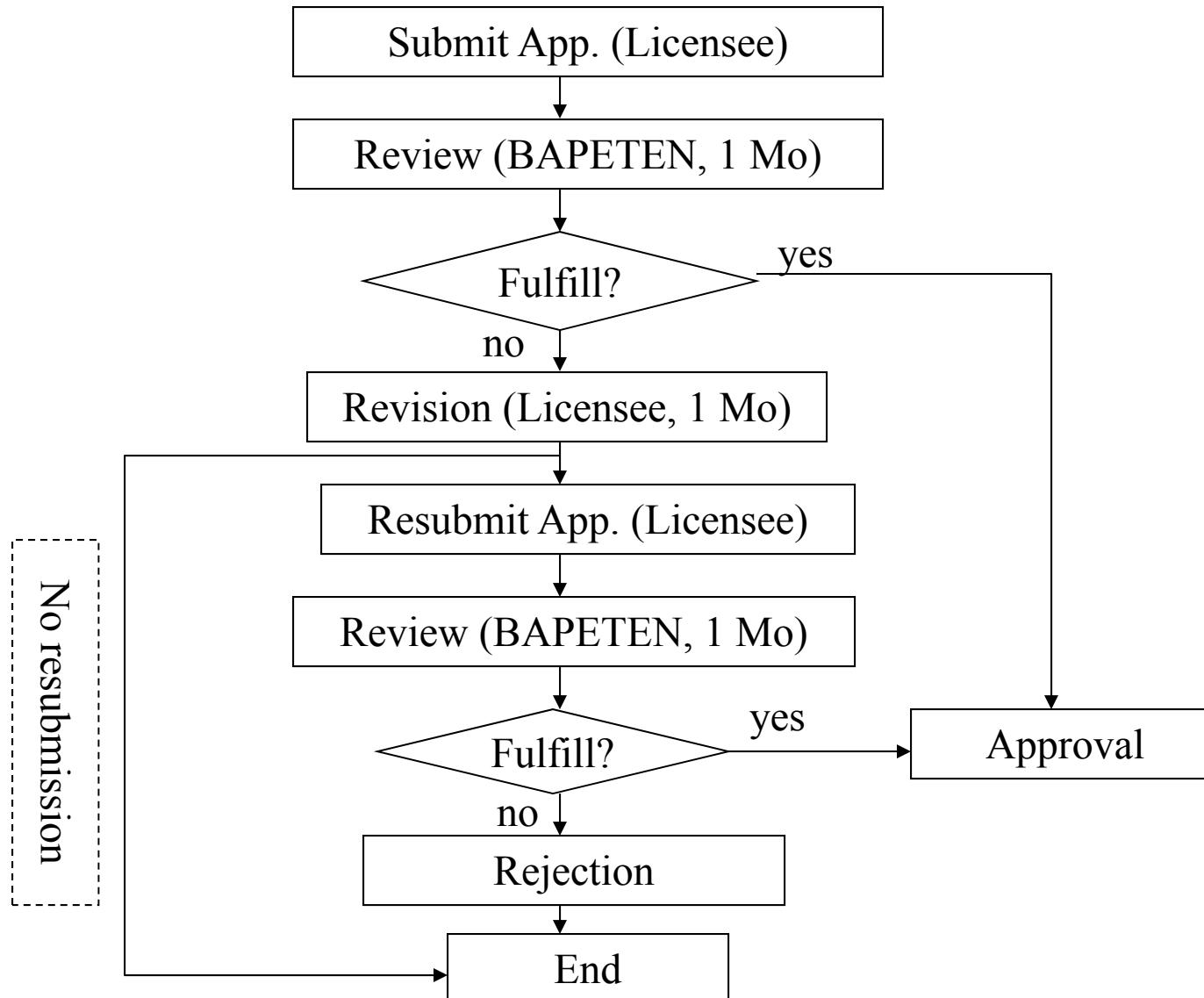


Utilization and Modification

- The project manager is responsible for:
 - Establishing the program and management system,
 - Implementing the utilization or modification works from the preparation until the completion,
 - Compliance of contractor or supplier,
 - Availability of preventive action from radiological hazards,
 - Proposing revision of SAR.
- The personnel are in charge of implementing the utilization or modification.
- The reactor manager is responsible for:
 - Safety of the reactor operation during modification or utilization,
 - Works schedule which is integrated with reactor operation.
- Quality assurance unit is responsible for the implementation of management system during utilization or modification.
- The licensee shall ensure all personnel involved have the knowledge on:
 - Radiation protection including the regulation,
 - Operating procedure of utilization or modification,
 - Procedure on nuclear emergency preparedness



Flow Chart: utilization





Utilization

- The licensee shall submit the updated safety documents which include changing part of SAR, after the utilization done completely.

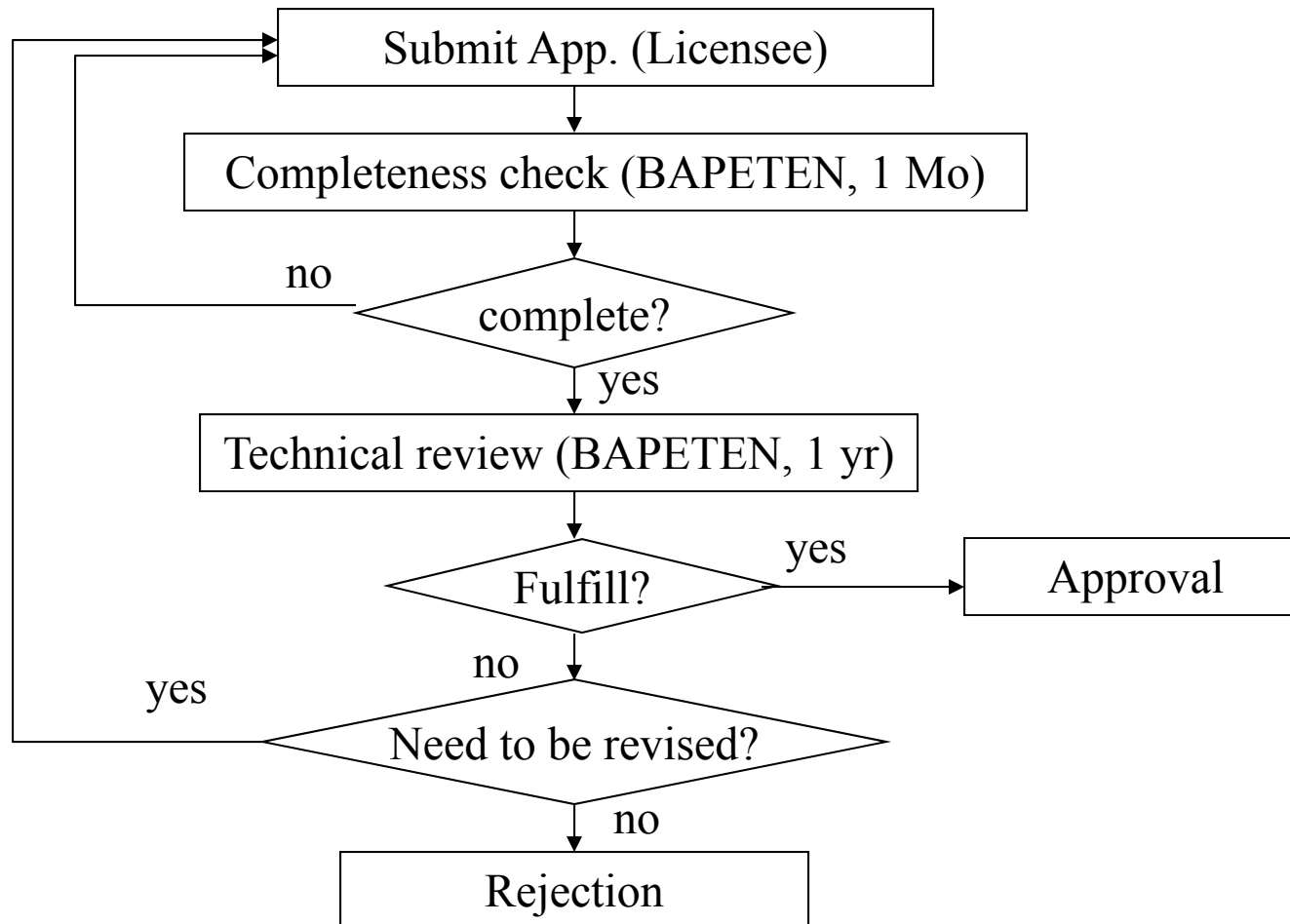


Modification

- In implementing the modification, the licensee shall fulfill the design requirement, which include:
 - The reliability design of SSCs,
 - Operability and maintainability design,
 - Design on the ease of decommissioning,
 - Radiation protection design,
 - Human factor design,
 - Design to minimize the aging.



Flow Chart: Modification





Modification

- The licensee shall conduct functional tests after modification in accordance with functional and performance test program, to ensure meeting the designed modification purpose.
- The functional and performance test include:
 - Personnel
 - Purpose and expected results,
 - Detailed test,
 - Test schedule,
 - Method and procedure,
 - Acceptance criteria,
 - Follow up of irregularities, and
 - Safety requirement during the test
- The functional and performance test program shall be submitted to safety committee to be reviewed and to BAPETEN to be approved before the implementation.



Safety analysis

- The licensee shall conduct safety analysis on modification focusing on radiological potential hazard to the personnel, community and environment.
- The analysis include:
 - Identification and selection on hazard potential,
 - Evaluation on radiological and non-radiological impacts,
 - Analysis on impacts that may appear after modification on unmodified SSCs,
 - Efforts to handle the potential danger due to modification,
 - Efforts to mitigate radiological and non-radiological impacts,



Safety analysis

- The safety analysis should consider:
 - Failure of core components,
 - Failure of coolant system,
 - Failure of confinement,
 - Failure of electrical power supply,
 - Failure of instrumentation system,
 - Failure of other components, and
 - Human error during modification



Past Modification Experiences

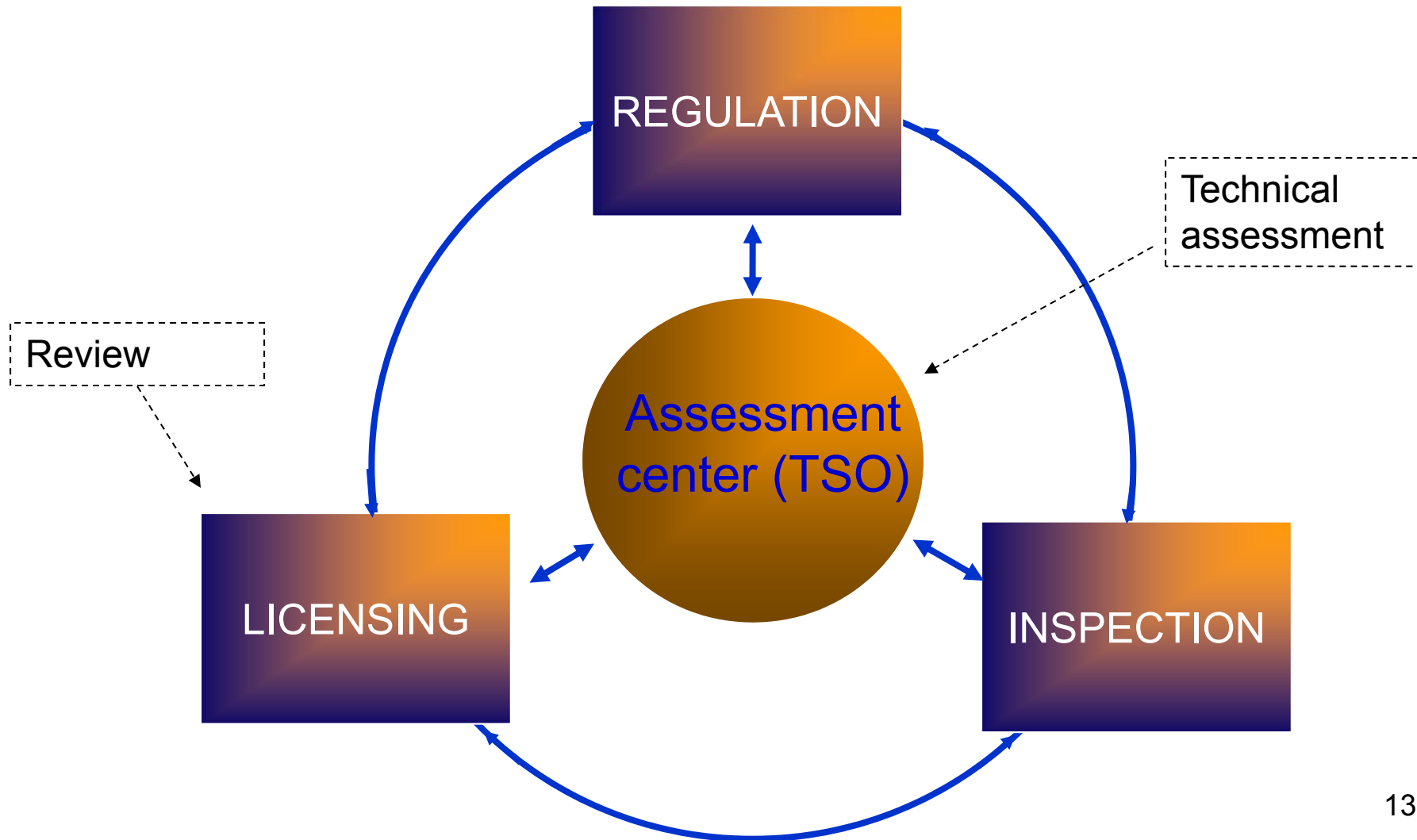
- RSG GAS: fuel material replacement from U_3O_8 -Al to U_3Si_2 -Al.
- TRIGA 2000: power upgrading from 1 MW to 2 MW
- Kartini reactor: bulk shielding modification

Projected / expected Modification

- TRIGA 2000: replacement of FFCR to ordinary CR (without fuel follower)
- Kartini reactor: use of beamport for BNCT



Internal Process within BAPETEN





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Thank You
Terima kasih