Public Outreach Meeting for the Forthcoming TerraPower Natrium Demonstration Reactor Construction Permit Application

U.S. Nuclear Regulatory Commission

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November 7, 2023

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United States Nuclear Regulatory Commission
Protecting People and the Environment

NRC Mission Statement – Protecting People and the Environment

The NRC licenses and regulates the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment.

www.nrc.gov/about-nrc.html

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Code of Federal Regulations

- NRC's regulations (or rules) are contained in Title 10 of the *Code of Federal Regulations*, Parts 1 through 199
- Regulations govern:
  - Transportation and storage of nuclear materials
  - Use of radioactive materials at nuclear power plants, research and test reactors, uranium recovery facilities, fuel cycle facilities, waste repositories, and other nuclear facilities
  - Use of nuclear materials for medical, industrial, and academic purposes

https://www.ecfr.gov/

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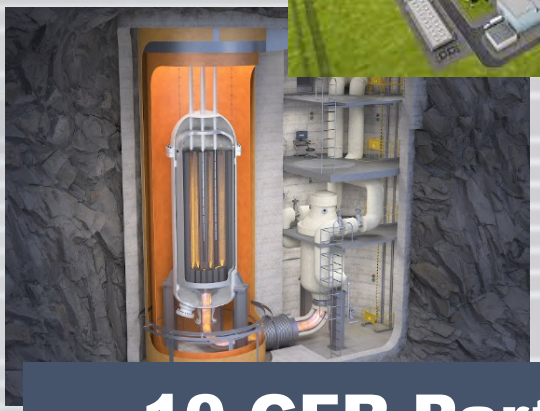
Advanced Reactor Licensing Pathways



10 CFR Part 50

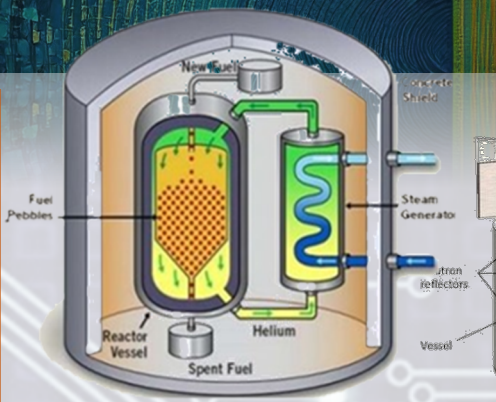
Large majority of operating fleet and NPUFs

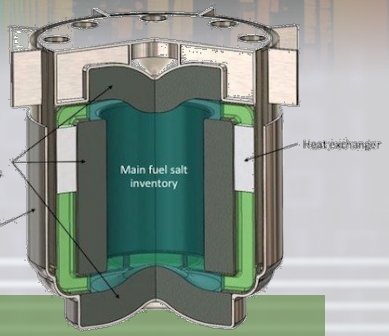
Two-step construction permit and operating license

10 CFR Part 52

Vogtle 3 & 4 AP-1000; NuScale

Combined License; Design Certification; ESP; ML; SDA





10 CFR Part 53

New licensing framework under development

Publish final rule by 2025

Licensing Process Brochure (NUREG/BR-0298)

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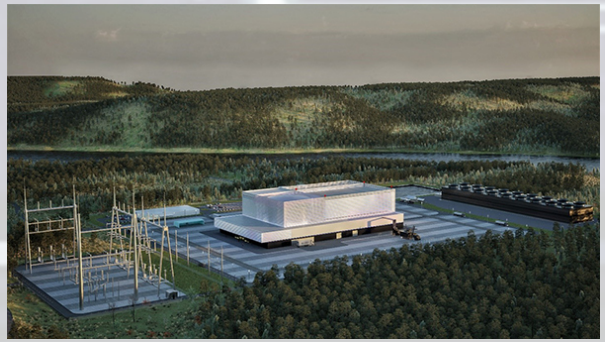
10 CFR Part 50: Two-Step Licensing Process

Construction Permit

Construction Permit Application → Public Hearing → Construction Permit → Construction Begins

Operating License

Operating License Application → Public Hearing Opportunity → Operating License → Operation Begins



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Principle Legislation & Regulations Driving Timely Decisions and Outcomes

Environmental Review

Environmental Impact Statement

- National Environmental Policy Act (1969)
- Impacts **ON** the environment **FROM** licensed activities
- 10 CFR Part 51
- Impact level
- Disclosure document

Safety Review

Safety Evaluation

- Atomic Energy Act (1954)
- Energy Reorganization Act (1974)
- Impacts **ON** the facility **FROM** the environment
- 10 CFR Parts 20, 40, 50, 52, 70
- Risk informed
- Reasonable assurance of adequate protection

www.nrc.gov/about-nrc/governing-laws.html

Safety Review – Fundamental Functions

Reactivity and power control

- Fuel
- Reactivity control systems

Heat removal

- Reactor coolant system
- Backup cooling systems

Radionuclide retention

- Barriers to retain radionuclides within the facility

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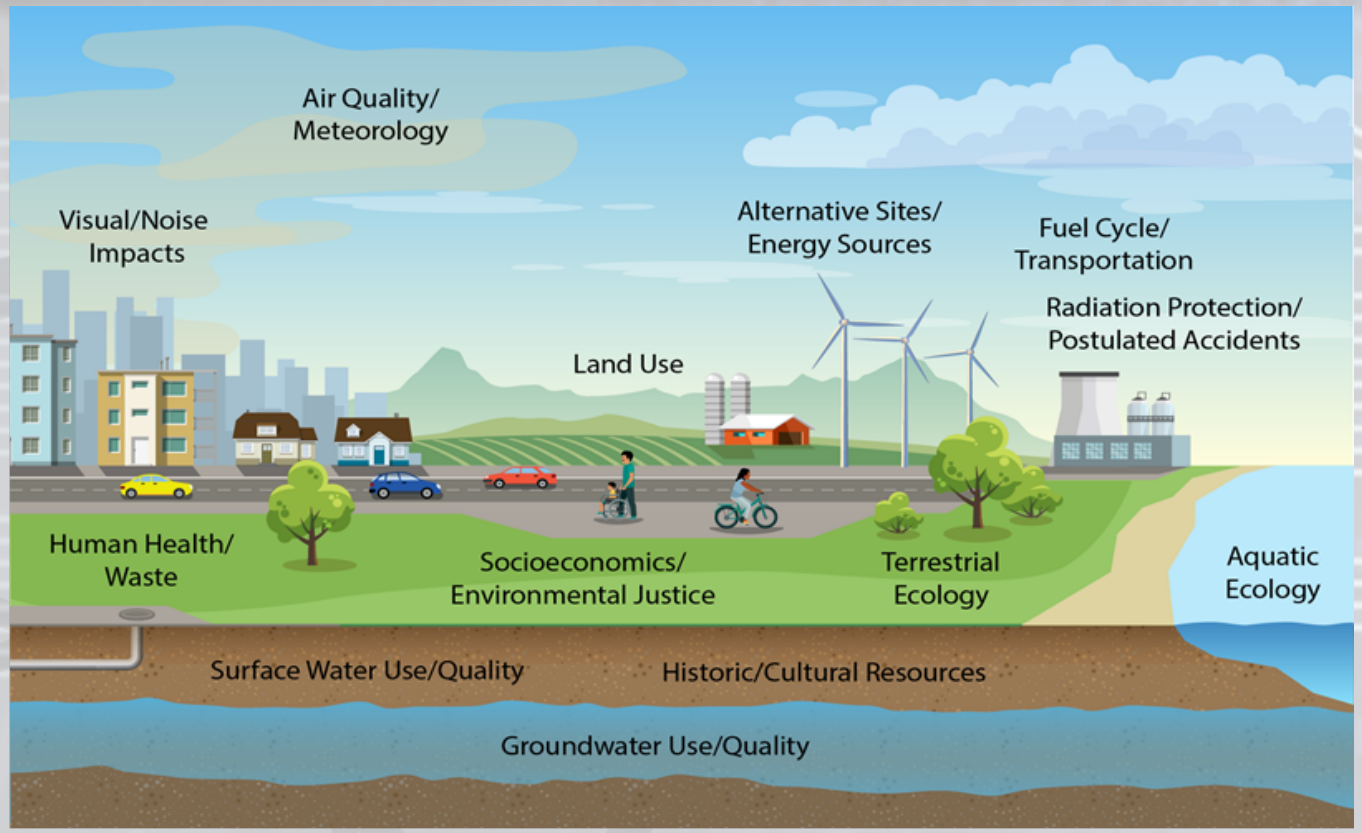
Safety Review – Key Topics

- External hazards (nearby facilities, hydrology, seismology, etc.)
- Reactor fuel
- Reactivity control and reactor shutdown
- Primary coolant and decay heat removal
- Instrumentation and control
- Radiation protection for both workers and the public
- Accident analyses
- Operational programs (emergency plan, security, operator training, etc.)

Environmental Review – Regulations

- National Environmental Policy Act (NEPA)(1969)
- National Historic Preservation Act (NHPA), Endangered Species Act (ESA), others
- 10 CFR Part 51 – NRC environmental protection regulations for domestic licensing and related regulatory functions
- The NRC NEPA document addresses impacts **on** the environment **from** the facility and informs the NRC licensing decision
- For a power reactor an Environmental Impact Statement (EIS) is required – *Federal Register* Notice

Resources Addressed in NRC Environmental Reviews



- Analyst will describe the "affected environment" (baseline conditions) for each resource area and then describe the consequences of the action (impact level) and compare those to the reasonable alternatives.
- Analyst will also describe "cumulative impacts" from any known past, present, or reasonably foreseeable future actions.

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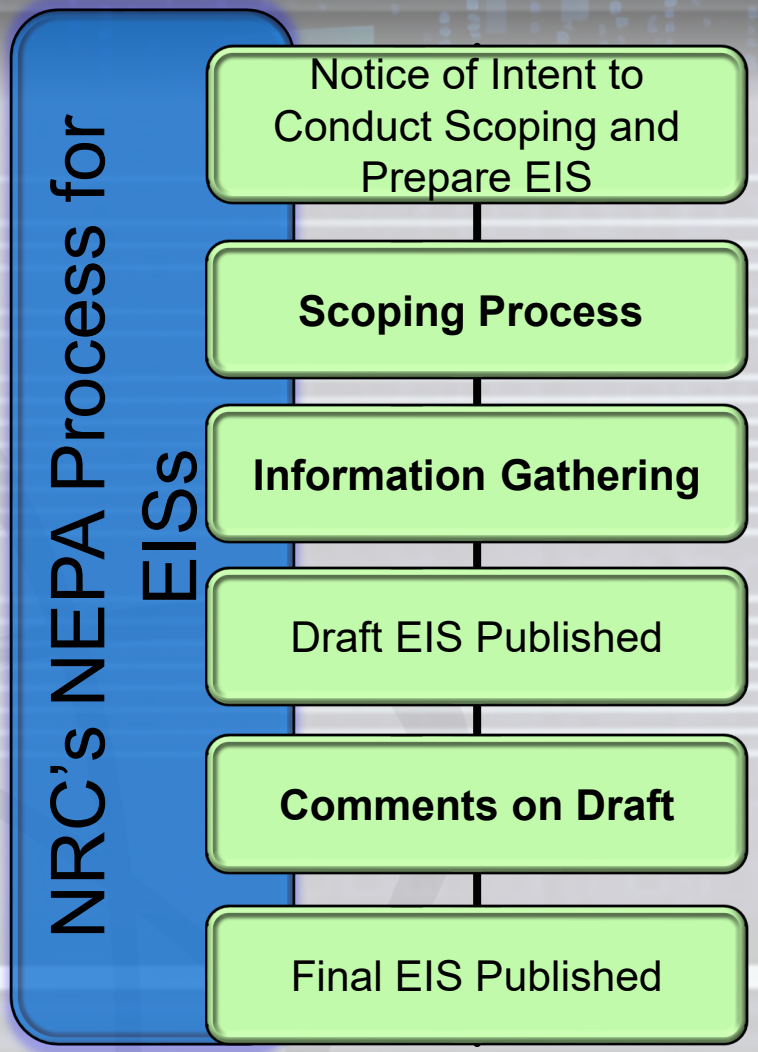
Environmental Review Process



- Publish *Federal Register* notice
- **Public scoping period with advertised and facilitated meetings held in plant vicinity**
- **NRC staff performs review**
- Publish *Federal Register* notice
- **Public comment period on Draft EIS for at least 45 days with advertised and facilitated public meetings held in plant vicinity**
- Staff responds to comments and publishes *Federal Register* notice

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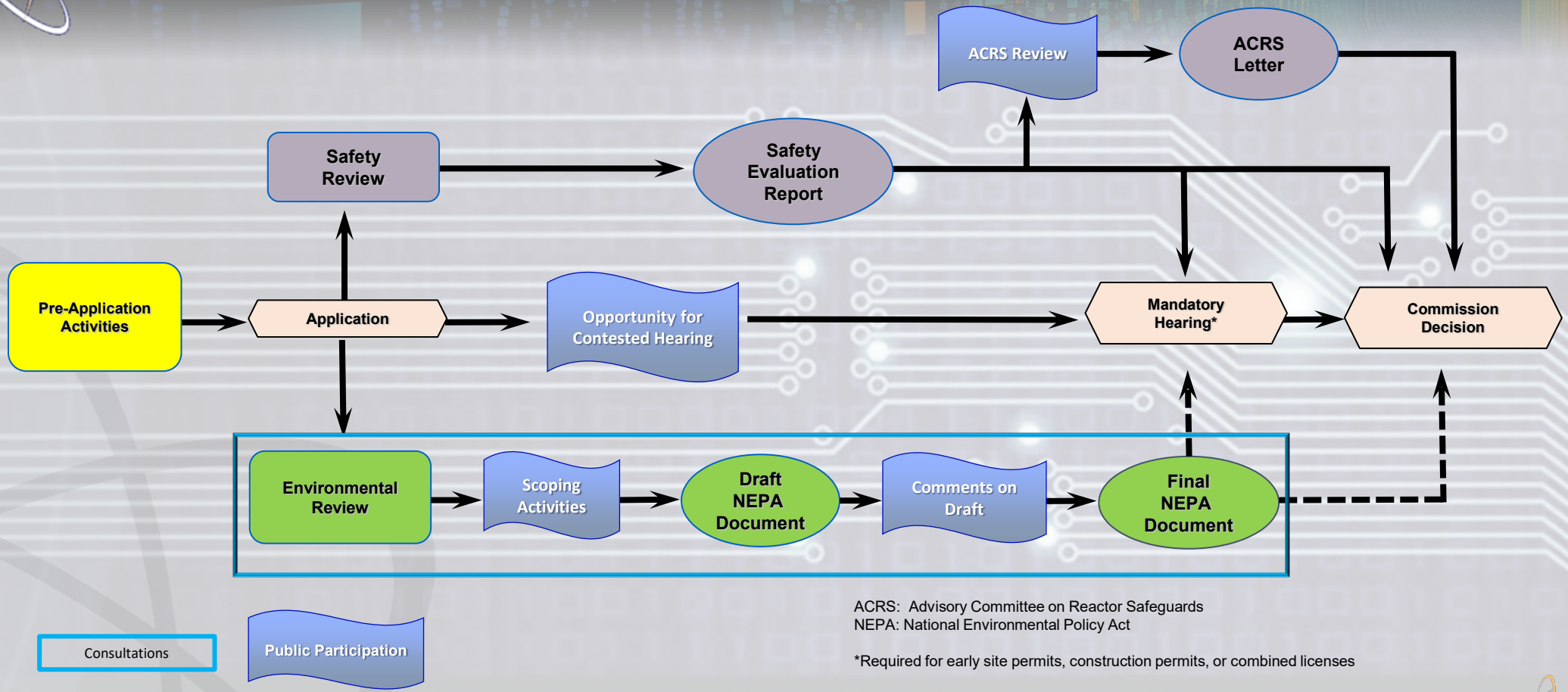
Licensing is a Multi-Step Process, with Opportunities for Public Engagement



ACRS: Advisory Committee on Reactor Safeguards
NEPA: National Environmental Policy Act

*Required for early site permits, construction permits, or combined licenses

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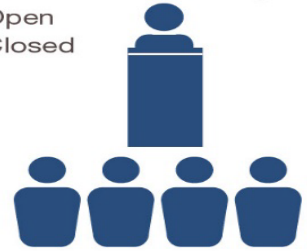
NRC Public Participation and Interaction

Public Meetings
Open
Closed



General Inquiries
Phone
Mail
E-mail
In Person

Information Meetings
Scoping
Preliminary
Counterpart
Information Exchanges

Education and Business Outreach
Minorities Groups
Small Business
Vendors/Contracts
Recruitment

Media Outreach
Press Conferences
Press Releases
Editorial Boards
Interviews

Public Comments
Regulations.gov
Mail
E-mail
Fax
Verbally at Public Meetings

Resident Inspectors in the Community

10 CFR 2.206 Petition
Electronic or Hard Copy

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Web Site
www.nrc.gov

Adjudicatory Hearings

Advisory Committee Meetings

Public Document Room
Phone
E-mail
In Person

Conferences
International
Trade
Industry

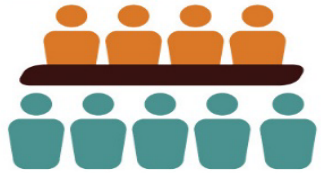
Emergency Preparedness
Federal
State
Local

Social Media
Blog
Twitter
YouTube
Flickr
Facebook

Visitors to the Agency

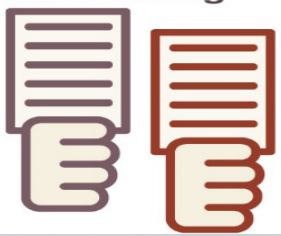
Open Houses

Congressional Hearings



Allegations

Petitions for Rulemaking



Federal Register Notices

www.nrc.gov/public-involve

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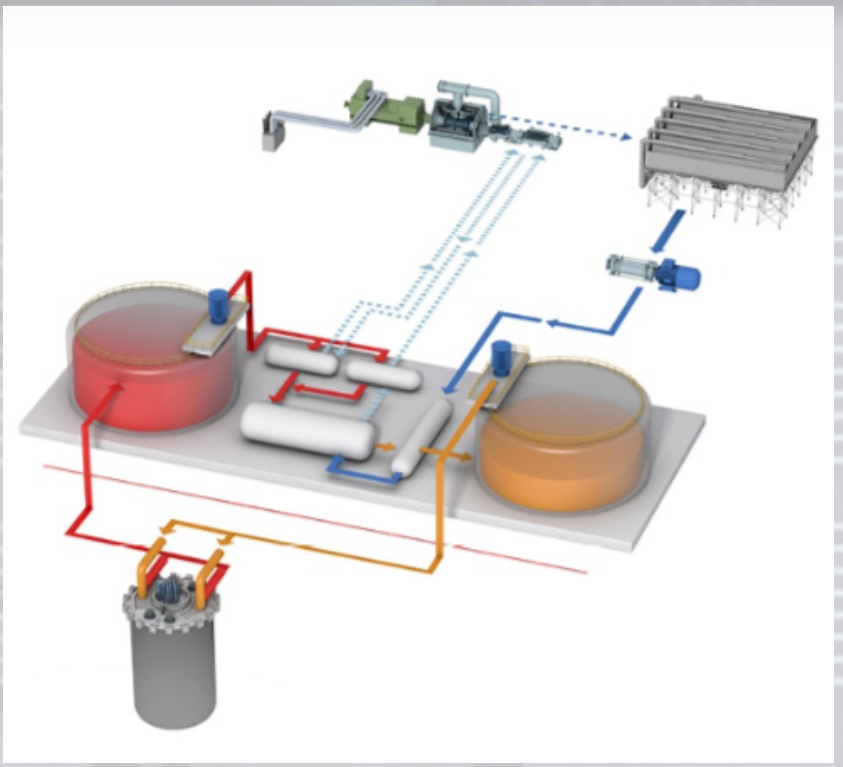
TerraPower Natrium Technology



- Natrium uses a pool-type sodium fast reactor (primary loop is located within the reactor vessel)
- Natrium reactor is rated for 840 MWt (345 MWe output or 500 MWe for peak demand periods)
- Basic plant layout includes a nuclear island and energy island
- Energy island leverages a molten salt storage system that can be used for flexible power operation
- PacifiCorp and TerraPower announced in 2021 that the Natrium demonstration plant would be sited in Kemmerer, WY

https://www.terrapower.com/our-work/natriumpower/

Timely NRC Review Schedules

The NRC established generic schedules for completing final safety evaluations for various licensing actions

Activity	Reactor Type	Milestone*
Part 50 - Construction Permit	All	36 months
Environmental Impact Statement	All	24 months
Part 50 - Operating License	Non-Light-Water Reactor	36 months
Topical Reports	All	24 months

*Actual schedules may be shorter or longer than the generic milestone schedule based on the specific needs of the licensee or applicant and the staff's resources.

www.nrc.gov/about-nrc/generic-schedules.html

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Thank You

Questions?

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