August 16, 2026

LL-AALO-2026-064
AALO-1-24-US-0001

U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Document Control Desk

Subject: Submittal of Aalo Holdings, Inc. Public Presentation on the Plant Parameter Envelope Framework

Aalo Holdings, Inc. (Aalo) submits the enclosed presentation, Aalo Commercial Product PPE: Presentation on the Plant Parameter Envelope Framework, to the U.S. Nuclear Regulatory Commission (NRC) for information purposes. We provide this presentation to support our ongoing pre-application engagement with the NRC staff on its XMR design.

The enclosed presentation introduces the Plant Parameter Envelope (PPE) framework, covering the reactor, plant, and site parameter types that bound the design, and the distinct roles of adequacy review and applicant control in maintaining the envelope. The presentation is intended to familiarize the NRC staff with the framework and to support future interactions.

This letter and the enclosures make no new or revised regulatory commitments.

Questions regarding this submittal should be directed to Colter Somerville at colter@aalo.com.

Sincerely,

Signed by:
Parthasarathy Chandran
CF87291184CC4B3...
8/15/2026

Parthasarathy Chandran

Regulatory Affairs Manager

Enclosure 1: Aalo Commercial Product PPE: Presentation on the Plant Parameter Envelope Framework

cc: Jorge Hernandez Munoz, NRC

James Delosreyes, NRC

Marjorie McLaughlin, NRC

Aalo

Aalo Commercial Product PPE

August 18, 2026
Presentation on the Plant Parameter Envelope framework

Colter Somerville & Pete Gaillard

Agenda

1. The problem, and the framework

- Why every new site reopens the safety question
- Concept, scope, and parameter types

2. The reactor, and what bounds it

- Aalo-1 design and passive safety
- Reactor and fuel/waste parameters

3. The plant, and what bounds it

- Pod, nuclear island, and factory fabrication
- Owner-engineered system parameters
- Site parameters: natural hazards, then siting and ground conditions

4. Deriving values and using the envelope

- How values are derived, and deriving site parameters
- Regulatory review, then applicant obligations

The Problem: Per-Site Redesign Starts the Review Over

Reviewed site by site, a reactor is re-engineered for each location and the same safety questions are reopened at every deployment. The Plant Parameter Envelope (PPE) is the fix.

Reviewed once

Safety is established for the reactor design itself, so a community is not host to a one-off experiment. The same reviewed design is what gets built.

Site screened

Local conditions are checked against limits already set and reviewed, not re-engineered to fit each location.

The limits are set to cover roughly 80% of candidate U.S. sites.

The rest are excluded because they exceed the most restrictive cutoffs, not because they were left out of scope.

Margin deliberate

Limits are set beyond what most sites present. The margin is intentional, so the safety answer does not change when the location does.

PPE: Concept, Scope, and Parameter Types

A bounding envelope

A fixed set of plant parameters held under configuration control

Site-neutral reach

The same reviewed design applies across many candidate sites, with little to no design change

The three parameter types

1. Reactor

Intrinsic characteristics of the Aalo product, independent of any site: thermal power, core inventory, source term, fuel form

2. Owner-Engineered

Derived by the applicant, combining reactor characteristics with assumed site conditions: dispersion factors, boundary distances, release points

3. Site

Bounding physical and environmental conditions used to screen sites: seismic ground motion, temperature, flood level, wind loading

This presentation covers the framework, the parameter set, and how values are derived. Bounding values or ranges to be issued in a subsequent topical report.

The Aalo-1 Reactor

The product

A 10 MWe (megawatt-electric) sodium-cooled reactor, liquid sodium metal serves as the primary coolant rather than water

Reactor class

A fourth-generation ("Gen-IV") design in the "extra-modular reactor" (XMR) class, sized between microreactors and larger small modular reactors (SMRs)

Technology basis

Sodium-cooled fast reactor technology established through national and international research programs: EBR-II (Experimental Breeder Reactor II) and Japan's Joyo, both retired from service, and Idaho National Laboratory's MARVEL, in build

Reactor Overview: Passive Safety by Design

Control

Diverse gravity- and motor-driven rods, negative temperature feedback

Cool

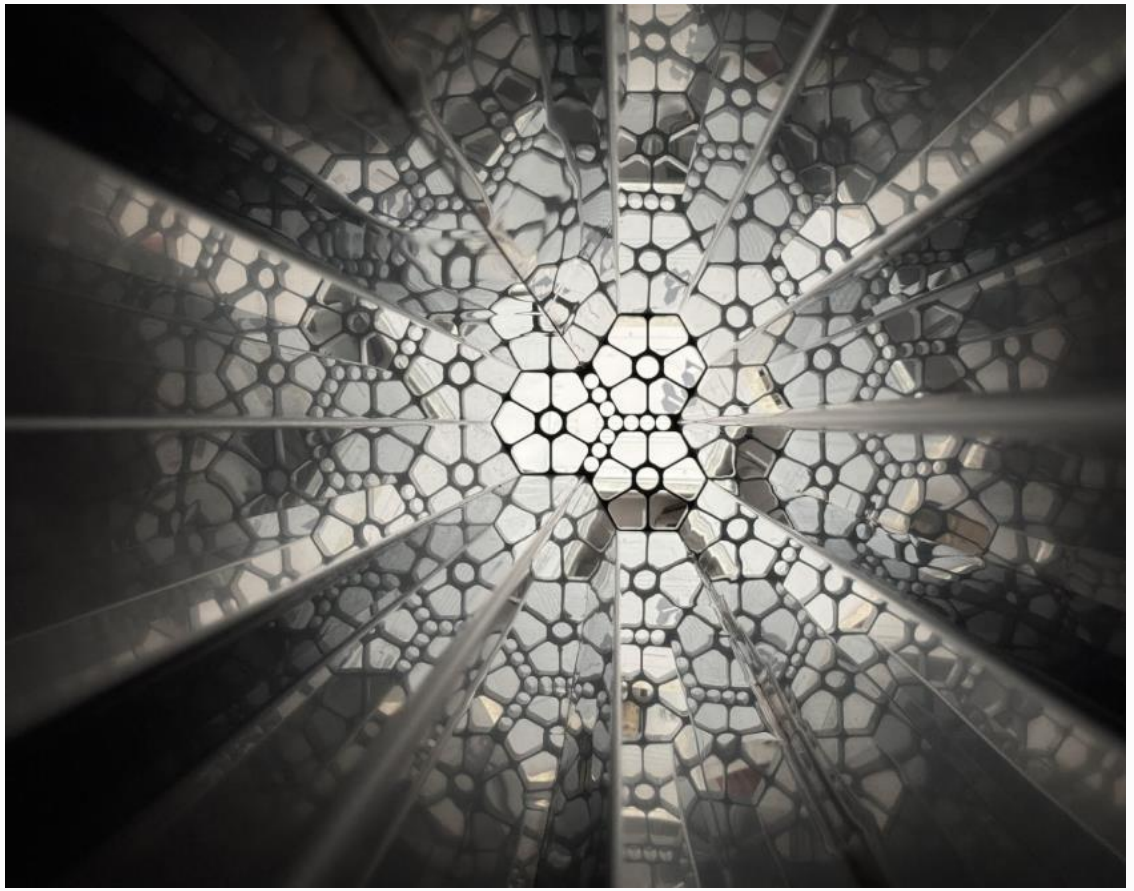
Sodium conducts heat about 160 times better than water, cooling the core by natural circulation at near-atmospheric pressure

Contain

Multiple physical barriers; one barrier's failure does not cascade

Shield

Boron carbide, lead, steel, and concrete layers keep public dose within federal limits



Reactor & Fuel/Waste Parameters

Intrinsic characteristics

Reactor thermal power; net electrical output

Source term

Total reactor core inventory (fuel assemblies); design-basis accident (DBA) source term, the radioactive material that could be released in the worst analyzed accident

Fuel cycle limits

Maximum enrichment limit; spent fuel heat load

Waste managed

Onsite spent fuel storage capacity; onsite radioactive waste generation over plant life

Values issued in subsequent topical report

The Aalo Commercial Product & Nuclear Island

50 MWe Pod

A modular Pod of five reactors with one or more power-generation turbines

Application

Optimized for data-center campuses, industrial parks, and other energy-intensive hubs

Reactor Buildings

House the Reactor Vessel System and interface with the decay heat removal system (DHRS), which cools the core without power or operator action

Fuel Building

Supports sodium-filled spent fuel pits for passive cooling and shielding

Ops Center

Attached nuclear island control and support facility adjacent to the Reactor Buildings

Standardized, not site-specific

Every Pod is built to the same configuration, so the envelope bounds the product rather than one plant.

Factory Fabrication and On-Site Fueling

Fuel travels only on site, never on public roads

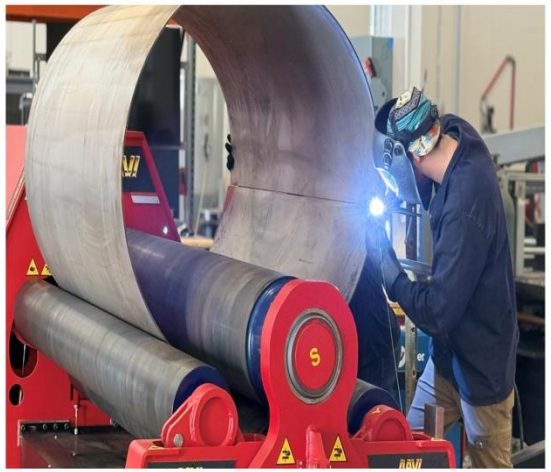
Fuel is loaded only after the reactor arrives on site.

The large majority of each reactor is factory-built as a controlled unit, then shipped by heavy-haul highway.

A repeatable production line

Factory production replaces field construction, tightening quality control, schedule, and cost.

The same line scales the fleet from one reactor to a full site, rather than a bespoke build each time.



Owner-Engineered System Parameters

Derived by the applicant

Integrating reactor characteristics with assumed site conditions:

- Ultimate heat sink thermal load
- Circulating water flow rate
- Cooling technology and heat rejection configuration
- Auxiliary water consumption rate

Physical & Effluent Limits

- Maximum reactor building footprint
- Maximum structure height
- Air-cooled heat exchanger height and count
- Normal and accident gaseous or liquid effluent releases

Values issued in a forthcoming topical report

Site Parameters: Design-Basis Natural Hazards

Seismic
- Design-basis ground motion

Wind
- Straight-line wind
- Tornado
- Hurricane
- Wind-driven missiles

Flooding
- Design-basis flood level
- Storm surge
- Tsunami and seiche
- Groundwater level
- Stormwater runoff

Other natural hazards
- Volcanic ashfall
- Lightning

Specific values are issued in the topical report

Site Parameters: Siting, Weather, and Ground Conditions

Emergency planning

- Exclusion area boundary distance
- Low population zone distance
- Atmospheric dispersion factor

Meteorology

- Dry- and wet-bulb temperatures
- Rainfall and probable maximum precipitation
- Snow load

Soil and foundation

- Bearing capacity
- Friction angle
- Shear-wave velocity
- Settlement

These limits are quantified in the topical report

How Values Are Derived

Inputs Reactor characteristics, public hazard data, and design standards

STEP 1

Bounding

Values are set to the maximum credible characteristics for the product, with conservative margins added

STEP 2

Internal consistency

Related parameters are chosen together so the envelope stays self-consistent across configurations

STEP 3

Documented basis

Aalo records each value's assumptions, margins, and supporting data, and makes that record available for review

Result

One bounding envelope, held under configuration control. The values hold for every candidate site, reviewed once and applied consistently everywhere.

Deriving Site Parameters

~80% of U.S. sites

Each hazard limit is drawn from the public sources below, then set at the level that bounds roughly 80% of candidate U.S. sites

Seismic

Design-basis ground motion from public data: U.S. Geological Survey, the American Society of Civil Engineers hazard tool, or published licensing records

Wind

Straight-line, tornado, and hurricane parameters per national structural design and building codes, including wind-driven missile criteria

Meteorology

Temperature, snow, and rainfall from National Weather Service and National Oceanic and Atmospheric Administration data, or site hazard studies

Flooding

Design-basis flood level bounds river, dam, surge, and overland-flow hazards using federal flood insurance maps or site-specific hazard data

The excluded 20%

Set by peak ground acceleration and design-basis flood level, the most restrictive cutoffs across candidate sites.

Distinct Roles: Review and Applicant Control

Adequacy review

The review assesses whether bounding assumptions are reasonable and conservative, not whether the design is optimal

Applicant control

Aalo identifies, evaluates, and resolves any exceedance, and maintains the envelope under configuration control

Both roles operate under the same envelope, applied through four obligations

1. Validation

Aalo compares the selected site and final plant configuration against the envelope to confirm they remain within bounds

2. Accountability

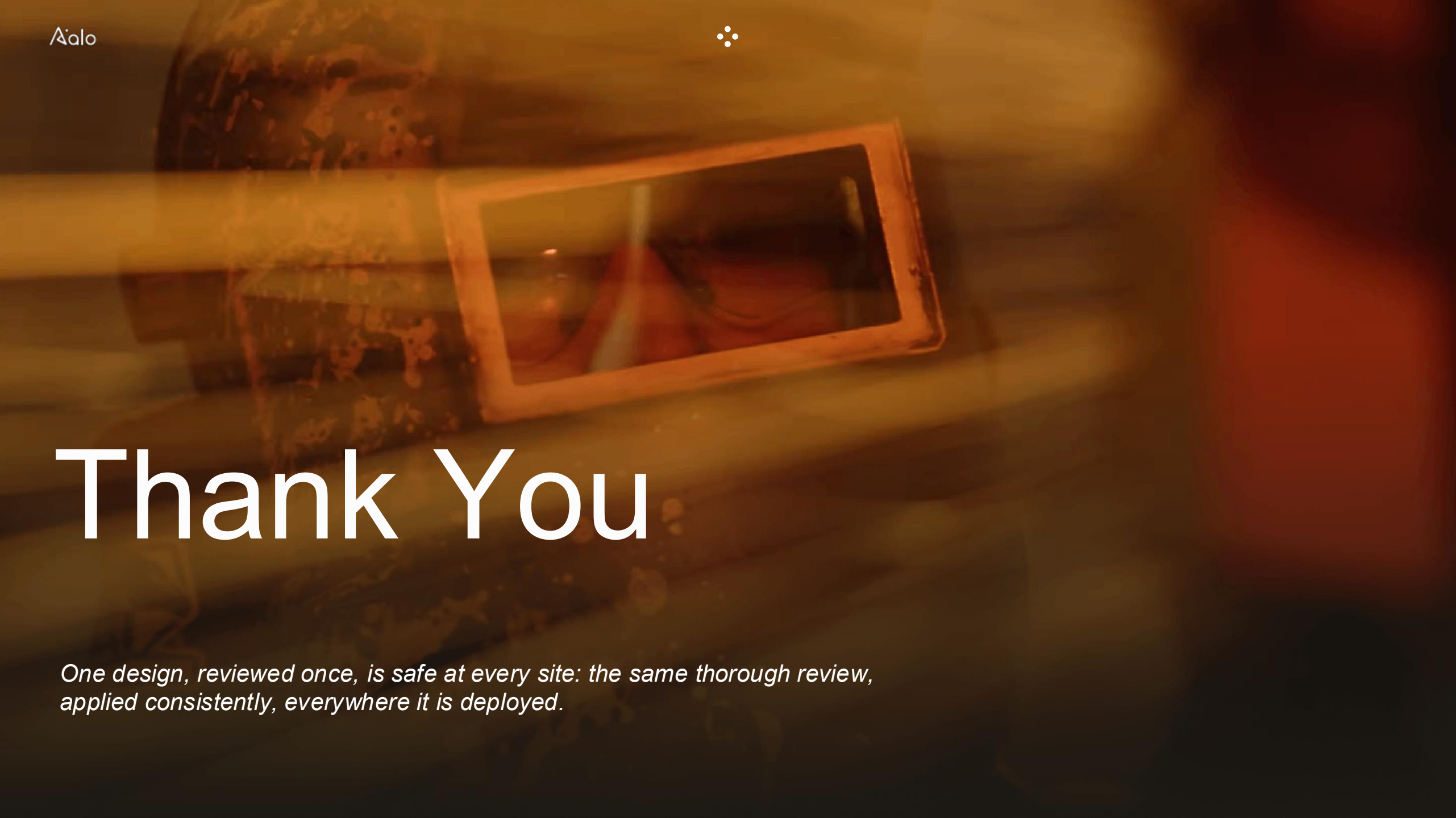
Aalo and its partners own the responsibility to identify and evaluate any exceedance, and to disclose it openly

3. Resolution Paths

Aalo resolves any exceedance through additional analyses, revised environmental evaluations, selecting a different site, or other licensing actions

4. Records

Aalo documents and change-controls each parameter, with its assumptions and margins, under its Quality Assurance Program Description



Thank You

One design, reviewed once, is safe at every site: the same thorough review, applied consistently, everywhere it is deployed.