Last Energy US

Enclosure 2 - Preliminary Safety Analysis Report

Caldwell LWA Application

October 2026

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Abbreviations and Acronyms

AISC	American Institute of Steel Construction
CFR	Code of Federal Regulations
FFD	Fitness For Duty
LWA	limited work authorization
PGA	peak ground acceleration
PSAR	preliminary safety analysis report
QA	quality assurance
QAPD	Quality Assurance Program Description
SRP	Standard Review Plan
USGS	United States Geological Survey

1. Purpose and Scope

This Preliminary Safety Analysis Report (PSAR) provides the technical basis for the permanent foundation work requested under the Caldwell Limited Work Authorization (LWA) as part of Part One of a two-part construction permit application. 10 CFR 50.10(d)(3)(i) requires an LWA application to include a PSAR, as defined in 10 CFR 50.34(a), limited to the portions of the facility within the scope of the LWA. The report must show compliance with the technically relevant Commission requirements applicable to the design of those portions of the facility covered by the authorization.

The requested foundation work includes driving steel H-piles, installing the steel liner, and placing bentonite grout within the lined foundation opening around the piles at the base. This is the full extent of the activity requested under this LWA. The steel H-piles are classified as safety-related in this Part One of a two-part construction permit application.

This analysis addresses the site-specific subsurface information relevant to the requested work, the engineering basis for the installed elements, applicable design requirements, installation verification, and quality assurance information applicable to the requested work.

Installation of Last Energy's PWR-20 reactor vessel ("reactor vessel") outside the requested authorization. Information concerning the reactor vessel is included only to the extent used in the engineering evaluations of the requested foundation work. The Part Two (of the two-part construction permit application) treatment of detailed site-specific seismic evaluation and seismic qualification of the foundation is described in Section 5.1. The remaining facility design and safety information will be provided in Part Two.

1.1. Items Outside the Scope of this Report

10 CFR 50.34(a) defines 13 areas of minimum information that a PSAR must address. Consistent with the 10 CFR 50.34(a) minimum scoping requirements, the list below identifies those areas that are not technically relevant to the requested foundation work or are addressed elsewhere in Part One, with a brief justification for each:

- 10 CFR 50.34(a)(5) – Items likely to become technical specifications: Not applicable. Technical specifications under 10 CFR 50.36 govern facility operation and are not implicated by the requested foundation work.
- 10 CFR 50.34(a)(6) – Preliminary plan for organization, personnel training, and conduct of operations: The organizational component is addressed in Enclosure 1, Section 4; personnel training and conduct of operations are not applicable to the requested work and are deferred to Part Two.
- 10 CFR 50.34(a)(8) – Identification of structures, systems, or components requiring research and development: Not applicable. The piles, liner, and grout employ established pile-driving and foundation grouting methods and do not require research and development to confirm design adequacy.
- 10 CFR 50.34(a)(10) – Preliminary emergency plans: Not applicable. Emergency planning under Appendix E to 10 CFR Part 50 addresses facility operation and accident response, neither of which is implicated by foundation installation. This information is deferred to Part Two.

- 10 CFR 50.34(a)(11) – Identification of construction hazards at multiunit sites: Not applicable. The Caldwell site is a single unit application.
- 10 CFR 50.34(a)(13) – Aircraft impact assessment information under 10 CFR 50.150(b): Not applicable to the requested work. The aircraft impact rule addresses the design of the reactor building and its mitigating systems; the requested foundation elements do not perform this function. This information is deferred to Part Two.

2. Requested Foundation Work and Authorization Boundary

This section defines the physical and regulatory boundary of the work requested under the Caldwell LWA, consistent with the requirement in 10 CFR 50.10(d)(3)(i) that an LWA application include a description of the activities requested to be performed. The subsections cover the following:

- Section 2.1: identifies each foundation related construction activity and its regulatory treatment. This section describes whether the activity is excluded from the definition of construction under 10 CFR 50.10(a)(2), or constitutes construction under 10 CFR 50.10(a)(1) and is requested for authorization under 10 CFR 50.10(d)(1).
- Section 2.2: describes the specific work for which authorization is requested.
- Section 2.3: addresses related activities that precede the requested work but do not themselves require authorization.

This section establishes the scope against which the remainder of this report demonstrates compliance with the technically relevant Commission requirements; Section 2 does not itself provide the safety, design, or technical basis for the requested work. The safety, design, and technical basis for the requested work is addressed in Sections 3 through 7.

2.1. Physical Sequence

Consistent with 10 CFR 50.10(a)(1)(iii), the requested foundation work constitutes construction because failure of the permanent foundation could prevent the reactor vessel, a safety-related structure, system, or component of the facility, from fulfilling its safety-related function. Table 2-1 identifies each physical step in installing the foundation and its regulatory treatment including whether the step is excluded from the definition of construction under 10 CFR 50.10(a)(2) regardless of its purpose, whether the step constitutes construction equipment or process material rather than an installed element, or whether the step is requested for authorization under 10 CFR 50.10(d)(1).

Table 2-1. Activity Sequence and Regulatory Treatment

Step	Function	Regulatory treatment	Requested under the LWA?
1. Clearing and grubbing	Prepares the work area surface	Site preparation excluded from construction by 10 CFR 50.10(a)(2)(iii).	No. Context only
2. Augering the foundation opening	Excavates the opening that receives the liner and the reactor vessel	Excavation, excluded from construction by 10 CFR 50.10(a)(2)(v)	No. Context only
3. Bentonite slurry during augering	Supports the excavation walls while the opening is formed	Process material used during an excluded activity	No. Context only
4. Liner installation	Provides lateral earth retention for the foundation opening.	Placement of a permanent retaining wall within an excavation under 10 CFR 50.10(d)(1)	Yes
5. Pile-driving frame installation	A temporary frame positions and guides the pile-driving equipment.	Construction equipment. Not an installed structure, system, or component	No. Context only

Step	Function	Regulatory treatment	Requested under the LWA?
6. Driving piles	Piles are driven below the foundation opening.	Driving of piles for the reactor vessel, constituting construction under 10 CFR 50.10(a)(1) and requested for authorization under 10 CFR 50.10(d)(1)	Yes
7. Grout backfill	Fills spaces around the piles at the base of the lined foundation opening.	Subsurface preparation and placement of grout for the supported structure, constituting construction under 10 CFR 50.10(a)(1) and requested for authorization under 10 CFR 50.10(d)(1).	Yes

2.2. Requested Permanent Work

Last Energy requests authorization under 10 CFR 50.10(d)(1) for three permanent elements of the foundation for the reactor vessel , as identified above in Table 2-1:

- The steel H-piles
- The bentonite grout
- The steel liner

Each is described below in further detail, with the engineering information provided in Section 4.

2.2.1. Steel H-Piles

HP14×89 steel H-piles are driven below the foundation opening and remain as permanent foundation elements. Section 4 presents the preliminary engineering basis and reported compressive capacity.

2.2.2. Bentonite Grout

Bentonite grout is placed within the lined foundation opening around the piles at the base. The grout remains permanently in place as part of the completed foundation work. The grout is not credited with providing structural support in this PSAR. The grout is distinct from the temporary bentonite slurry used during augering, as described in Section 2.3.

2.2.3. Steel Liner

The steel liner is installed in the foundation opening before H-pile driving and remains as a permanent foundation element. The steel liner maintains the foundation opening for subsequent installation of the reactor vessel. Section 4 presents the evaluated liner configuration and engineering basis.

2.3. Activities Not Requested Under the LWA

Section 2.3 addresses activities associated with the requested foundation work that are not themselves requested for authorization under the LWA, consistent with Table 2-1. These activities are addressed in Section 2.3, rather than in Section 2.2, because authorization is not requested for them.

Clearing, grubbing, and excavation of the foundation opening precede the requested permanent work. 10 CFR 50.10(a)(2)(iii) and (a)(2)(v) exclude these activities from the definition of construction. Last Energy does not request authorization for them under the LWA.

The pile-driving frame is temporary construction equipment used to position and guide pile-driving. The pile-driving frame does not constitute installation of a foundation, placement of grout, or another activity listed in 10 CFR 50.10(a)(1), and is not itself an installed structure, system, or component of the facility. Last Energy does not request authorization for its installation under the LWA.

Bentonite slurry is a process material used during augering. Its use is not requested for authorization under the LWA.

3. Site and Subsurface Basis

10 CFR 50.34(a)(1)(ii) requires a description and safety assessment of the site and facility, including an analysis of the radiological consequences of a postulated accident. Consistent with 10 CFR 50.10(d)(3)(i), section 3 addresses only the site and subsurface information technically relevant to the requested foundation work: the survey basis, geotechnical investigation, and geotechnical design parameters supporting the piles, liner, and grout. The facility-level safety assessment and radiological consequence analysis required by 10 CFR 50.34(a)(1)(ii) are not technically relevant to the requested foundation work and are deferred to Part Two.

3.1. Application Site and Work Area

The application site is the approximately [redacted], Caldwell County, Texas. Cross Texas Land Services provides the survey basis for the application site [4].

The work area is the portion of the disturbance area where the foundation will be installed. Figure 3-1 presents an example site-layout plan identifying the proposed work area.

Figure 3-1: Example Site-Layout Plans



3.2. Geotechnical Investigation and Results

Gessner Engineering performed a geotechnical investigation of the Caldwell site [1]. Two borings, BH-1 and BH-2, were drilled on August 22, 2026. Each bore extended to approximately 150 feet below the existing ground surface. Gessner performed field sampling and laboratory testing to characterize the subsurface conditions and develop preliminary driven-pile parameters.

The borings encountered predominantly clay soils. Shallow clayey gravel was also encountered at both boring locations. The soils were generally characterized as very stiff to hard.

No groundwater was observed during dry augering to approximately 80 feet in BH-1 and 70 feet in BH-2. Wet rotary drilling was used below those depths. Groundwater conditions below the dry-augered depths were not verified. Last Energy will supplement the Part One geotechnical evaluation with additional groundwater characterization relevant to the requested foundation work. Detailed boring logs, laboratory results, and geotechnical observations are provided in the Gessner Engineering geotechnical report. Figure 3-2 shows the locations of borings BH-1 and BH-2 relative to the application site. The existing borings provide preliminary site information. Last Energy will supplement the Part One geotechnical investigation with additional localized borings, sampling, and testing around the foundation footprint. The supplemental investigation will be developed to address the applicable requirements of 10 CFR 50.34 and 10 CFR Part 100, with consideration of the guidance in RG 1.132.

Figure 3-2. Boring Locations



3.3. Geotechnical Design Parameters

Gessner Engineering provides preliminary geotechnical parameters for estimating driven-pile capacity, including allowable side-shear resistance and end-bearing capacity. These recommendations do not themselves constitute the foundation design. Table 3-1 summarizes the available subsurface information and the soil profile identified

in A.H. Beck's pile evaluation. Section 4 presents the engineering methods, loading assumptions, and reported results.

Table 3-1. Geotechnical Design Parameters

Parameter	Value or basis	Source
Subsurface profile	Predominantly clay, with shallow clayey gravel at BH-1 and BH-2.	Gessner Engineering geotechnical report
Groundwater observations	No groundwater observed during dry augering to approximately 80 ft at BH-1 and 70 ft at BH-2. Groundwater conditions below those depths were not verified.	Gessner Engineering geotechnical report
Preliminary axial pile parameters	Depth-dependent allowable side-shear resistance and end-bearing capacity.	Gessner Engineering geotechnical report, Table 4
Soil profile used in pile evaluation	Stiff to hard clay using the B-2 profile, selected by A.H. Beck as more conservative because hard clay was encountered deeper than at B-1.	A.H. Beck pile design summary
Applicability to the foundation work area	BH-1 and BH-2 provide information on subsurface conditions at the application site. Last Energy will supplement this information as described in Section 3.2.	Gessner Engineering geotechnical report; A.H. Beck pile design summary

The Gessner recommendations and the A.H. Beck liner evaluation serve different purposes. Gessner Engineering's geotechnical report characterizes subsurface conditions and provides preliminary design parameters. A.H. Beck's engineering evaluations address the configurations and loading conditions described in Section 4. The proposed treatment of the site-specific seismic evaluation and related foundation effects is described in Section 5.1.

4. Preliminary Engineering Basis

Section 4 addresses the preliminary design and evaluation requirements in 10 CFR 50.34(a)(3) and (a)(4). Consistent with 10 CFR 50.10(d)(3)(i), the information is limited to the portions of the facility within the scope of the LWA. This section describes the permanent configuration, design inputs and loads, applicable criteria and standards, and supporting engineering evaluations.

4.1. Permanent Configuration

Table 4-1 identifies the preliminary configuration of the liner, piles, and grout requested under this LWA.

Table 4-1. Permanent Configuration

Element	Configuration	Source
Liner	Cylindrical steel liner; 14-ft outside diameter; 48-ft overall length; 0.75-in. wall thickness. ASTM A36 steel or higher. Section shows 45 ft to the indicated excavation level and 3 ft of liner extending below that level.	A.H. Beck liner evaluation, plan and section drawings
Piles	HP14 x 89 ASTM A572 Grade 50 steel H-piles. The A.H. Beck liner evaluation illustrates nine pile positions in a three-by-three arrangement; the arrangement and spacing are illustrative. The A.H. Beck pile design summary evaluates a pile-tip elevation of 520 ft.	A.H. Beck liner evaluation, plan view; A.H. Beck pile design summary
Grout	Bentonite grout prepared using fine powdered sodium bentonite is placed around the piles at the base of the lined foundation opening. No structural support is credited to the grout.	Placement and function described in Section 2.2.2

4.2. Design Inputs and Loads

Table 4-2 identifies the inputs and loads used in the engineering evaluations supporting the requested foundation work. Section 3 describes the site and subsurface conditions. The proposed treatment of seismic information is described in Section 5.1.

Table 4-2. Design Inputs and Loads

Input	Basis used in the engineering evaluations	Source
Liner lateral earth pressure	Equivalent fluid density of 100 pcf applied over the 48-ft depth modeled in the liner evaluation.	A.H. Beck liner evaluation
Liner surcharge loading	HS-20 surcharge loading applied as an additional lateral pressure component.	A.H. Beck liner evaluation
Pile soil profile	Stiff to hard clay using the B-2 profile, selected as more conservative because hard clay was encountered deeper than at B-1.	A.H. Beck pile design summary
Pile section and embedment	HP14×89; 44-ft embedment below elevation 564 ft, extending to pile-tip elevation 520 ft.	A.H. Beck pile design summary

The A.H. Beck pile design summary calculates axial compressive capacity using Ensoft APILE and the soil profile identified above. The liner evaluation addresses lateral earth pressure and surcharge loading.

General Technology Description

Last Energy's PWR-20 reactor design incorporates a compact, modular nuclear power system housed within a dedicated Power Vault structure. The Power Vault provides a defined enclosure for the reactor and its associated mechanical, structural, and operational equipment. The integrated arrangement is intended to minimize the plant footprint while accommodating the equipment necessary for reactor operation, control, and cooling.

The reactor system includes the nuclear fuel and reactor core, reactor pressure boundary, and associated components necessary to sustain and control the nuclear fission process. Supporting equipment within the Power Vault includes reactor coolant pumps, control rods, control rod drive mechanisms, coolant piping, instrumentation, and associated mechanical and structural supports. These components collectively support reactor operation, reactivity control, coolant circulation, and the removal of heat generated during reactor operation and following shutdown.

The Power Vault is preliminarily represented as a cylindrical structure approximately 10 feet in diameter and 60 feet in height. Although the structure contains substantial mechanical equipment, much of its internal volume necessarily consists of open space required for equipment installation, component clearances, piping arrangements, and access provisions. Consequently, the Power Vault is not a solid mass of steel but rather an integrated arrangement of structural elements, mechanical components, and internal void spaces.

The Power Vault and its contained equipment impose gravitational and operational loads on the supporting foundation system. These loads are transferred through the supporting structural arrangement to the foundation and ultimately to the underlying soil through the installed foundation piles. For the Caldwell installation, the preliminary foundation configuration includes nine supporting piles beneath the Power Vault.

To evaluate the preliminary axial foundation loading conservatively, Last Energy has assumed that the entire cylindrical volume of the Power Vault consists of solid steel, using a unit weight of 499 pounds per cubic foot. This assumption provides a deliberately conservative estimate of the Power Vault's gravitational load for initial comparison against the allowable axial capacity of the foundation piles.

The following assessment evaluates this assumed loading condition against the preliminary geotechnical pile capacities to establish the available axial capacity margin and support subsequent refinement of the foundation design.

Last Energy has evaluated the preliminary axial loading of the Power Vault foundation piles using a conservative assumption that the entire Power Vault structure consists of a solid steel cylinder. This approach intentionally overestimates the structural weight of the Power Vault to establish a bounding preliminary loading condition for comparison against the allowable axial capacity of the foundation piles.

The Power Vault houses the reactor and associated equipment, including pumps, control rods, control rod drive mechanisms, piping, and supporting systems. For this preliminary evaluation, Last Energy assumes the Power Vault is a solid steel cylinder measuring 10 feet in diameter and 60 feet in height, with an assumed steel unit weight of 499 pounds per cubic foot.

Under these assumptions, the calculated cylindrical volume is approximately 4,712 cubic feet, resulting in a total estimated weight of **2,351 kips** (kip = 1000lb). Assuming this weight is distributed equally across the nine supporting foundation piles, the resulting axial load is approximately **261 kips per pile**.

Each foundation pile has an estimated ultimate axial capacity of 550 kips and an allowable axial capacity of 275 kips, reflecting a geotechnical factor of safety of 2.0. The nine piles therefore provide a combined allowable axial capacity of **2,475 kips**, compared with the conservatively estimated Power Vault load of 2,351 kips.

This comparison demonstrates that the assumed solid steel Power Vault loading remains approximately **5.0% below the combined allowable axial capacity** of the foundation piles, corresponding to approximately 124 kips of unused allowable capacity.

Importantly, the solid-steel assumption is intentionally conservative. The actual Power Vault will consist largely of internal void space necessary to accommodate the reactor and associated equipment. Accordingly, the actual structural configuration is expected to weigh substantially less than the assumed solid steel cylinder, although the final equipment weights and other applicable loads must be included to confirm the total foundation demand.

Last Energy's preliminary assessment demonstrates that the nine foundation piles possess sufficient combined allowable axial capacity to support the conservatively assumed solid-steel Power Vault weight under an equal-load-distribution assumption. This comparison provides an initial indication of structural design conservatism, with additional capacity margin expected as the Power Vault geometry and equipment weights are refined.

Final confirmation will account for foundation self-weight, actual equipment loads, nonuniform pile loading, applicable design-basis load combinations, and geotechnical performance requirements.

4.3. Applicable Criteria, Codes, and Standards

10 CFR 50.34(a)(3) requires the PSAR to describe the preliminary design of the facility. This includes the principal design criteria and the design bases associated with those criteria. It also includes information on materials, general arrangement, and approximate dimensions. The information must provide reasonable assurance that the final design will conform to the design bases with adequate margin for safety.

Last Energy reviewed the General Design Criteria in Appendix A to 10 CFR Part 50 to identify the overarching criteria relevant to the requested Part One foundation work. Table 4-3 summarizes the Part One treatment of those criteria.

Table 4-3 Design Criteria Treatment

General Design Criteria	Principal Design Criteria
Criterion 1 - Quality Standards and Records	The steel H-piles are designated safety-related for Part One. Section 6 describes the quality assurance controls applied to the design and construction activities affecting their safety-related function.
Criterion 2 - Design Bases for Protection Against Natural Phenomena	Sections 3 and 5 describe the site and subsurface basis and the treatment of natural phenomena relevant to the requested foundation work. Detailed site-specific seismic evaluation and qualification are to be addressed in Part Two.
Criterion 4 - Environmental and Dynamic Effects Design Bases	Section 4 describes the preliminary loads and environmental conditions evaluated for the requested foundation work. Facility-level operational and accident-related effects outside the Part One scope are to be addressed in Part Two.

4.4. Preliminary Evaluations and Results

10 CFR 50.34(a)(4) requires a preliminary analysis and evaluation of the design and performance of structures, systems, and components. The evaluation must address the adequacy of the design and its margins of safety. Table 4-4 identifies the engineering evaluations applicable to the requested foundation work.

Table 4-4. Preliminary Evaluations

Evaluation	Acceptance Criterion	Result	Source
Pile axial compressive capacity	Allowable capacity determined using the factor of safety identified in Table 4-3.	APILE-calculated axial capacity of 550 kips ultimate and 275 kips allowable for the evaluated HP14×89 pile and soil-profile configuration.	A.H. Beck pile design summary
Steel liner performance under lateral loading	Calculated stress within the report's allowable stress of 21.6 ksi; evaluation performed in accordance with AISC 360.	Maximum reported stress of 3.787 ksi under combined lateral earth-pressure and HS-20 surcharge loading, below the allowable stress.	A.H. Beck liner evaluation

Last Energy will supplement the Part One foundation evaluation using the additional geotechnical information described in Section 3.

The liner evaluation addresses combined lateral earth-pressure and surcharge loading. The pile evaluation addresses axial compressive capacity. Last Energy will evaluate buoyancy and other groundwater-related effects on the requested foundation work using the supplemental groundwater characterization described in Section 3.2. The proposed treatment of seismic evaluation is described in Section 5.1.

5. Technically Relevant Site and Regulatory Design Requirements

5.1. Seismic Evaluation Scope and Part Two Treatment

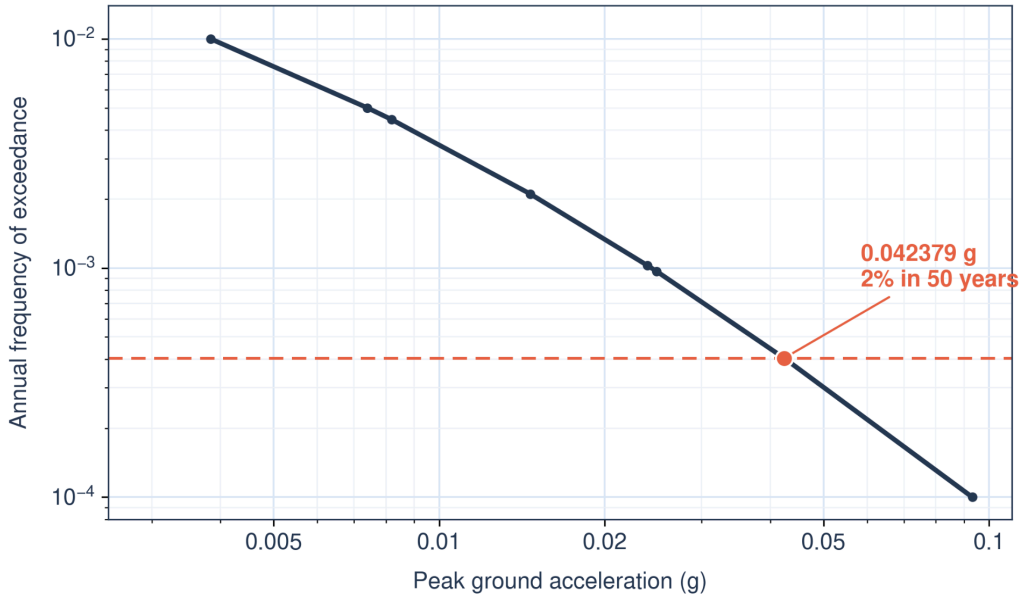
Last Energy will address the detailed site-specific seismic evaluation and seismic qualification of the foundation for the reactor vessel in Part Two of the two-part construction permit application. The Caldwell LWA requests authorization to install the liner, drive piles, and place grout. Installation of the reactor vessel is outside the scope of this LWA.

Under 10 CFR 50.10(d)(3)(i), the design and construction information submitted with an LWA application is limited to the portions of the facility within the requested authorization. The PSAR must demonstrate compliance with Commission requirements technically relevant to those portions.

For preliminary regional seismic-hazard context, Last Energy obtained Peak Ground Acceleration (PGA) and spectral-acceleration values for the application-site location from the United States Geological Survey (USGS) revised 2023 National Seismic Hazard Model [5][6]. The screening comparison considered all eight USGS site classes as no seismic site class has been assigned to the application site for the purposes of this LWA.

Class E produces the highest PGA among the modeled classes at each available return period in the export. At a 2 percent probability of exceedance in 50 years, its modeled PGA is 0.042379 g. Figure 5-1 presents the Class E PGA values at the available return periods.

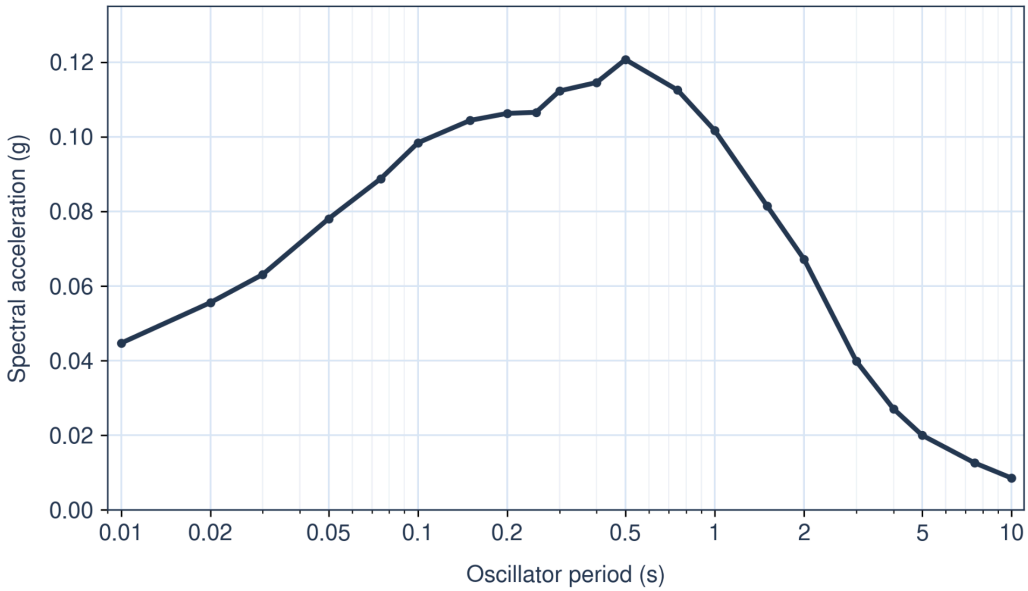
Figure 5-1. USGS Modeled Peak Ground Acceleration at Selected Return Periods, Class E



For spectral acceleration, Last Energy selected the highest modeled value among the eight classes at each exported oscillator period, using a common probability of exceedance of 2 percent in 50 years. Figure 5-2 presents

this envelope across periods from 0.01 to 10 seconds. The envelope combines values from different assumed classes and represents the maxima within this model comparison; the envelope does not represent a single site class or a measured soil profile.

Figure 5-2. Envelope of USGS Spectral Acceleration at 2% Probability of Exceedance in 50 Yrs



The USGS hazard information presented above provides preliminary regional seismic context for Part One. The figures bound only the exported model values; they do not bound all site-specific seismic effects or establish the site-specific ground-motion response spectrum or facility seismic design basis. The proposed Part Two evaluation includes establishment of the facility seismic design input and evaluation of earthquake-induced ground deformation, liquefaction, slope instability, and related foundation effects.

Section 3 presents the available site and subsurface information. Section 4 identifies the geotechnical parameters, loading assumptions, and results of the engineering evaluations supporting the requested work. Those evaluations support the conditions they address; they do not establish qualification for the eventual facility seismic design basis.

Part Two will establish the seismic basis necessary to demonstrate the suitability of the installed foundation before the reactor vessel relies on it. Part One does not seek approval of the complete plant seismic design basis or a final determination of site suitability.

5.2. LWA-Scoped Standard Review Plan Evaluation

This section compares the steel liner, steel H-piles, and bentonite grout requested under the LWA with relevant acceptance criteria in the Standard Review Plan (SRP), NUREG-0800. Consistent with 10 CFR 50.10(d)(3)(i), the evaluation is limited to the requested work. The SRP sections considered are Sections 2.5.1, 2.5.2, 2.5.4, and 2.5.5

(Revision 5); 2.5.3 (Revision 6); 3.8.5 (Revision 4); and 17.5 (Revision 1). Section 5.1 describes the Part Two treatment of criteria that depend on the facility seismic basis. The available evaluations are not presented as satisfying those deferred criteria.

5.2.1. Subsurface materials and foundation stability

SRP Section 2.5.4 addresses subsurface properties, groundwater, foundation interfaces, and stability. Section 3 and the Gessner Engineering geotechnical report provide boring data, soil conditions, geotechnical parameters, and groundwater observations and their limitations. Section 3.2 also identifies the supplemental localized borings, groundwater characterization, sampling, and laboratory testing that Last Energy will provide to complete the Part One geotechnical basis. Gessner also identifies potential near-surface soil movement due to moisture changes. Section 4 and the A.H. Beck liner evaluation and pile design summary evaluate lateral earth pressure and surcharge loading on the liner and calculate axial geotechnical capacity for the piles using the more conservative BH-2 soil profile. These evaluations support only their stated loads and conditions.

5.2.2. Foundation design

SRP Section 3.8.5 addresses foundation configuration, design loads and methods, materials, construction quality, and performance of seismic Category I foundations. Section 4 describes the preliminary configuration evaluated for the requested work and summarizes the A.H. Beck liner evaluation and pile design summary ; Section 6 describes quality controls. The liner evaluation uses AISC 360 for the stated lateral loads, and the pile evaluation addresses axial geotechnical capacity. No structural support is credited to the grout. These evaluations do not demonstrate the full facility load combinations or seismic qualification addressed by SRP Section 3.8.5.

5.2.3. Geologic and seismic considerations

SRP Sections 2.5.1, 2.5.2, 2.5.3, and 2.5.5 address geologic characterization, vibratory ground motion, surface deformation, and slope stability. The Gessner Engineering geotechnical report provides local subsurface information used for the requested work. It does not establish the site-specific seismic ground motion or evaluate sitewide surface deformation and slope stability for the completed facility. Those SRP criteria are not presented as satisfied by the Part One information.

5.2.4. Quality assurance

SRP Section 17.5 addresses quality assurance programs for construction permit applicants. Section 6 describes the quality assurance controls applicable to the requested LWA work. The steel H-piles are designated safety-related for Part One and will be controlled in accordance with the applicable requirements of Appendix B to 10 CFR Part 50. Consistent with 10 CFR 50.10(d)(3)(i), Section 6 addresses only the quality assurance program elements applicable to the requested LWA work.

6. Quality Assurance

6.1. Purpose , Scope and Regulatory Applicability

Last Energy will apply a Quality Assurance (QA) Program satisfying the applicable requirements of Appendix B to 10 CFR Part 50 to activities affecting safety-related functions within the scope of the Caldwell LWA. The QA Program applies to applicable design, procurement, construction, inspection, testing, and verification activities performed by Last Energy and by organizations performing those activities on Last Energy's behalf.

Last Energy's existing DOE-approved Quality Assurance Program Description (QAPD), US0200-QA-RPT-0001, Revision 5.0 [7], provides the initial programmatic framework for these activities. The QAPD was developed for the DOE reactor pilot program and addresses quality management, organization and independence, engineering design control, procurement, inspection and testing, corrective action, records, and independent assessment. Only the QAPD provisions and implementing procedures applicable to the Part One LWA scope are relied upon in this section.

For the Caldwell LWA, Last Energy will evaluate the applicable QAPD provisions and implementing procedures against the applicable requirements of Appendix B to 10 CFR Part 50, using NUREG-0800 Section 17.5 as the review framework. Where the existing controls do not fully address an applicable Appendix B requirement, Last Energy will establish supplemental Caldwell-specific controls necessary to satisfy that requirement.

6.2. Safety-Related Foundation Elements and QA Boundaries

For purposes of Part One, Last Energy designates the permanent steel H-piles as safety-related. The piles provide structural support for the reactor vessel, and failure of that support function could prevent the reactor vessel from fulfilling its safety-related function.

The permanent foundation configuration also includes a steel liner and bentonite grout. The current preliminary engineering evaluation does not credit the bentonite grout as providing structural support. Last Energy will evaluate the functional interaction among the steel H-piles, steel liner, bentonite grout, and surrounding soil to determine whether liner or grout performance is necessary to preserve the credited safety-related function of the piles.

Appendix B quality assurance controls will apply to activities affecting the safety-related function of the steel H-piles. Activities involving the steel liner, bentonite grout, or associated construction processes will be subject to applicable quality assurance controls to the extent their performance could affect that function. Last Energy will document the resulting QA applicability determinations before performance of the affected LWA activities.

6.3. QA Organization, Responsibilities, and Independence

Last Energy retains overall responsibility for the QA Program applicable to the Caldwell LWA, including quality-affecting activities performed by contractors and suppliers. Delegation of engineering, procurement,

construction, inspection, testing, or other quality-affecting activities does not relieve Last Energy of this responsibility.

Last Energy's existing QAPD establishes organizational responsibilities and authorities for quality assurance and provides QA personnel with sufficient authority, organizational freedom, and access to management to identify quality problems, initiate or recommend corrective actions, and verify satisfactory resolution. These organizational controls will be applied to the Caldwell LWA and supplemented as necessary to satisfy the applicable requirements of Appendix B to 10 CFR Part 50.

QA personnel have authority to stop or cause suspension of work that does not meet established quality requirements. Personnel performing verification functions will be appropriately independent of the individuals performing the work being verified. Unresolved quality issues may be escalated through established management channels.

6.4. Engineering Design Control and Verification

Last Energy will control design activities affecting safety-related functions within the Caldwell LWA scope through documented design control and engineering change processes. Design inputs and design outputs will be identified, documented, reviewed, approved, and verified in accordance with applicable quality assurance controls. Design inputs will be translated into design outputs, including applicable calculations, analyses, drawings, specifications, and construction requirements.

Design activities requiring verification will be verified by qualified personnel other than those who performed the original design. Design interfaces between Last Energy and external engineering organizations will be controlled to ensure that applicable design information and responsibilities are identified and communicated.

External engineering analyses relied upon as safety-related design inputs will be subject to applicable review, verification, and acceptance controls before reliance. Design changes affecting safety-related functions will be reviewed, approved, verified, and documented before implementation.

6.5. Procurement and Supplier Quality Oversight

Last Energy will control the procurement of items and services affecting safety-related functions within the Caldwell LWA scope to ensure that applicable technical and quality assurance requirements are identified in procurement documents and are appropriately imposed on suppliers.

Suppliers will be evaluated and selected based on their capability to satisfy the applicable procurement requirements. Safety-related procured items and services will be controlled under either the supplier's acceptable Appendix B quality assurance program or the applicable Last Energy quality assurance controls, with Last Energy retaining responsibility for ensuring that the applicable requirements are satisfied.

Supplier oversight and acceptance methods may include evaluation of supplier capability, review of objective quality evidence, audits, source inspection, document review, or receipt inspection, as appropriate to the item or service. Where commercial-grade items are used in safety-related applications, appropriate acceptance or dedication controls will be applied to verify the characteristics necessary for their intended function. Material identification and traceability will be maintained where required by the applicable quality assurance controls.

6.6. Construction Work Control and Special Processes

Last Energy will require construction activities affecting the safety-related function of the steel H-piles to be performed in accordance with approved drawings, specifications, procedures, or work instructions containing applicable acceptance criteria. Activities involving other foundation elements and associated construction processes will be subject to applicable QA controls to the extent that their performance could affect the safety-related function of the H-piles.

Special processes used in safety-related LWA work will be controlled using qualified procedures and qualified personnel in accordance with applicable codes, standards, specifications, and other requirements. These controls will apply, where applicable, to welding, heat treating, nondestructive testing, and other special processes identified by the applicable work documents.

6.7. Inspection, Testing, and Acceptance

Last Energy will establish inspection and testing controls for activities affecting the safety-related function of the steel H-piles. Inspections and tests will be performed in accordance with approved procedures and applicable acceptance criteria by qualified personnel. Inspection activities will be performed by individuals other than those who performed the work being inspected.

Inspection and testing requirements, including applicable methods, acceptance criteria, and required inspection points, will be established in the approved work documents. Measuring and test equipment will be controlled and calibrated where necessary to verify conformance with specified requirements. Inspection and test results will be documented and retained as QA records.

6.8. Document and Configuration Control

Last Energy will control the preparation, review, approval, issuance, revision, and distribution of documents governing activities affecting safety-related functions within the LWA scope. Document controls will ensure that current approved documents are available at the point of use and that changes are reviewed and approved by authorized personnel.

Last Energy will maintain configuration control between the approved foundation design, construction documentation, and installed foundation elements. Field changes, deviations, and design revisions affecting safety-related functions will be evaluated, reviewed, approved, and documented before implementation.

6.9. Nonconformance and Corrective Action

Last Energy will identify, document, evaluate, and control nonconforming materials, components, services, and activities affecting safety-related functions within the LWA scope. Nonconforming conditions will be controlled to prevent inadvertent use, installation, or acceptance, and dispositions will be reviewed and approved by authorized personnel.

Conditions adverse to quality will be promptly identified and corrected. Significant conditions adverse to quality will be subject to documented cause evaluation and corrective actions to prevent recurrence. Last Energy will verify the implementation and effectiveness of corrective actions as appropriate.

6.10. QA Records and Audits

Last Energy will maintain QA records providing objective evidence that activities affecting safety-related functions within the LWA scope conform to applicable requirements. Records will be identifiable, legible, retrievable, and protected against damage, deterioration, or loss. Record retention requirements will be established in accordance with applicable regulatory and QA Program requirements.

Last Energy will conduct planned and documented audits to verify compliance with the applicable QA Program and assess its effectiveness. Audits will be performed by qualified personnel independent of the activities being audited. Audit findings will be documented, reported to responsible management, and tracked through corrective action and closure.

6.11. Appendix B Compliance and Implementation

Last Energy will use its existing Quality Assurance Program Description (QAPD) and implementing procedures as the foundation for the QA Program applicable to the Caldwell LWA. Table 6-1 identifies the corresponding provisions of the existing QAPD and implementing procedures for each criterion of 10 CFR Part 50, Appendix B.

Last Energy will evaluate these program provisions against the applicable requirements of Appendix B and establish supplemental controls where necessary to achieve compliance. The QA Program, including applicable supplemental controls, will be implemented before performance of the safety-related activities to which those requirements apply.

Last Energy retains responsibility for ensuring that applicable QA requirements are implemented by its personnel, engineering contractors, suppliers, and construction organizations.

Table 6-1. Appendix B QA Program Cross Reference — Caldwell LWA

Appendix B Criterion	Existing LE QAPD Basis (established under NE O 414.1)	Implementing Procedure
I. Organization	§3 — Organization, Responsibilities, and Authority	Organization, Roles, and Quality Assurance Program Control
II. QA Program	§§1–4 — QA policy, scope, and program elements	Quality Assurance Program Description
III. Design Control	§4.4.2 — Design	Design Control and Engineering Change Management Procedure
IV. Procurement Document Control	§4.4.3 — Procurement	Procurement and Supplier Quality Procedure
V. Instructions, Procedures, and Drawings	§4.4.1 — Work Processes	Work Planning, Instructions, and Field Changes
VI. Document Control	§4.3 — Documents and Records	Document and Records Control
VII. Control of Purchased Material, Equipment, and Services	§4.4.3 — Procurement	Procurement and Supplier Quality Procedure
VIII. Identification and Control of Materials, Parts, and Components	§§4.4.1 and 4.4.3	Procurement and Supplier Quality Procedure
IX. Control of Special Processes	§4.4.1 — Work Processes	Work Planning, Instructions, and Field Changes
X. Inspection	§4.4.4 — Inspection and Acceptance Testing	Inspection, Testing, and Calibration
XI. Test Control	§4.4.4 — Inspection and Acceptance Testing	Inspection, Testing, and Calibration
XII. Control of Measuring and Test Equipment	§§4.4.1 and 4.4.4 — Inspection and Testing	Inspection, Testing, and Calibration
XIII. Handling, Storage, and Shipping	§4.4.1 — Work Processes	Inspection, Testing, and Calibration
XIV. Inspection, Test, and Operating Status	§4.4 — Inspection and Acceptance Testing	Inspection, Testing, and Calibration
XV. Nonconforming Materials, Parts, or Components	§4.3 — Quality Improvement	Nonconformance of Process or Product Standard Operating Procedure
XVI. Corrective Action	§4.3 — Quality Improvement	Reporting, Corrective Action, and Improvement
XVII. Quality Assurance Records	§4.3 — Documents and Records	Document and Records Control
XVIII. Audits	§4.5 — Management and Independent Assessment	Assessments and Audits

6.12. Fitness For Duty Requirements

Last Energy will establish and implement a Fitness For Duty (FFD) program for personnel performing applicable safety-related construction activities at the Caldwell site in accordance with 10 CFR Part 26, including the construction-specific provisions of 10 CFR Part 26, Subpart K (§§ 26.401–26.419), as applicable.

The FFD program will address personnel performing activities within the scope of 10 CFR 26.4, including construction, supervision, and quality verification of safety-related foundation structures. Last Energy will control

implementation through documented policies and procedures, personnel training, drug and alcohol testing, behavioral observation, fitness monitoring, corrective actions, and appropriate recordkeeping.

Last Energy will maintain oversight of contractors and subcontractors performing covered activities to ensure compliance with applicable FFD requirements. The program will be established before commencement of covered LWA construction activities, with its implementation documented in accordance with 10 CFR 26.401(b).

7. Conclusion

The site investigation and engineering evaluations provide a preliminary basis for the foundation work requested under this LWA. These evaluations address the subsurface conditions and the stated design conditions for the liner and piles. The design does not credit the grout as structural support. Last Energy will supplement the Part One geotechnical investigation and foundation evaluation as described in Sections 3 and 4.

Last Energy will apply the quality controls described in Section 6 to the installed work. Part Two will evaluate the installed foundation against the facility's site-specific seismic basis before construction of the reactor vessel relies on it.

8. References

[1] Gessner Engineering, *Preliminary Geotechnical Engineering Study*, Project No. [redacted], September 9, 2026.

[2] A.H. Beck Foundation Co., Inc., *Steel Shaft Design*, Project No. [redacted], September 23, 2026.

[3] A.H. Beck Foundation Co., Inc., *Driven Pile Design*, September 23, 2026.

[4] Cross Texas Land Services, *Final Survey*, Survey No. [redacted], June 11, 2026.

[5] USGS, *https://earthquake.usgs.gov/nshmp/hazard/static*, accessed September 29, 2026.

[6] USGS, *Static Hazard Spectra Excel*, accessed September 29, 2026

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