UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	§	
	§	DOCKET NOS. 50-445 and
VISTRA OPERATIONS COMPANY, LLC	§	50-446
	§	
	§	NRC-2022-0183
COMANCHE PEAK NUCLEAR POWER	§	
PLANT, UNITS 1 AND 2	§	March 1, 2023

AMENDED PETITION FOR LEAVE TO INTERVENE AND REQUEST FOR HEARING OF CITIZENS FOR FAIR UTILITY REGULATION

COMES NOW the Petitioner, Citizens for Fair Utility Regulation ("CFUR") on its behalf and on behalf of its members, by and through counsel, pursuant to 10 C.F.R. §2.309 and a notice published by the Nuclear Regulatory Commission ("NRC" or "Commission") at 87 *Fed. Reg*. 230, 73798 (December 1, 2022), and hereby moves for leave to intervene and requests a hearing in the matter of Vistra Operations Company, LLC's license renewal application. In the proceeding, Vistra Operations Company, LLC ("Vistra") seeks to extend the NRC operating licenses for an additional 20 years beyond the current termination dates of February 8, 2030 and February 2, 2033 for Comanche Peak Nuclear Power Plant (CPNPP), Units 1 and 2, respectively, in Somervell County, Texas, located near the City of Glen Rose and the Dallas/Fort Worth Metroplex.

Specifically, this proceeding concerns the license renewal application ("LRA") of CPNPP's current operating license pursuant to Section 103 of the Atomic Energy Act, as amended and 10 C.F.R. Part 54 by Vistra Operations Company, LLC (Vistra) on October

3, 2022. The LRA was accepted for docketing and published by the NRC on October 31, 2022 (87 *Fed. Reg.* 65617). Notice of hearing and opportunity to petition for leave to intervene was published in the Federal Register on December 1, 2022.

In support of this request for hearing and petition for leave to intervene, Petitioner further states as follows:

This petition sets forth with particularity the contentions sought to be raised by the Petitioner. As demonstrated below, CFUR (on behalf of its members and represented persons Lon Burnam, Terry McIntire, Margaret DeMoss, Janet Mattern, Anita Smith, Suzanne Mabe and Karen Hadden) seeks to establish representational standing through its members and represented persons, in order to represent them in the pursuit of this Petition. Petitioner has separately filed its declarations respecting individual standing and delegation of authority to the Petitioner.

I. CFUR MEMBER STANDING

A. Petitioner CFUR

Petitioner "Citizens for Fair Utility Regulation" is a nonprofit organization made up of civically-minded volunteers who are also environmentally minded. They operate without official titles within the organization. Members live in the Dallas/Ft. Worth area, Somervell and Hood Counties, most within in a 50-mile radius of the CPNPP. Former Texas State Representative Lon Burnam, who represented Ft. Worth for 18 years, is a founding board member for CFUR, and helped form the group in the late 1970's to demand better and more consumer-friendly utility regulation. CFUR opposed the original

license for operation of the Comanche Peak Nuclear Power plant and took the case all the way to the U.S. Supreme Court.

The group remains committed to safe and affordable energy and is opposed to extending the Comanche Peak Nuclear Power Plant license for an additional 20 years. The group seeks standing in a hearing regarding the Comanche Peak Nuclear Power Plant License Renewal Application.

More detail is provided in the attached declarations and summarized in the Member Declarations section below for group members who seek a contested case hearing as part of CFUR. One is Janet Mattern, who lives in Ft. Worth, Texas, within the 50-mile radius of Comanche Peak Nuclear Power Plant. Suzanne Mabe and Lon Burnam are CFUR members who also live in Ft. Worth, within 50 miles of Comanche Peak Nuclear Power Plant. Others include, e.g., Terry McIntire who owns a family farm in Bluff Dale, Texas, only 7 miles from CPNPP, and Margaret DeMoss who has asked CFUR to represent her. She owns a home 10 miles from the plant.

CFUR also seeks to protect the health, safety and welfare of its members and that of the broader community. CFUR now seeks to intervene in this proceeding on behalf of its members. By declaration submitted along with this Petition, CFUR wishes to represent all Member Declarants more specifically described below.

B. Member Declarations

Lon Burnam is a founding board member of CFUR whose residence is located at 2103 6th Avenue, Fort Worth, Texas 76110. He lives and works within a 50-mile radius of CPNPP, and his home is less than 40 miles from CPNPP. Mr. Burnam, a former State Representative and 18-year member of the Texas Legislature is a founding board member

of CFUR, a group that formed in 1978 with critically-minded volunteers who care about the environment, public health and affordable energy. Mr. Burnam opposes the renewal application of CPNPP due to concerns over the seismic impacts of earthquakes on aging nuclear reactors and concerns about the releases of tritium and other radionuclides into the air and water. He is also concerned about embrittlement and metal fatigue impacting the safety of aging reactors and the availability of adequate cooling water for safe operation of CPNPP as climate change brings hotter temperatures and drought conditions.

Terry McIntire is a member of CFUR who owns a family farm where his 96-year old father lives located at 9702 Paluxy Hwy., Bluff Dale, Texas 76433. His property is within the 50-mile radius of CPNPP, and, in fact, is just 7 miles from the plant. Mr. McIntire is opposed to this license renewal because of the risk to the public from an unexpected nuclear accident that might come from the aging of the plant, from the increased earthquake activity near the plant and from the risk to the area residents of a terror attack.

Janet Mattern is a member of CFUR whose residence is located at 6662 St. Andrews Rd., Fort Worth, Texas 76132. She lives in southwest Fort Worth within a 50-mile radius of CPNPP, and her home is about 30 miles from the plant. Ms. Mattern is opposed to extending he CPNPP license renewal for another 20 years because of the cost to the public and the risk of a calamitous event due to physical aging of the plant, increased seismic activity, the increased in population of the area, and water availability for CPNPP operations due to climate change.

Suzanne Mabe is a founding board member of CFUR whose residence is located at 1801 8th Avenue, Apt 1408, Fort Worth, Texas 76110. She lives within a 50-mile

radius of CPNPP, and her home is approximately 40 miles from the plant. Ms. Mabe is concerned about the request to extend the operations of CPNPP because of the age of the plant and all the problems she remembers that took 14 years for it to be built. She is troubled by the earthquakes in the region, the storage of nuclear waste and the general health and the safety of residents of North Texas who live in the area around the plant. For these reasons, Ms. Mabe is opposed to CPNPP's license renewal application.

Anita Smith is a member of CFUR who owns property in Pecan Plantation, 8027 Ravenswood Rd., Granbury, Texas 76049. She lives within a 50 mile radius of CPNPP, and her property is only about 10 miles from the facility. She is opposed to the license renewal application for Comanche Peak due to her concern over the physical aging of the plant, the large number of people living in the area now due to population increases, increased seismic activity in the area due to injection wells, and federal agencies' failure to adequately protect the public safety.

Margaret DeMoss owns a home at 9116 Ravenswood Rd. Granbury, Texas 76049. She lives well within the 50-mile radius of CPNPP and, in fact, her home approximately 10 miles from the plant. Ms. DeMoss has asked CFUR to represent her in this proceeding. Ms. DeMoss is opposed to extending the license agreement for CPNPP to operate for another 20 years without further investigation of the impacts of earthquakes, drought and aging on plant infrastructure and the cooling pond. Ms. DeMoss used to work in the energy industry and is familiar with the modern safeguards of the public health. Since many more people live in close proximity now to the CPNPP, she believes public safety should be the number one concern in deciding whether to renew CPNPP's application.

Karen Hadden is a member of CFUR who lives at 605 Carismatic Lane in Austin, Texas 78748. She is the executive director of the Sustainable Energy & Economic Development (SEED) Coalition, a Texas-based organization that seeks to reduce radioactive risks. She frequently visits friends within the 50-mile radius of the CPNPP and enjoys visiting recreational destinations near the plant such as Dinosaur Valley State Park in Glen Rose. She is opposed to extending the license agreement for an additional 20 years because of the aging infrastructure of the plant, the threat to the Squaw Creek Reservoir and surrounding land, and the threat of release of tritium and other radionuclides. She is concerned about the impact of these issues on the health and safety of the area residents and is troubled that the impacts of climate change have not been adequately considered.

Linda Hanratty is a member of CFUR who lives at 4236 Oak Park Court in Ft. Worth, Texas 76109. She lives within the 50-mile radius of CPNPP, approximately 40 miles away. Ms. Hanratty is opposed to extending the license agreement for Comanche Peak due to her concerns over the potential health, safety, security and financial impacts of operating the plant for another 20 years. She is concerned about the potential of earthquakes in the region as well as the additional routine radiation releases from an additional 20 years of operation. Specifically, routine releases of tritium and other radionuclides to surrounding air and water could create health risks for her and others living within the 50 mile zone. She is also concerned about the effects of climate change which is predicted to bring hotter temperatures in future drought conditions in the coming years.

Reed Bilz is a member of CFUR who lives at 6130 Haley Lane in Ft. Worth, Texas 76132, about 34 miles from CPNPP. She is opposed to extending the license agreement for Comanche Peak due to the health, safety and security concerns. She believes that an additional 20 years of routine radiation releases, 20 more years of generating waste that could later be hauled by rails near her home could cause health risks to her and her neighbors. She is also concerned about this aging reactor suffering from embrittlement and metal fatigue and the risk that poses to her. Finally, she is concerned about the integrity of the Shaw Creek Reservoir Dam, and whether there will be enough water for cooling as temperatures rise due to climate change and the increase in droughts.

Finally, **John MacFarlane** lives at 2104 Washington Avenue, Fort Worth, Texas 76110, approximately 40 miles from CPNPP. He also opposes extending the license agreement for Comanche Peak for another 20 years. In addition to being an affected resident of the 50 mile zone, Mr. MacFarlane is also an expert on some of the contentions raised in this petition. His expert declaration, resume, and resume attachments are included as a declaration attachment to this Petition. Mr. MacFarlane has over 20 years of experience as a National Environmental Policy Act (NEPA) practitioner from his time as a NEPA Project Manager for the U. S. Environmental Protection Agency. He reviewed federal agency Environmental Impact Statements and provided comments on the adequacy of the information and recommended measures to avoid and mitigate significant adverse impacts due to the natural and human environment. Mr. MacFarlane's familiarity with issues and contentions presented in this Petition make his statements and supporting documentation valuable in support thereof. He shares many of

the concerns of other declarants regarding the aging nature of the plant for safety reasons for himself and the general public that have been previously stated. He also points out concerns over the failure of the Environmental Report to address NEPA Guidance on the Consideration of Greenhouse Gase Emissions and Climate Change, just to mention just a few of his points.

C. Legal Basis for Standing

Pursuant to 10 C.F.R. §2.309, a request for hearing or petitions for leave to intervene must address (1) the nature of the petitioner's right under the Atomic Energy Act to be made a party to the proceeding, (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding, and (3) the possible effect of any order that may be issued in the proceeding on the petitioner's interest.

The NRC has applied judicial concepts of standing in the past to determine whether a petitioner has satisfied the general requirements above to intervene in this type of proceeding.[1] A petitioner must demonstrate that (1) they have suffered or will suffer distinct and palpable harm that constitutes injury-in-fact within the zone of interests arguably protected by governing statutes (e.g. the Atomic Energy Act of 1954 ("AEA") and the National Environmental Policy Act of 1969 ("NEPA"); (2) the injury an be fairly traced to the challenged action: and (3) the injury is likely to be redressed by a favorable decision.[2]

---

[1] *See Metropolitan Edison Co.* (Three Mile Island Nuclear station, Unit 1), CLI-83-25, 18 NRC 327,332 (1983) (citing *Portland General Electric Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI76-27, 4 NRC 610 (1976).

[2] *See Carolina Power & Light Co*. (Shearon Harris Nuclear Power Plants), LBP-99-25, 50 NRC 25,29 (1999).

An organization may intervene in a proceeding either on its own right by demonstrating harm to its organizational interests or in representational capacity by demonstrating harm to its members.[3] For an organization to seek representational standing, it must demonstrate how at least one of the members may be affected by the licensing action, must identify that member by name and address, and must show that the organization is authorized to request a hearing on behalf of that member.[4]

D. Standing of CFUR's Members Based on Proximity

The declarations filed along with this Petition demonstrate that CFUR's members have standing to participate. The member declarations have all authorized CFUR to represent their interests in this proceeding. CFUR has likewise committed to representing the Member Declarants in CFUR's declaration filed contemporaneously with this Petition.

Since most of the Member Declarants live, work or recreate within 50 miles of CPNPP, each has demonstrated presumptive standing by virtue of their proximity to the plant.[5] In an operating license amendment proceeding, a petitioner can base their standing upon a combination of residence or visits near the plant and a showing that the proposed action entails an increased potential for offsite consequences.[6] Petitioners may

---

[3] *See Hydro Resources, Inc.* (2929 Coors Rd., Suite 101, Albuquerque, NM 87120), LBP-98-9, 47 NRC 261, 271 (1998).

[4] *See, e.g., Georgia Institute of Technology* (Georgia Tech Research Reactor, Atlanta, Georgia), CLI-95-12, 42 NRC 111, 115 (1995*); Houston Lighting and Power Co.* (South Texas Project, Units 1 and 2), ALAB-549, 9 NRC 644, 646-48 (1979); *Houston Lighting and Power Co*. (Allens Creek Nuclear Generating Station, Unit 1) ALAB-535, 9 NRC 377, 390-97 (1979).

[5] *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 and 4), LBP-01-6, 53 NRC 138, 146, *aff'd* CLI-01-17, 54 NRC 3 (2001).

[6] *Commonwealth Edison Co*. (Zion Nuclear Power Station, Units 1 and 2), CLI-99-4, 49 NRC 185, 191 (1999); *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-08-18, 68 NRC 533, 541 (2008).

be accorded standing if they live close enough to the planned project so that there is a reasonable apprehension of injury.[7]

Each Member Declarant explains that they will suffer (or be under the threat of suffering) particularized injuries from the continued operations of CPNPP's Units 1 and 2 without adequate analysis of the environmental effects and/or health and safety effects of the continued operations under the National Environmental Policy Act ("NEPA"), and without consideration of the aging effects on certain safety-related structures, systems and components at CPNPP under the Atomic Energy Act ("AEA").

These Member Declarants have expressed concerns that fall within the zone of interests protected by the NEPA and its implementing regulations.[8] Their concerns also fall within the zone of interests protected by the AEA and its implementing regulations.[9] The Member Declarants, therefore, have standing to intervene in their own right: they have met the requirements for injury-in-fact, causation, and redressability, and their concerns fall within the zone of interests protected by NEPA, the AEA, and their implementing regulations. They will be affected by CPNPP's proposed relicensing and failure to provide a legally adequate environmental analysis. They have provided their names and addresses, have authorized CFUR to intervene in this proceeding on their behalf. Thus, Petitioner CFUR has standing to pursue this action.[10]

---

[7] *Hydro Resources, Inc., supra*.

[8] *See, e.g., Ouachita Watch League v. Jacobs*, 463 F.3d 1163, 1173 (11th Cir. 2006) ([S]ince the injury alleged is environmental, it falls within the zone of interests protected by NEPA. . . ."); *Sabine River Auth v. U.S. Dep't of Interior*, 951 F.2d 669, 675 (5th Cir. 1992) (plaintiff' concern about impacts on water quality and quantity fell within NEPA's zone of interests).

[9] *Sequoyah Fuels Corp. and General Atomics* (Gore, Oklahoma site), 39 N.R.C. 54, 75 (1994).

[10] *Entergy Nuclear Vermont Yankee, LLC, and Entergy Nuclear Operations, Inc.* (Vermont Yankee Nuclear Power Station), 60 NRC 548, 553 (2004).

The Member Declarants have proven geographical proximity to CPNPP and sufficient involvement and motivation in the relicensing issues, such that they should be afforded standing as individual petitioners. Thus, CFUR's willingness to represent its members in this proceeding should result in recognition by the Commission of CFUR's organizational legal standing to proceed to assert and litigate contentions on their behalf.

II. CONTENTIONS

A license renewal is authorization from the NRC to operate an existing nuclear power plant at a specific site for up to 20 years. Before issuing a license renewal, the NRC staff must complete safety and environmental reviews of the application. The LRA must comply with provisions of the APA, NEPA, NRC regulations and all applicable laws. Petitioner's contentions here implicate failures in the LRA to adequately analyze and consider several public health/environmental effects as described below.

A. Contention 1 – The License Renewal Application ('LRA") Lacks Adequate Data and Analysis Regarding Radiological Releases and Emissions and Potential Health Impacts.

- The LRA is inadequate because it fails to include updated information on the release of tritium and other radionuclides, which is readily available and should be relied upon.
- It fails to analyze cumulative radiological impacts and resulting potential health risks of operating Comanche Peak Nuclear Power Plant Units 1 and 2 for an additional 20 years.
- It fails to fully analyze the hazards that would result from 20 more years of discharge of water that contains radioactive particulates and tritium into Squaw Creek Reservoir.

- The License Renewal Application fails to provide analysis of an additional 20 years of gamma emitters and cumulative impacts to farms, crops, wildlife, and vegetation.
- The LRA fails to analyze the financial consequences of 20 more years of radiologic releases and the potential cost of remediation in the future.
- The LRA's Environmental Report 3.6.4.2.1 History of Radioactive Releases discusses pipe leaks that led to radiation releases, but there is no analysis of similar pipe leaks or breakage that may occur in the future and the related radiation release increase that could result in aging nuclear reactors.[11] This section is inadequate because it omits necessary information.

The LRA should include data from **Luminant's Comanche Peak Nuclear Power Plant 2021 Annual Radiological Environmental Operating Report.**[12] It discusses the Radiological Environmental Monitoring Program, which includes in annual reports:

- Measurement of ambient gamma radiation by Thermal Luminescent dosimetry
- Determination of airborne gross beta, gamma emitters and Iodine-13
- Determination of tritium and gamma emitters in Discharge Pathway surface water
- Determination of gross beta, tritium, Iodine– 131, and gamma emitters in potential drinking water sources

[11] Environmental Report 3.6.4.2.1, p. 1786.

[12] https://www.nrc.gov/docs/ml2211/ml22118a088.pdf

- Determination of tritium and gamma emitters in ground water and fish
- Determination of gamma emitters in food products
- Determination of gamma emitters and Iodine– 131 in broadleaf vegetation[13]

These types of measurements and determinations and key related data should be analyzed for an additional 20 years of operating Comanche Peak Units 1 and 2.

Within 20 miles of the Comanche Peak Nuclear Power Plant site there are 76 sample locations for various kinds monitoring.[14] At some locations Thermo Luminescent Dosimeters measure direct (ambient) radiation levels quarterly and annually. Background radiation levels were accounted for. The previously referenced report found a total 2021 annual dose average of 39.785 mR (measured dose) and a maximum average dose of 0.145 mR/day. Samples taken near the Independent Spent Fuel Storage pad had a 1.462 quarterly average.[15]

Such key data points should be included in the License Renewal Application, which it fails to do so, and fails to analyze the potential health impacts to workers and the surrounding community regarding an additional 20 years of operation, including cumulative impacts.

The previously referenced report also found that gross beta activity from airborne Iodine-131 emissions reached a maximum of 9.70E-02 pCi/m3.[16] The Centers for Disease Control and Prevention website states that external exposure to Iodine-131 can cause burns to the eyes and skin. Internal exposure can lead to absorption by the thyroid

[13] Luminant's Comanche Peak Nuclear Power Plant 2021 Annual Radiological Operating Report , p 6

[14] Id. at 6-8.

[15] Id. at 12-13.

[16] Id. at 17.

gland, potentially increasing the risk of thyroid cancer or other thyroid problems.[17] Operating the Comanche Peak nuclear reactors for another twenty years would mean another twenty years of dangerous airborne emissions. Potential health impacts to the approximately 1159 full-time permanent employees, outage employees and the surrounding community should be analyzed.

Measurement of gamma emitters in food products and gamma emitters and I-131 in broadleaf vegetation are also important, especially considering the extent of farmlands near Comanche Peak Nuclear Power Plant. The Environmental Report Section 3.2.2 on Offsite Land Use[18] states that 69% of Somervell County is farmland, with 352 farms. Farms in the region produce forage crops, wheat, and potatoes and have orchards. Hood county has 76.3 % farmland and 788 farms. Some raise cattle, sheep, pigs, and chickens. Pasture lands rangelands and recreational parks could be impacted by airborne emissions. The LRA fails to provide analysis of an additional 20 years of gamma emitters and cumulative impacts to farms, crops, wildlife, and vegetation, but it should.

According to Scientific American,[19] tritium levels as high as 3.2 million picocuries per liter have been reported to the NRC at some nuclear facilities. Health studies were not considered in setting the 20,000 pCi/L drinking water standard. EPA calculated that the standard would result in an extra radiation dose of less than 4 millirems (or 40 microsieverts) per year, about the amount from a chest X-ray. Tritium is produced by cosmic rays, nuclear bomb detonations and nuclear power plants, so while

[17] https://www.cdc.gov/nceh/radiation/emergencies/isotopes/iodine.htm

[18] Environmental Report 3.2.2, page 1696.

[19] https://www.scientificamerican.com/article/is-radioactive-hydrogen-in-drinking-water-a-cancer-threat/

nuclear plants are not the only source, it is important to consider their tritium contribution and how to limit it. Tritium is typically found in water, so it can be ingested by humans. When beta particles are emitted inside the body, there is damage to DNA and cellular processes, which can lead to cancers.

In their August 2009 article in Science for Democratic Action, "Radioactive Rivers and Rain: Routine Release of Tritiated Water from Nuclear Power Plants,[20] Annie and Dr. Arjun Makhijani state that "as radioactive water, tritium can cross the placenta posing some risks of birth defects and early pregnancy disorders." They note that "EPA's Maximum Contaminant Goal for all radionuclides, including tritium, is zero." Table 2 from their article shows some comparative nuclear plant data:

[20] File:///radioactive-rivers-and-rain-routine-release-of-tritiated-water-from-nuclear-power-plants

Table 2: Tritium concentrations in drinking and surface/lake/river water near selected pressurized water reactor plants in 2006

Data shown for the sample locations with the highest annual mean.*

Plant	Range (picocuries per liter)	Mean (picocuries per liter)	Distance from plant, in miles, and sampling location
Drinking Water			
Catawba 1 & 2 (SC)[1]	1,000-2,200 582-1,170	1,598 770	7.30 (indicator)** Rock Hill Water Supply 13.5 (control) Belmont Water Supply
Comanche Peak 1 & 2 (TX)[2]	<1,300-1,400	not given	9.9 Lake Granbury
McGuire 1 & 2 (NC)	697-2,290	1,460	3.3 North Mecklenburg Water Treatment Facility
Oconee 1, 2, & 3 (SC)[3]	298-370	340	18.9 Anderson water plant
Vogtle 1 & 2 (GA)	518-935 Water near intake of treatment plant 471-1,040 Finished water at treatment plant	746 766	76 Purrysburg (SC) Water Treatment Plant (Downstream from both Vogtle and Savannah River Site (part of weapons complex))
Watts Bar 1 (TN)	394-817	606	24 Public water sampling location
Surface/River Water			
Catawba 1 & 2 (SC)	15,400-18,000 442-827	16,700 583	0.45 (indicator)** Discharge Canal 4.21 (control) Lake Wylie
Comanche Peak 1 & 2 (TX)	10,500-13,400 10,200-13,100	not given	1.4 ESE (indicator)** 1.5 N (indicator) Squaw Creek Reservoir
Shearon Harris 1 (NC)	3,150-6,370	4,730	4.70 Harris Lake
McGuire 1 & 2 (NC)	730-2,570 219	1,650 219	0.45 (indicator) Discharge Canal Bridge 11.9 (control) Plant Marshall Intake Canal
North Anna 1 & 2 (VA)	2,900-4,100 2,130-4,300	3,625 3,283	3.37 Waste Heat Treatment Facility Lagoon 5.80 North Anna River
Oconee 1, 2, & 3 (SC)	2,620-13,600	6,718	0.79 Lake Hartwell
Point Beach 1 & 2 (WI)	nondetectable- 1,017[4] 3,096[5]	not given	4.0 4.0 Lake Michigan
H.B. Robinson 2 (SC)	856-3,670	1,650	0.6 Black Creek
Three Mile Island 1 (PA)	<164-9,830	1,927	0.5 Susquehanna River
Vogtle 1 & 2 (GA)	1,140-3,870	2,307	0.80 Savannah River[6]
Watts Bar 1 (TN)	N/A[7]	588	9.9 Tennessee River
Wolf Creek 1 (KS)	8,624-14,276	11,286	3.2 Coffey County Lake

Sources by plant: *Annual Radiological Environmental Operating Reports* (ER) for 2006 (except for Point Beach, where the source is the ***2006 Annual Monitoring Report***.). Links at http://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-info.html. **Page citations can be obtained from IEER**.

Colorado and California set lower goals than the EPA standard for tritium in drinking water. Thorough analysis of the health and environmental impacts from tritium releases of an additional 20 years of operation Comanche Peak Nuclear Power Plant must be conducted and included in the License Renewal Application.

B. Contention 2 – Seismic Analysis in Inadequate; Lack of Complete Data Could Result in Seismic Risks.

The LRA fails to provide an adequate analysis of the magnitude of the seismic activity near the CPNPP. In Seismic Reference 3.5.4 (p. 1738-1739) of the CPNPP LRA, the applicant notes that 18 earthquakes have occurred within a 50-mile radius of the plant. Yet a former senior oil and gas geologist who researched the earthquake activity within a proximity of approximately twenty to thirty miles of CPNPP discovered more than one dozen earthquakes occurred in just a three-year period alone between the years of 2009 and 2012. *See* the diagrams which map these earthquakes in **Attachment A**, attached, *infra*.

Though these multiple earthquakes were relatively minor ranging in magnitude from 2.0 to 3.3, the short timeframe of dates when these quakes occurred and the distances between events illustrates that these quakes were likely related to deep injection in the Barnet Shale Geological Area, a rich hydrocarbon-producing geological formation near the CPNPP. Additionally, in Section 3.5-2 of the LRA, the applicant's list of Historical Earthquakes (p. 1751-1759) is not adequate in that it lists only those events at 3.0 magnitude or greater, yet more earthquakes have been documented as illustrated on the attached maps in **Attachment A**. Furthermore, the five earthquakes in 2012 that all occurred during a 7-month period are within or proximal to the projected karst zone adjacent to Comanche Peak. The LRA did not account for issues related to the Karst topography of the nearby area. *See* **Attachment B,** attached *infra*.

Attachment B also illustrates a dormant lateral fracture system adjacent to the CPNPP. Relatively thick shales are associated with the permeable Ellenburger karst

zones. High pressure injection in the karst has been strongly associated with activating dormant fracture systems and earthquakes in the DFW area.[21] This phenomenon has also been observed in Oklahoma.[22]

Though the applicant remarks that "no earthquakes have been felt at the site since the beginning of site selection activities in the 1960's," that does not mean that earthquakes occurring during the plant's years of operations have not contributed to the cracking, loss of material, fatigue, etc. The LRA documents cracking in various components throughout this section, including problem areas where "Further Evaluation" is "Recommended." This includes:

- Cracking of piping, piping components, and piping elements.
- Cracking of various structural support components (page 418)
- Cracking of the concrete as it relates to the dome; wall; basemat; ring girders; buttresses, foundation; sub foundation (page 1029)
- Cracking and distortion due to increased stress levels from "settlement" including below-grade exterior and foundation (page 1041-1042)
- Cracking of concrete on the exterior above- and below-grade; foundation; interior slab (page 1044 of pdf)

---

[21] "Many Dallas-Ft. Worth Area Faults Have the Potential to Host Earthquakes New Study Finds, *Texas Geosciences*, University of Texas at Austin, July 23, 2019. https://www.jsg.utexas.edu/news/2019/07/finds/#:~:text=A

"SMU Study Finds Earthquakes Continue for Years After Gas Field Wastewater Injection Stops, February 13, 2018. http://blog.smu.edu/research/2018/02/13/smu-study-finds-earthquakes-continue-for-years-after-gas-field-wastewater-injection-stops/#:~:text=SMU

[22] Injection Wells Blamed in Oklahoma Earthquakes, *Science.org*, July 4, 2014, Vol 345, Issue 6192, pp. 13-14.

As documented in Section 3.5-1 (page 1049), the application also notes that there is a "loss of material; Loss of form due to erosion, settlement, sedimentation, etc." on "earthen water-control structures: dams; embankments; reservoirs; channels; canals and ponds."

The average lifespan of a dam, according to the Army Corps of Engineers is fifty years. The Squaw Creek Reservoir, now renamed Comanche Creek Reservoir, was completed in 1979. The material loss, embankment erosion, etc., of this 44-year-old earthen dam could have been enhanced by seismic activity. Years ago, the same geologist who mapped the earthquakes for these comments, found three lineaments that converged directly to the location of a minor breach on Lake Lewisville where the Army Corps of Engineers had found significant erosion. Due to these findings and the concern that additional drilling from proposed fracking leases could lead to a catastrophic breach on Lake Lewisville, these leases were pulled from auction by the Bureau of Land Management. Should a catastrophic breach occur on Comanche Creek Reservoir, used for cooling for CPNPP, the dam could release up to 151,273-acre feet of water, a potentially calamitous event. This type of concern is not adequately considered by the LRA.

In a response to a request for information sent to the NRC on March 27, 2014, after the Fukushima Daiichi nuclear power plant failure, Luminant (a/k/a Vistra) expressed that "There is no evidence of historical or modern earthquakes causing earthquake-induced geologic failure within the site region." Failure is the operative word in this instance. Though no ***failure*** has yet occurred at the Comanche Peak nuclear power plant, that does not mean that cracking or damage may not have occurred or been

enhanced due to repeated seismic activity. *See* page 3 of the attached response to the NRC.

On page 4 of the same 2014 response to the NRC, the applicant determined "that the maximum potential earthquake would be an intensity VII (Modified Mercalli Scale) event." This level of magnitude could cause meaningful damage to an "aging" plant such as Comanche Peak.

A recent article dated November 17, 2022, in the *San Antonio Express-New*s entitled "West Texas earthquake damages historic building on University Health campus" illustrates how an earthquake, felt more than 350 miles away in Mentone, Texas near the New Mexico border, forced the evacuation of a historic San Antonio hospital building and effectively rendered it unsafe. The US Geological Survey attributed that this damage "was caused by oil and gas extraction." According to the USGS geophysicist in the article, the frequency of Texas quakes has been increasing since 2015, noting that as "the amount of oil and gas production has increased, there has been a corresponding increase in the rates of wastewater injection wells in the area. So those factors go hand in hand."

Also noted in the Express-News article according to the Texas Tribune, more than 200 earthquakes of 3.0 magnitude or greater have occurred in Texas just in 2021, more than double the 98 recorded in 2020. This trend should be included in analysis in the License Renewal Application.

As both the Permian Basin and the Barnett Shale continue to ramp up oil and gas activities to meet energy demand, there is no guarantee that extraction activities won't cause slippage of the fracture adjacent to the plant.

When Comanche Peak was built, the now accepted understanding that both deep injection and, to a lesser extent, hydraulic fracturing can cause the slipping of lineaments or faults was not understood at that time. In areas where deep injection occurs, the frequency and the intensity of earthquakes tend to increase. Should major structural damage occur to the nuclear power plant or to the neighboring dam now approaching 50-years old, the results could be catastrophic. According to the applicant's own data in Appendix E, Section 3.11-1 (see pages 1930-1934 of the pdf), almost 100 municipalities are located, in total or in part, within a 50-mile radius of the plant. These serious concerns should have been more adequately addressed and taken seriously by the LRA.

The region surrounding the plant is a highly populated, 19-county area with Tarrant County representing an overall population of more than 2.1 million residents. As stated by the applicant, there are three cities within the 50-mile radius of the plant with populations over 100,000 including Ft. Worth, Arlington, and Grand Prairie. Ten additional communities with populations over 25,000 within the same 50-mile radius include Burleson, Cedar Hill, Cleburne, Haltom City, Hurst, Mansfield, Midlothian, North Richland Hills, Waxahachie and Weatherford. Should a catastrophic event occur at the plant releasing radiation, the effects would not only affect these small villages and towns, but also prove devastating to largely populated areas in the Dallas/Fort Worth area. This concern should have been more adequately addressed.

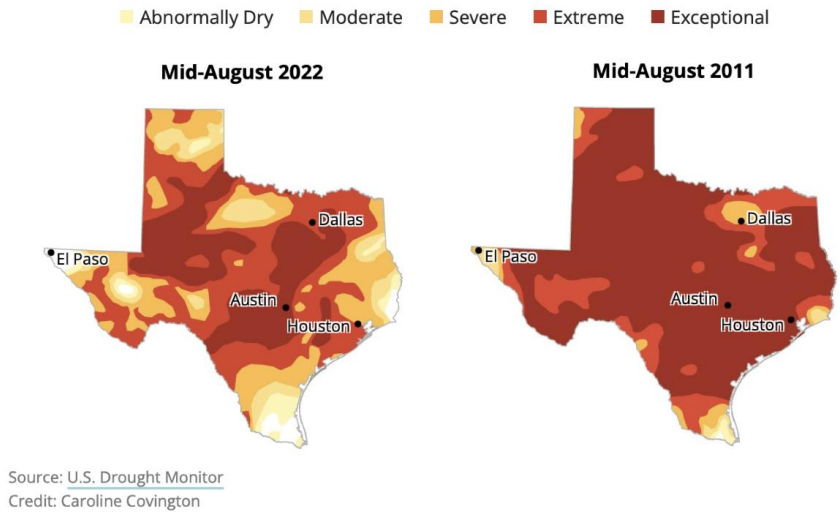
Finally, reliance on an outdated 2013 Environmental Impact Statement (EIS) is not prudent to evaluating this application in light of the information we now have ten years later about the effects of oil and gas operations, and their relationship to drilling,

deep injection, and seismic activity. The omission of updated data is another serious flaw in the LRA that must be remedied in the Environmental Impact Statement ("EIS').

C. Contention 3 - The LRA fails to fully analyze predicted climate changes that could affect the ability of the Comanche Peak Nuclear Power Plant to have cooling water available at temperatures consistent with operational requirements.

The License Renewal Application fails to fully analyze increases in ambient water temperatures that could affect the capacity of the Squaw Creek Reservoir to maintain water temperatures consistent with Comanche Peak nuclear plant operational requirements. High temperatures can contribute to drought and increased evaporation, potentially impacting the ability to have enough cool water for the Comanche Peak Nuclear Power Plants to cool down.

Texas had intense drought statewide in 2022. The Texas Tribune reported in August, 2022, that about 27% of the state was under an "exceptional drought" and 62% of the state was under an "extreme drought." State Climatologist John Nielsen-Gammon said "We've been having several months of exceptionally high temperatures and below-normal rainfall, and as long as that's going on, drought conditions get worse."



Source: U.S. Drought Monitor
Credit: Caroline Covington

Texas Tribune article stated that "As of Aug. 16 (2022) 97% of the state is in some level of drought." The article stated that officials in Gunter, in North Texas, warned in July (2022) that the city could run out of water. "…Dry conditions in Texas could continue, especially later in the fall and winter, potentially leading to a multiyear drought, Nielsen-Gammon said." He expected that economic impacts of the current drought could be in the billions (of dollars).

"And the longer the drought goes on, the more the impact starts shifting from agricultural issues to water supply issues," he (Nielsen-Gammon) said. Depleted reservoirs would require even more rainfall to recover, he added.[23]

The LRA fails to consider the effect on nuclear plant operations related to increased ambient temperatures of air and the effect of higher cooling water temperatures and limited quantities of water. The failure to consider these adverse impacts has the effect of omitting material information concerning water usage and anticipated temperatures, and the potential effects on plant operations.

The omission has the effect of overstating advantages of nuclear power and understating environmental impacts.

The LRA also omits discussion of predictions regarding increasing ambient water temperatures in the future, which could cause the nuclear units to decrease power output or cease operations altogether.

This omission is material because it bears on the suitability of the nuclear generation option when compared to other generation options that are not constrained by

[23] https://www.texastribune.org/2022/08/19/texas-drought-water-conservation/

ambient temperatures of surface water and on the ability of the reactors to operate when needed most, including peak demand times in the hottest months of the year.

The US EPA website states that "More frequent and severe heat waves will likely increase the demand for electricity in the Southeast and Southwest. At the same time, these areas are likely to experience reduced water supplies due to increased temperature and evaporation, as well as possible decreased rainfall. Since water is necessary for electricity production, these combined effects could stress water resources."[24]

The potential impact of rising surface water temperatures was not compared to the potential surface water impacts related to alternatives for generating power. This omission is material because it bears on the suitability of the nuclear generation option when compared to other generation options that are not constrained by ambient temperatures of surface water.

D. Contention 4 - The LRA fails to consider Greenhouse Gas emissions as required by the Council of Environmental Quality's National Environmental Policy Act (NEPA) Guidance.

Section IV of the Council on Environmental Quality's (CEQ) National Environmental Policy Act Guidance on Consideration of Greenhouse Gas (GHG) Emissions and Climate Change, (posted in the Federal Register January 9, 2023),[25] identifies, and explains the following steps agencies should take when analyzing a proposed action's climate change effects under NEPA:

---

[24] https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-energy_.html - Overview

[25] https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate.

(1) Quantify the reasonably foreseeable GHG emissions (including direct and indirect emissions) of a proposed action, the no action alternative, and any reasonable alternatives as discussed in Section IV(A) below.

(2) Disclose and provide context for the GHG emissions and climate impacts associated with a proposed action and alternatives, including by, as relevant, monetizing climate damages using estimates of the SC-GHG, placing emissions in the context of relevant climate action goals and commitments, and providing common equivalents, as described below in Section IV(B).

(3) Analyze reasonable alternatives, including those that would reduce GHG emissions relative to baseline conditions, and identify available mitigation measures to avoid, minimize, or compensate for climate effects.

See the Expert Declaration of John McFarlane testimony clarifying these agency requirements.

- The Comanche Peak License Renewal Application/Environmental Report fails to comply with the CEQ guidance.

The License Renewal Application fails to include the required quantification of reasonably foreseeable greenhouse gas (GHG) emissions for the proposed action, the no action alternative and any reasonable alternatives. This information is not to be found in Section 7.2 of the Environmental Report (beginning on page 2045 of 2289), as it should be. Nor was this data included in Table 8-0., on Page 2087 of 2289, that summarizes

environmental impacts or in the subsequent Tables 8.0-2 and 8.0-3 that provide more detail.

GHG emissions were discussed only regarding fossil fuel alternatives that were deemed not to be reasonable. The application fails to state what the GHG emissions would be if the reactor ceased operations, instead of operating for an additional 20 years. After decommissioning, common sense says that the emissions would be zero.

The License Renewal Application falsely assumes that fossil fuel alternatives would have to fill in the gap if the reactors shut down, and that GHG emissions would increase. This is not true, since there are abundant renewable resources in Texas and energy storage technology is improving. Viable, affordable alternatives utilizing a combination of solar, wind and energy storage should have been analyzed, including power purchase options. Numerous combinations could have been considered, many of which would produce little to no GHG emissions, but this was not done. Instead, natural gas was included in the sole combination alternative, leading to a false conclusion that there would be more GHG emissions if renewables were used. Many viable combination options with little to no GHG emissions exist but were simply not analyzed.

There was no monetizing of climate impacts included in these sections of the Environmental Report, although this is required by the new guidance.

- The application fails to consider climate impacts on Comanche Peak reactors and reactor safety.

The impact of a changing climate on the safety and operations of the reactor must be included in the license renewal application as well. Drought impacts Texas today and is predicted to be a concern in the future. The impacts of torrential rains and increased cooling water temperatures must also be included. There is no analysis in the application regarding potential lack of adequate cooling water, despite the fact that several nuclear reactors across the country have had to shut down when there was not enough cool water. The application does not address this possibility or the safety or economic consequences if Comanche Peak were unable to run due to lack of cool water.

The following table (Table 4.4 on page 26) is from the Climate Change Assessment of the Vulnerability of Nuclear Power Plants and Approaches for the Adaptation, NEA No. 7207, 2021. Page 67.[26] It provides examples of "power plant critical incidents caused by drought."

[26] NEA (2021), Climate Change: Assessment of the Vulnerability of Nuclear Power Plants and Approaches for their Adaptation, OECD Publishing, Paris. https://www.oecd-nea.org/jcms/pl_61802/climate-change-assessment-of-the-vulnerability-of-fnuclear-power-plants-and-approaches-for-their-adaptation?details=true

Table 4.4. **Examples of recent power plant critical incidents caused by drought, United States 2000-2012**

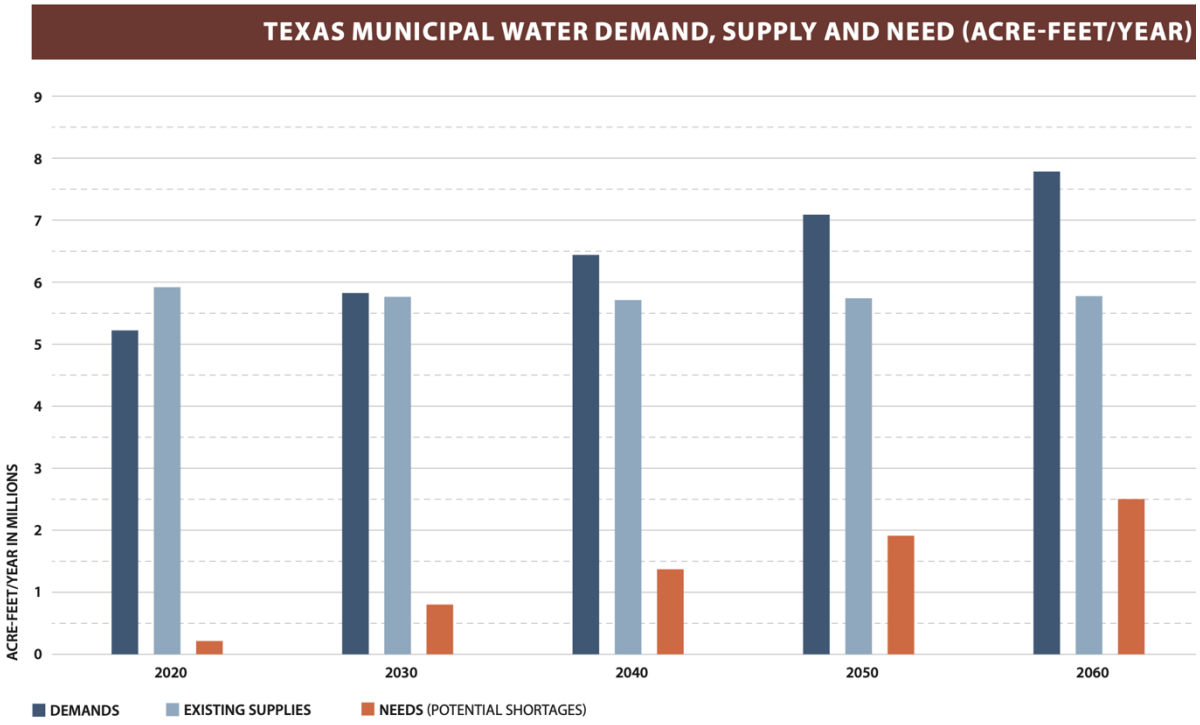
Year	Plant	Details
2000-2008	Gerald Gentleman Station, Nebraska	Extended drought conditions have forced nuclear power plants to develop alternative methods for providing cooling water to the plant, including installation of a well field and modifications to the plant's cooling system.
Summer 2006	Donald C. Cook Nuclear Plant, Michigan	One of two nuclear reactors shut down because lake water used to cool the facility elevated the temperature reading in the containment building.
Summer 2007	Plant Hammond, Georgia	Record drought and heat reduced releases from Lake Allatoona resulting in Coosa River flows near half the 2Q10 flow. This forced Georgia Power to mitigate thermal impacts by reducing load to a minimum each night, placing aeration spargers to aid intake temperature and supplement dissolved oxygen, and installing temporary mobile cooling towers.
Summer 2007	Gallatin Steam Plant, Tennessee	Energy production reduced because intake cooling water temperature went above the allowable discharge temperature because of heatwave and drought.
Summer 2007	Cumberland Power Plant, Tennessee	(same as above)
August 2007	Browns Ferry Nuclear Plant, Alabama	One of three nuclear reactors shut down because water temperature in the river was too high for cooling due to drought and high air temperature.
August 2007	Riverbend Steam Station, North Carolina	Energy production curtailed because river water temperature was too high for cooling due to severe drought.
August 2007	Allen Steam Station, North Carolina	(same as above)
January 2008	McGuire Nuclear Plant, North Carolina	Because of extreme drought, the water level of Lake Norman dropped to less than 1 foot below the minimum allowed for plant use.
January 2008	Shearon Harris Nuclear Plant, North Carolina	Because of extreme drought, the water level of Harris Lake dropped to 3.5 feet below the minimum allowed for plant use.
February 2008	Joseph M. Farley Nuclear Plant, Alabama	Due to extreme drought, water levels in Lake Lanier were significantly reduced, Prompting potential reductions to lake releases. Reduced flows out of the lake would have impacted the plant which is downstream.
February 2008	Scholz Power Plant, Florida	(same as above)
August 2008	Missouri River Power Plants, Nebraska	Extended drought conditions reduced flows in the Missouri River which led to concerns that discharged waters would exceed permitted limits forcing cut backs in power generation.
August 2010	Browns Ferry Nuclear Plant, Alabama	Power generation was cut in half for over a month to avoid overheating the Tennessee River.
Summer 2011	North Texas Power Plant, Texas	Night-time operations were reduced because extreme heat made it harder for the water to cool down enough to be discharged, and drought, which reduced the volume of water available in the cooling reservoir.
Summer 2012	Braidwood Nuclear Plant, Illinois	The twin-unit Braidwood plant was deeded to get special permission to continue operating during the summer because the temperature in its cooling water pond rose to 102°F, four degrees above its normal limit.
July 2012	All of the US	US nuclear power production hit its lowest seasonal levels in nine years as drought and heat forced nuclear power plants from Ohio to Vermont to curtail output.
August 2012	Millstone Nuclear Plant, Connecticut	Millstone had to shut down one of its reactors because the water it drew from the Long Island Sound was too warm to cool critical equipment outside the core.

Source: Lew, 2012.

■ The application specifically fails to consider anticipated water shortages.

A December 2022 Texas State Comptroller Fiscal Notes publication included the article *Drought in Texas, How Rain Scarcity Affects Texans and the Economy*.[27] Exhibit 2 shows predictions regarding Texas Municipal Water Demand. It shows increasing water shortages predicted in the decades between 2020 and 2070. Since the Comanche Peak license renewal would extend operations until 2050 and 2053, data regarding water availability must be included and analyzed in the License Renewal Application, especially considering the new guidance. There may or may not be adequate cooling water in the future, and the water that is available may be too hot to cool the reactors.

EXHIBIT 2



[27] https://comptroller.texas.gov/economy/fiscal-notes/2022/dec/drought.php

- The application fails to consider increases in extreme weather in Texas.

The Texas A&M University Office of the State Climatologist published an Assessment of Historic and Future Trends of Extreme Weather in Texas, 1900-2036. Oct. 7, 2021.[28] The report's executive summary (included on page 29, *infra*) points out that "changes in local (wildfire) risk involve climate change impacts on amount of dry vegetation."[29] Future changes in the severe thunderstorm and tornado outlook were considered to be unknown. With regard to the "2036 Expected Drought" section, they report that "Increasing temperatures, rainfall variability and other factors will in balance decrease water availability, but impact changes will vary strongly across applications." The Comanche Peak reactors are set to retire in 2030 and 2033, so the predictions of drought and high temperatures fall within the currently licensed operation timeframe. The number of 100-degree days is expected to be double the 2001-2020 average.

Therefore, from all the above reasons set forth in this contention, the analysis of a changing climate must be considered in the License Renewal Application, not simply historic data.

[28] https://climatexas.tamu.edu/files/ClimateReport-1900to2036-2021Update

[29] https://climatexas.tamu.edu/files/2021UPDATE_Climate-ExecutiveSummary-Flyer.pdf - climatexas.tamu.edu: /files/2021UPDATE_Climate-ExecutiveSummary-Flyer.pdf

TEXAS A&M UNIVERSITY
Office of the Texas State Climatologist

ASSESSMENT of HISTORIC and FUTURE TRENDS of

EXTREME WEATHER IN TEXAS, 1900-2036

EXECUTIVE SUMMARY

REPORT HIGHLIGHTS





This report analyzes historic observations of temperature, precipitation, and extreme weather in Texas and identifies ongoing and likely future trends out to the year 2036. These trends represent climatological expectations; the actual weather from year to year and decade to decade will be heavily influenced by natural variability which at this point is largely unpredictable.

HISTORIC TEMPERATURE TRENDS
- Rising temperatures since 1970s in Texas consistent with global trends

2036 EXPECTED AVERAGE TEMPERATURE
- About 3.0°F warmer than the 1950-1999 average
- About 1.8°F warmer than the 1991-2020 average

2036 EXPECTED NUMBER OF 100°F DAYS
- Nearly double the 2001-2020 average
- More 100°F days in urban areas

2036 EXPECTED EXTREME SUMMER HOT DAYS
- Surpassing historic values

2036 EXPECTED EXTREME WINTER COLD DAYS
- Odds decreasing but still a threat

HISTORIC PRECIPITATION TRENDS
- Precipitation amounts up 10% or more in eastern Texas over past century
- Little precipitation trend in western Texas

2036 EXPECTED PRECIPITATION
- Additional trend small compared to natural variability

2036 EXPECTED EXTREME PRECIPITATION
- Intensity 6%-10% larger than the 1950-1999 average
- Events 30%-50% more frequent than the 1950-1999 average

2036 EXPECTED DROUGHT
- Increasing temperatures, rainfall variability, and other factors will on balance decrease water availability but impact changes will vary strongly across applications

RIVER FLOODING
- No identified long-term observed trend
- Increased river flooding most likely in areas with normally high rainfall or for the most extreme events

URBAN FLOODING
- Expected increase similar to extreme precipitation

WINTER WEATHER
- Probably less snow and ice

SEVERE THUNDERSTORMS AND TORNADOES
- Historical trend data is unreliable
- Direction of future changes is largely unknown

COASTAL SUBSIDENCE AND SEA LEVEL RISE
- Barrier islands and coastal wetlands are generally retreating
- Continued relative sea level rise expected

STORM SURGES
- Increase in severity expected due to relative sea level rise
- An increase in intensity of the strongest hurricanes is also likely overall, but local trends will be very erratic

WILDFIRE
- Wildfire is affected by many factors
- By themselves, changes in weather and climate would increase fire risk
- Changes in local risk involve climate change impacts on amount of dry vegetation

Report authors: John Nielsen-Gammon, Sara Holman, Austin Buley, and Savannah Jorgensen ***Document:*** OSC-202101 ***Update Sponsor:*** Texas 2036 ***Report date:*** October 7, 2021
Full report at https://climatexas.tamu.edu/files/ClimateReport-1900to2036-2021Update

WHEREFORE, CFUR prays the Nuclear Regulatory Commission accord it organizational standing to proceed on behalf of its members and represented parties for the above-stated contentions, and to admit those contentions for adjudication.

March 1, 2023

Respectfully submitted,

/Signed (electronically) by/
W. David Griggs

WILLIAM DAVID GRIGGS
Attorney at Law
Texas State Bar No. 08491100
1925 Belt Line Rd., Suite 552
Carrollton, Texas 75006
Telephone: (214) 244-5979
david@dgriggs.com

COUNSEL FOR PETITIONER
CITIZENS FOR FAIR UTILITY REGULATION

CERTIFICATE OF SERVICE

Pursuant to 10 C.F.R. Section 2.305, I hereby certify that copies of the foregoing "Amended Petition for Leave to Intervene and Request for Hearing of Citizens for Fair Utility Regulation" have been served upon the Electronic Information Exchange (NRC Filing System), in the captioned proceeding, this 1st day of March, 2023.

Respectfully submitted,

/Signed (electronically) by/
W. David Griggs

William David Griggs
Attorney at Law
1925 E. Belt Line Rd., Suite 552
Carrollton, Texas 75006
(214) 244-5979
david@dgriggs.com