UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE COMMISSION

In the Matter of
South Texas Project Nuclear Operating Co.
Application for the South Texas Project Units 3 and 4
Combined Operating License Application

Docket Nos. 52-012, 52-013

PETITION FOR INTERVENTION AND REQUEST FOR HEARING

Pursuant to 10 CFR Section 2.309 and the notice published by the Nuclear Regulatory Commission at 74 Fed. Reg. 7934 on February 20, 2009, the Sustainable Energy and Economic Development Coalition (SEED), Susan Dancer, South Texas Association for Responsible Energy, Daniel A. Hickl, Public Citizen, Bill Wagner, hereby petition to intervene in the combined operating license application (COLA) filed by South Texas Nuclear Operating Company (Applicant) to build and operate two new nuclear power plants known as South Texas Project Units 3 and 4. The plants are proposed to be located adjacent to the existing South Texas Project Units 1 and 2 site in Matagorda County, Texas. The Petitioners also request an oral hearing in this matter.

DESCRIPTION OF THE PROCEEDING

This proceeding related to a COLA for construction and operation of the South Texas Project (STP) Units 3 and 4 at the South Texas Project site in Matagorda County, Texas. The Applicant submitted its COLA on September 20, 2007, which was revised and supplemented by letters dated September 26, 2007; October 15, 2007; October 18, 2007; November 8, 2007; November 12, 2007; November 13, 2007; November 21, 2007; January 31, 2008; and September 24, 2008. The application was accepted for

docketing on November 29, 2007, and the docket numbers established for Units 3 and 4 are 52-012 and 52-013, respectively. A notice for hearing was published at 74 Fed. Reg. 7934-7938 on February 20, 2009.

DESCRIPTION OF THE PETITIONERS

This Petition is submitted on behalf of the Sustainable Energy and Economic Development (SEED) Coalition and its representative member Susan Dancer, Public Citizen and its representative member Bill Wagner, South Texas Association for Responsible Energy and its representative member Daniel A. Hickl.

SEED Coalition is a statewide nonprofit working for clean air and clean energy in Texas. The SEED Coalition office is at 1303 San Antonio, #100 in Austin, Texas, 78701. The organization advocates for safe energy alternatives and opposes the development of nuclear power, including the proposed STP Units 3 and 4. SEED Coalition has members that reside within fifty miles of the proposed site for STP Units 3 and 4. The members of SEED Coalition who live within fifty miles of the proposed STP Units 3 and 4 include Susan Dancer who resides in Blessing, Texas, approximately 8 miles from the STP site. Ms. Dancer wishes to be represented by SEED Coalition in this case. See: Dancer Declaration, attached.

Public Citizen is a non-profit, non-partisan membership organization based in Washington, D.C. with over 100,000 members nationwide. Public Citizen advocates for safe, clean energy alternatives and opposes the development of nuclear power, including the proposed STP Units 3 and 4. Public Citizen's Texas office is at 1303 San Antonio, Austin, Texas, 78701. Public Citizen has members within fifty miles of the site for the proposed STP Units 3 and 4. Those members include Bill Wagner who wishes to be represented by Public Citizen in this case. He resides in Bay City, Texas approximately 18 miles from the STP site. See: Wagner Declaration, attached.

South Texas Association for Responsible Energy is a citizen organization that opposes the COL for STP units 3 and 4. South Texas Association for Responsible Energy has members within fifty miles of the proposed reactors that include Daniel A. Hickl, who resides in El Maton, Texas within 10 miles of the STP site, wishes to be represented by South Texas Association for Responsible Energy in this case. See: Hickl Declaration, attached.

An accident at the proposed STP Units 3 or 4 could result in radiological releases and environmental contamination that would adversely affect the health of the individual petitioners and the value of their property. These individuals and the organizations representing them seek to avoid or minimize those risks by ensuring that safety and environmental concerns are fully addressed in the NRC's licensing proceeding for the proposed STP Units 3 and 4.

As set forth below, the Petitioners have standing, both individually and as organizations to petition for intervention and an oral hearing.

STANDING

Pursuant to 10 CFR 2.309, a request for hearing by these petitioners must:

> Set forth with particularity the interest of the petitioner in the proceeding, how that interest may be affected by the result of the proceeding, including the reasons why the petitioner should be permitted to intervene with particular reference to the factors set forth in 10 CFR 2.309(d)(1), and the specific aspect or aspects of the subject matter of the proceeding as to which the petitioner can and wishes to intervene.
>
> *In the Matter Pacific Gas & Electric Co.,* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 426 (2002).

According to the Atomic Safety and Licensing Board (ASLB) standing requirements are described as follows:

> In determining whether a petitioner has sufficient interest to intervene in a proceeding, the Commission has traditionally applied judicial concepts of standing. 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), CLI-76-27, 4 NRC 610(1976). Contemporaneous judicial standard for standing require a petitioner to demonstrate that (1) it has suffered or will suffer any distinct and palpable harm that constitutes injury-in-fact within the zone of interests arguably protected by the governing statutes (e.g. the Atomic Energy Act of 1954 (AEA), the National Environmental Policy Act of 1969 (NEPA); (2) the injury can be fairly traced to the challenged action; and (3) the injury is likely to be redressed by a favorable decision. See *Carolina Power and Light Co.*,(Shearon Harris Nuclear Power Plant), LBP-99-25, 50 NRC 25, 29 (1999). An organization that wishes to intervene in a proceeding may do so either in its own right by demonstrating harm to its organizational interests, or any representational capacity by demonstrating harm to its members. *See Hydro Resources, Inc. (2929 Coors Road, Suite 101, Albuquerque, NM 87120),* LBP-98-9, 47 NRC to 61, 271 (1998). To intervene in a representational capacity, an organization must show not only that at least one of its members would fulfill the standing requirements, but also that he or she has authorized the organization to represent his or her interests. See *Private Fuel 3 Storage*, LLC (Independent Fuel Storage Installation), LBP-98-7, *47 NRC 152, 168, aff'd on other grounds,* CLI-98-13, 48 NRC 26 (1998). *Diablo Canyon*, *supra*, 56 NRC at 426. *See Also, Southern Nuclear Operating Co.* (Vogtle Electric Generating Plant), 52-011-ESP, Board Memorandum and Order (March 12, 2007) (Ruling on Standing and Contentions) at 5-6.

The Petitioners herein have standing to participate in this proceeding as demonstrated by the declarations attached hereto. The individual Petitioners have authorized their affiliated organizations named herein to represent their interests in this proceeding. *See: Diablo Canyon*, 56 NRC at 426.

The attached declarations establish that the individual Petitioners reside within 50 miles of the proposed STP Units 3 and 4. Accordingly, the individual Petitioners have presumptive standing because of their proximity to the proposed Comanche Peak Units 3 and 4. *Diablo Canyon*, *supra*, 56 NRC *at* 426-27, citing *Florida Power & Light Co.,* (Turkey Point Nuclear Generating Plant,Units 3 and 4), LBP-01-6, 53 NRC 138, 146, affirmed, CLI-01-17, 54 NRC 3 (2001) (petitioners who reside within 50 miles of a proposed nuclear power plant have presumptive standing in nuclear reactor construction permit and operating license cases due to an “obvious potential for off-site consequences"). Further, the declarations

establish that each would suffer a distinct and palpable harm to constitute injury-in-fact within the zone of interests that are to be protected by the Atomic Energy Act, 42 USC 2011, et seq. (AEA) and the injury can be fairly traced to the challenged action and the injury is likely to be redressed by a favorable decision. The Petitioners' objectives in this matter are to protect public health and safety, and the environment by opposing the construction and operation of any new nuclear plants, including the proposed STP Units 3 and 4. Accordingly, the Petitioners' intent is to assure that no combined operating license (COL) is issued by the NRC unless the applicant can establish that it meets the requirements of the AEA, 42 U.S.C. 2133(b)(d), that require the public's health, safety and property will not be jeopardized by the Applicant's operation of a nuclear plant.

SUMMARY OF CONTENTIONS

1. The number and significance of authorizations and permits required for the combined license that have yet to be obtained by the Applicant preclude issuance of the COL. Further, the outstanding items preclude Petitioners from raising all material issues in this adjudication and they should be given appropriate leave to supplement their contentions as information related to the outstanding items is obtained. P. 10.

2. The Applicant's COLA is incomplete because it fails to include the requirements of 10 CFR 52.80(b) under which the Applicant must submit a description and plans for implementation of the guidance strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities assuming the large loss of areas of the plant due to large-scale explosions/ fires as required by 10 CFR 50.54(hh)(2). P. 13.

3. The STP Environmental Report erroneously assumes that there will be high-level waste/spent nuclear fuel disposal capacity available at a federal site, presumably Yucca Mountain, Nevada. But even if Yucca Mountain is available as a federal repository for spent nuclear fuel and high-level nuclear waste, its capacity would be reached by waste from the current generation of operating reactors. Therefore, the spent nuclear fuel and high-level waste generated by STP Units 3 and 4 would have to be dispositioned to a subsequent repository that has been neither sited nor authorized. P. 23.

4. The STP Environmental Report assumes that there will be no significant releases to the environment from management of spent nuclear fuel and high-level wastes. This is a false assumption that is contradicted, among other sources, by the Department of Energy' Final Environmental Impact Statement on Yucca Mountain that significant radioactivity releases from Yucca Mountain would occur over time. Even DOE's License Application estimates non-zero releases. P. 26.

5. Because no spent nuclear fuel and high-level radioactive waste repository site is now available and future availability of such site is problematic, the COLA adjudication should consider the environmental consequences and public health impacts from long-term storage of high-level waste and spent fuel on site at STP Units 3and 4. P. 28.

6. The COLA adjudication should consider the public health impacts and environmental consequences of requiring governmental units to become the custodian of high-level waste and spent nuclear fuel at the STP site after the operating license has terminated and post-closure activities have been completed. P. 30.

7. The COLA should consider environmental impacts and public health consequences of accidents and releases related to off-site radioactive waste disposal. P. 31.

8. The COLA is inadequate because it fails to fully analyze the radiological hazards that will occur from operation of the STP Units 3 and 4 nuclear plants based on discharge of water that contains radioactive particulates to the Main Cooling Reservoir (MCR). P. 32.

9. Increasing Levels of Groundwater Tritium. The Environmental Report fails to predict or evaluate the effects of increasing groundwater tritium concentrations. P. 35.

10. The Main Cooling Reservoir (MCR) will be in a near- state of design basis flood level with operation of all four plants. The reactor buildings, buildings, ultimate heat sink water storage basins, and the residual service water pump houses are below the design basis flood level and vulnerable to flooding. P. 36.

11. The COLA is inadequate because it assumes there will be an adequate supply of fresh water for purposes of plant operations. This assumption is faulty because of the failure of the STP Environmental Report to analyze impacts of global warming on rainfall and the hydrological cycle. P. 37.

12. Insufficient TPDES Permit Effluent Limits. The proposed Texas Pollution Discharge Elimination Permit fails to establish necessary effluent limits for the range of toxic and harmful chemicals that have been documented to be present or are possibly present in the power plant effluent. P. 40.

13. Reliance on Dilution to Achieve Discharge Standards. The Environmental Report discusses the

importance of dilution of nuclear power plant wastewater to meet discharge standards, but neglects to evaluate the relationship between a slightly larger effective Main Cooling Reservoir volume and the additional waste loads from doubling the electrical generation capacity. P. 40.

14. Unregulated Wastewater Discharge. A regulatory loophole has allowed a primary discharge of wastewater from the existing facility to be unregulated. The proposed expansion would be operated under the same regulatory framework. The harm caused by this regulatory failure will be magnified by the proposed addition of two additional nuclear powered generating plants. P. 40.

15. Unevaluated Reduction in Surface Water Flow. The Environmental Report fails to evaluate the effect of Colorado River withdrawals of up to 48% of the river flow on the river and estuary resources. The Environmental Report fails to demonstrate the availability of necessary surface water from the Colorado River during drought conditions. The Environmental Report also fails to evaluate the effect of increased groundwater withdrawals on flow in adjacent streams and rivers including the Colorado River. P. 41.

16. Unevaluated Reduction in Groundwater Supply for Adjacent Landowners. The Environmental Report fails to provide adequate information regarding the effect of the expansion on the availability of groundwater from the regional Gulf Coast Aquifer. A determination of key information necessary for an analysis of impact is deferred to a later detailed engineering phase. Information provided in the Environmental Report underestimates the predicted effect of the proposed expansion on groundwater availability to wells on adjacent property. P. 41.

17. The Applicant's calculations of radiation doses to the general public as a result of consuming radioactively contaminated fish and invertebrates are incorrect. The calculations are done using the LADTAP II model which is obsolete and systematically underestimates doses to the public. P. 41.

18. The STP Environmental Report concedes that in order to support the uranium fuel cycle for STP 3 and 4 at least twenty-one acres off-site will never be available for future use. The COLA adjudication should require that the Applicant explain the basis for the permanent dedication of these twenty-one acres to nuclear operations and specify the means by which the twenty-one acres will be secured and maintained in perpetuity. P. 43.

19. The STP Environmental Report states that an unquantified amount of land onsite will be dedicated to licensed radioactive waste disposal facilities and be unavailable for other uses. But the Applicant has failed to specify the location onsite for the disposal facility and has not applied for the necessary permit for such activities pursuant to 10 CFR Pt. 72. P. 44.

20. The uranium fuel cycle has substantial greenhouse gas impacts must be considered in each phase of the uranium fuel cycle. P. 44.

21. Impacts from severe radiological accident scenarios on the operation of other units at the STP site have not been considered in the Environmental Report. P. 46.

22. The COLA should consider all radiological, environmental and public health impacts related to decommissioning of STP Units 3 and 4. P. 47.

23. The STP Environmental Report is inadequate because it fails to make reasonable assumptions about alternatives to the proposed action of constructing and operating STP Units 3 and 4. P. 48.

24. The COLA is inadequate and unreliable because it fails to discuss the access to and costs of uranium used for power plant fuel. P. 57.

25. The Decommissioning Funding Assurance described in the application is inadequate to assure sufficient funds will be available to fully decontaminate and decommission South Texas Project Units 3 and 4. The NRG Licensees must use the prepayment method of assuring decommissioning funding. P. 59.

26. The Applicant has not established that there is a need for the power that would be generated by STP Units 3 and 4. P. 62.

27. The numerous "construction-related unavoidable impacts" have unacceptable adverse impacts. There should be remediation measures put in place that would effectively address these adverse impacts, but none are described, and apparently none are planned. P. 64.

28. Whooping cranes and endangered species analysis and protection are inadequate. P. 66.

CONTENTIONS

1. The number and significance of authorizations and permits required for the combined license that have yet to be obtained by the Applicant preclude issuance of the COL. Further, the outstanding items preclude Petitioners from raising all material issues in this adjudication and they should be given appropriate leave to supplement their contentions as information related to the outstanding items is obtained.

NRC licensing hearing requirements require Petitioners to raise material issues based on the content of contentions filed pursuant to 10 CFR 2.309(c)(2). *BPI v. Atomic Energy Commission*,502 F.2d 424, 427 (D.C. Cir.1974). The contentions must include a specific statement of the law or fact be raised or controverted, a brief explanation of the basis for contention, a showing of materiality and the basis for the contention. 10 CFR 2.309 (f). The Petitioners herein contend that the number and significance of open items on the applicant's authorization/permits list precludes them from being able to determine what issues will be material in this proceeding. Accordingly, the petitioners contend that this adjudication should not proceed to a hearing until all items in Applicant's Environmental Report, Table 1.2-1 have been closed out.

A representative sample of outstanding authorizations/permit required to be obtained by the applicant includes the following:

- an air quality construction permit, anticipated to be obtained by the constructor in December 2010,
- a Texas Pollutant Discharge Elimination System Permit, anticipated to be obtained in December 2009,
- a storm water discharge permit, to be obtained by the constructor in December 2009,
- an approval by the Texas Council on Environmental Quality of a modification to public water system, expected to be obtained in December 2009,
- a groundwater well permit, expected to be obtained in December 2009,
- a permit to plug groundwater wells, expected to be obtained in December 2009,
- a notice of registration for on-site disposal of class III construction waste, expected to be obtained December 2009,
- a notice of registration for off-site disposal of industrial solid wastes, expected to be obtained December 2009,

- a permit from the Matagorda County Floodplain Management Authority for land disturbing activity and construction, expected to be obtained by the constructor in December 2009,
- a Section 401 Certification Pursuant to the Federal Clean Water Act that is contingent on a U.S. Army Corps Of Engineers concurrence with a wetland delineation,
- a license or limited work authority from the NRC pursuant to ten CFR fifty-two for safety related construction, expected to be obtained either in January 2010 or January 2011,
- a revision of the existing TPDES permit that limits discharges into surface water, to be obtained as required or is discharged information becomes available,
- an air quality permit it would be a revision of an existing operating permit to be obtained as required or as discharge information becomes available,
- a groundwater well permit for new well operation an increase in the permitted amount of groundwater extraction, expected to be obtained in February 2011,
- a water rights permit for the use of additional makeup water from the Colorado River,
- revisions for the transportation of radioactive waste into the states of Tennessee and Utah will be obtained if required,
- a permit pursuant to 10 CFR 61 to license a land disposal of radioactive waste facility, if required,
- a permit pursuant to 10 CFR 71 to package and transport radioactive materials, if required,
- a license under 10 CFR part 72 to establish an independent spent fuel storage installation, if required.

These are not inconsequential items and may have a significant impact on whether the STP Units 3 and 4 can be constructed and operated. For example, to the extent that the operation of Units 3 and 4 depends on a significant increased use of groundwater, failure to obtain the permits required for such may preclude granting the COL. Additionally, because the Applicant will likely be required to store high level waste/spent nuclear fuel on-site, a permit under 10 CFR Pt.72 is a predicate to operation. Failure to obtain such a permit may bar issuance of the COL.

Moreover, because these items are still open, determining materiality of contentions by the Petitioners herein is difficult or impossible. Accordingly, the Petitioners specifically reserve the right to seek leave to file further contentions or supplement those herein, pursuant to 10 CFR 2.309 (c)(2) and/or 10 CFR 2.309(f)(2)(i)-(iii), as further information is obtained related to the outstanding items listed above.

2. The Applicant's COLA is incomplete because it fails to include the requirements of 10 CFR 52.80(b) under which the Applicant must submit a description and plans for implementation of the guidance strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities assuming the large loss of areas of the plant due to large-scale explosions/ fires as required by 10 CFR 50.54(hh)(2).

On October 3, 2007, the NRC published a proposed rule that applies to combined operating license applicants and requires an evaluation of the effects of an impact of a large commercial aircraft on nuclear power plants. 72 Fed. Reg. 56287, *Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs; Proposed Rule.* On March 27, 2009 the NRC amended its security regulations and added requirements pertaining to COLAs as related to 10 CFR 50.54(hh) that require mitigative strategies and response procedures for potential or actual aircraft attacks. Specifically, 10 CFR 52.80 has been amended by adding subsection (d) to require combined license applicants to submit a detailed description and plans for implementation of the guidance and strategies intended to maintain or restore containment, reactor core cooling and spent fuel pool cooling capabilities under the circumstances that result with the large loss of the areas of the plant due to explosions or fires. The requirements under 10 C.F.R. 50.54(hh) are mitigative strategies similar to operational programs that are required as a part of a COLA and implemented prior to plant operation. 74 Fed. Reg. 13926, 14004.

In a letter dated July 18, 2008 to the NRC chairman, the Advisory Committee on Reactor Safeguards (ACRS) stated that the proposed rule would add requirements for a COLA to identify and incorporate design features and functional capabilities that avoid or mitigate, as practical, with reduced reliance on operator actions, the ramifications of an aircraft impact on core cooling capability, containment integrity, spent fuel pool integrity, and spent fuel pool cooling. The ACRS viewed this as an additional requirement that would apply to COL applications already filed with the NRC. The ACRS correspondence also noted that the impact of a large commercial aircraft on a nuclear reactor should be considered a beyond-design-basis-event.

The new requirements in 10 C.F.R. 50.54(hh) concern procedures to deal with events that cause large fires and explosions like those associated with an impact of a large commercial aircraft and cause a loss of a substantial portion of the nuclear plant and its functioning components. 73 Fed. Reg. 19443 (April 10, 2008). The description of the procedures is considered a part of the combined license application. 74 Fed. Reg. 13926, 13945 (March 29, 2009).

Significantly, the new regulations now require that applicants consider beyond-design basis events in considering the means to mitigate the effects from large scale fires/explosions. The Commission has specifically recognized that mitigative strategies can address how losses of large areas of a nuclear plant and related losses of plant equipment can be dealt with from a variety of causes, including aircraft impacts and beyond design bases security events. 74 Fed. Reg. 13926, 13945. Therefore, the design basis in the applicant's Environmental Report, Final Safety Analysis Report, and the Design Control Document for anticipated explosions/fires at a nuclear plant are no longer adequate to address the regulatory requirement under the assumption that large areas of the plant and equipment will be lost due to explosions/fires. A review of the applicant's relevant documentation indicates that there is no design basis that explosions/fires will cause a large loss of a plant and related equipment losses.

The Environmental Report, at Section 7.1, p.7-1, evaluates the radiological consequences of design basis accidents at the proposed plants. Various design basis accidents are discussed including failure of small lines carrying primary coolant outside the containment, main steam line break, loss of coolant accident (LOCA), cleanup water line break outside containment, and a fuel handling accident. However, there is no discussion of an accident that would cause a large loss of the plant area due to a fire or explosion that would compromise the capacity to maintain integrity of the containment, maintain core coolant and maintain spent fuel pool coolant.

The Final Safety Analysis Report (FSAR) section 15A, adopts the Advance Boiling Water Reactor (ABWR) Nuclear Safety Operational Analysis (NSOA) in the Design Control Document (DCD), section 15A., page 15 A.-1. The NSOA considers a range of events that could cause major radiological consequences. Additionally, the NSOA considers the availability and adequacy of essential protection sequences required to permit the plant to function under normal circumstances, moderate frequency incidents (anticipated operational transients), infrequent incidents and design basis accidents. DCD, page 15 A.-1. The NSOA spectrum of events is intended to represent "a complete set of plant safety considerations." However, what the NSOA considers a worst-case accident does not include explosions/fires that cause a large loss of plant, equipment and personnel.

Design basis accidents are defined as "hypothesized events that affect the radioactive material barriers and are not expected during plant operations. These are plant events, equipment failures, combinations of initial conditions which are or of extremely low probability (once in 100 years or longer)." DCD, p. 15 A.-14. The postulated accident types that are considered in the NSOA as design basis include a mechanical failure of a single component that leads to the release of radioactive materials from one or more barriers. Examples of mechanical failure would be a break of the coupling between the

control rod drive and control rod and a rupture of any single pipe, up to and including a complete break of the largest pipe in the reactor coolant pressure boundary. DCD, P. 15 A.-14.

Clearly, the design basis accidents described and considered in the DCD, while significant, are much less serious than a large scale explosions/fires caused by a commercial aircraft impact. The DCD design basis accidents assume a single component mechanical failure or the rupture of any single pipe. If explosions/fires are large enough to cause the loss of a large area of a nuclear plant it is unreasonable to assume that only a single mechanical failure would occur or that a single pipe would rupture as a result. Therefore, the design basis accident analysis in the NSOA is inadequate to meet the requirement of 10 CFR 50.54 (hh).

The NSOA describes "special events" that are intended to demonstrate that a plant is capable of accommodating “off-design” occurrences. Of the fifty-six events considered in the NSOA only four are "off-design" and none have any assumption that there is a loss of a large part of a plant and the corresponding loss of equipment caused by fire or explosion. DCD pp.15A-43-45.

The first “off design” event considered is a spent fuel cask drop accident. It is assumed that because of the redundant nature of the crane that handles shipping casks and spent fuel casks a cask drop accident is not considered a credible event. Nevertheless, the accident is considered to be a consequence of some other unspecified failure of the task lifting mechanism (perhaps, like an explosion secondary to an airplane impact) that would cause a cask to fall about 90 feet from the refueling floor level to the ground level through the refueling floor maintenance hatch. It is also assumed that the dropped cask would lose coolant in its outer structure. However, there is no assumption of any fuel damage. It is further assumed that the loss of coolant would require the plant personnel to force the cooling of the cask by spraying it with water. Any radioactivity that does escape from the damaged cask is considered to be “accommodated” by the secondary containment and standby gas treatment systems and it is implicitly

assumed that these systems would still be available after an accident. Under the requirements of 10 CFR 50.54 (hh) there should be an assumption in this accident scenario that both water for forced cooling of the cask is unavailable and that the standby gas treatment system and secondary containment have been lost. These are reasonable assumptions in the event of large-scale explosions/fires.

The NSOA next considers a reactor shutdown based on an anticipated transient without SCRAM (ATWS), DCD, pp. 15A-44-45. A scram is a "sudden shutting down of a nuclear reactor". NRC Glossary. ATWS is defined by the NRC as "one of the "worst case" accidents, consideration of which frequently motivates the NRC to take regulatory action. The ATWS could occur if the system that provides a highly reliable means of shutting down the reactor (scram system) fails to work during a reactor event (anticipated transient). The types of events considered are those used for designing the plant. NRC Glossary.

The ATWS event assumes that multiple safety systems will fail simultaneously. The scenario is intended to demonstrate the means to counteract the multiple failures and still maintain the reactor in a safe status, eventually reaching cold shutdown. However, what is particularly noteworthy is the necessity for multiple systems to be available to replace the functions of other systems assumed unavailable. For example, the postulated ATWS assumes that a scram is initiated and there is a failure of the hydraulic function used to insert the control rods. As a backup, the control rods would be manipulated and inserted by electric motors. However, in a scenario that assumes an explosion and subsequent fire large enough to destroy the hydraulic means to move the control rods, it is unreasonable to assume that the backup electric motors would be operable considering their close physical proximity to the hydraulic equipment.

The interrelatedness of the safety systems is further illustrated by the ATWS postulated event when it is assumed multiple reactor internal pumps would trip and cause a subsequent power decrease. If the reactor vessel is isolated from the main condenser it is assumed the reactor power can be transferred

from the reactor to the suppression pool through the relief valves. The Nuclear Boiler Instrumentation System would initiate operation of systems to maintain adequate reactor vessel water. This assumes that the standby liquid control system would be initiated manually and allow the decay heat to dissipate. Yet other systems are then initiated to remove reactor decay heat from the suppression pool and the primary containment. This emergency reactor shutdown sequence depends on the operation of at least eight separate systems in order to function as intended. It is reasonable to assume that an explosion and fire powerful enough to destroy, for example, multiple reactor internal pumps, would also destroy some or all of the redundant systems that must function properly in the absence of operable reactor internal pumps in order to avoid a major radiological accident.

The next event considered is a reactor shutdown from outside the main control room. DCD, p. 15A-45. The objective would be to safely shut down and cool the reactor without using the controls located in the main control room because a fire or explosion that destroys the main control room would necessitate control of the reactor from a remote location. Again, in order to achieve this objective collateral systems such as the reactor protection system (RPS), the nuclear boiler instrumentation system (NBIS), the reactor core isolation cooling system (RCIC) and the high-pressure coolant injection system (HPCI) all function to control water levels in the reactor. Again, it is reasonable to assume that a fire and explosion severe enough to destroy the main control room would also have effects on collateral systems necessary to control the reactor outside the main control room. But the NSOA scenario assumes all backup systems would be intact and function as intended. This assumption is not plausible under large-scale explosions/fires conditions.

The last "off design" basis scenario considered in the NSOA is shutting down the reactor without the control rods. DCD, p. 15A-45. Shutting down a reactor without the use of control rods can be achieved by use of the standby liquid control system. According to the DCD, the standby liquid control system must function properly in order to manually shut the reactor down without using the control rods.

Given that the standby liquid control system must function in order to manually shut the reactor without using control rods it must be assumed that that it would remain intact after an explosion and fire that also rendered inoperable the means by which to insert the control rods into the reactor. An explosion and fire large enough to cause the failure of the hydraulic and electrical means by which to manipulate the control rods should also be considered sufficiently destructive to cause loss of the standby liquid control system. But the NSOA assumes the standby liquid control system is available and will function as intended. This is not a reasonable assumption in the event of a large-scale explosions/fires.

The same assumptions that underpin successful resolution of "off design" basis events are also assumed for events the considered design basis. DCD, section 15A.6.6.1, p. 15A-43. For example, event 32 is a loss of coolant accident (LOCA) and in to believe that anticipates a break of a large diameter high-pressure core system injection line inside the primary containment. Resolution of such an event assumes operation of approximately nine different systems. DCD Section 15 A .6 .5 .3, p. 15A-39. Whether all nine of these critical systems would be available in the event of a large loss of a plant due to explosions/fires should be considered in the context of 10 CFR 50.54 (hh).

The close interrelatedness of the safety systems, both in physical proximity and function, makes the systems inherently vulnerable in the event of large explosions/fires. The requirements of 10 CFR 50.54(hh) require an assumption that the magnitude of an explosion/fire would be equivalent to that caused by an aircraft. However, it appears that the fire modeling relied on in the DCD assumes fires of a magnitude much smaller than expected from an aircraft impact. The DCD Fire Protection Probabilistic Risk Assessment relies on the EPRI Fire Induced Vulnerability Evaluation (FIVE Methodology). For example, the FIVE methodology addresses postulated fire diameters and flame heights as follows:

> Flame heights estimated with Heskestad's correlation is summarized in a surface plot in Figure 5-2 for heat release rates ranging from 100 to 1000 kW and fire diameters ranging from 0.5 to 4 m (1.6 to 13.1 ft).

> The sensitivity analysis presented in Figure 5-3 suggests that the highest flame heights are observed with the combination of high heat release rates and relatively small to medium fire diameters [less than 2 m (6.6 ft)]. It is difficult to determine a typical range of fire diameters and fire intensities for NPP applications in order to bound the sensitivity analysis for flame height. Such ranges depend on the nature of the ignition source (oils spills, electrical cabinets, etc), and the geometric characteristics of the scenario. Probably the largest flame-heights are associated with high heat release rates and very small diameters [fires above 1 MW and diameters of ~0.5 m (1.6 ft)], which likely are unrealistic scenarios for diffusion flame fires in NPP applications. *Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications*, *Volume 4: Fire-Induced Vulnerability Evaluation* (FIVE-Rev 1), p. 5-5

.

The fire model used for the DCD does not assume fire/explosion magnitudes that could be expected with an aircraft impact. As noted above, the range of assumed fire diameters ranged from 1.6 feet to 13.1 feet. As noted in the FIVE study, it is difficult to predict a range of fire diameters and fire intensities for nuclear power plant applications. The ranges are dependent on the nature of the ignition sources, and the so-called geometric characteristics of the scenario. But even the largest flame heights assumed in the model are anticipated to be from fires that have relatively small diameters. This is certainly not a reasonable assumption as related to fires that could result from an aircraft impact.

The FSAR and DCD are inadequate to meet the new requirements of 10 CFR 50.54 (hh). Accordingly, the COLA is deficient and incomplete. The NRC should not rely on the FSAR or the DCD for purposes of determining compliance with the new requirements of 10 CFR 50.54 (hh).

The COLA and its supporting documents, the Environmental Report, the FSAR and DCD do not cover eventualities related to an aircraft impact into a nuclear plant. Consequently, the COLA does not undertake an analysis of how to maintain containment integrity, core cooling and spent fuel cooling that assumes the large loss of a plant due to explosions/fires. A fair reading of the DCD's fifty-six postulated events that could cause unacceptable consequences indicate none approach the magnitude of explosions/fires that could be reasonably anticipated to result from an aircraft impact. Even for the

NSOA accidents that are postulated to be the most severe there is no assumption of a loss of a large area of the plant to explosions/fires. Further, the NSOA's fifty-six postulated events are successfully resolved on paper based on assumptions that critical redundant safety systems will function as intended. Given the regulatory requirement to plan for major fires/explosions and the attendant consequences, the assumptions that bound the DCD/NSOA's analyses are not reasonable. Moreover, none of the accident scenarios address an explosion/fire that causes a sudden loss of spent fuel pool integrity or loss of coolant. Consideration of spent fuel pool cooling capability is specifically required under 10 CFR 50.54(hh). Nevertheless, none of the COLA documents cover such a scenario.

The new requirements under 10 C.F.R. 50.54 (hh) anticipate that applicants will address the large loss of plant due to explosions and fires caused by a beyond design basis event. 74 Fed. Reg. 13926, 14001. In effect, there is now a beyond design basis requirement built into 10 CFR 50.54 (hh). The new design basis for applicants is one that assumes there will be a large loss of plant due to explosions/fires and that there must be an affirmative showing that the applicant's design basis can accommodate such losses and maintain containment integrity, core cooling and spent fuel pool integrity and cooling. The STP COLA does not satisfy this requirement.

Relying on local firefighting capacity for a major fire at STP Units 3 and 4 is unreasonable because most firefighters are volunteers. STP Environmental Report, sections 2.5.2.7.2. Therefore, in the event of a major fire at STP that would cause a loss of large areas of the plant reliance on local volunteer fire departments to render adequate emergency assistance including fire suppression capacity would not be feasible.

Fire hazards represent about half of the risk of a nuclear reactor meltdown.[1] In other words, the chance of a reactor meltdown caused by a fire roughly equals the chances of meltdown from all other causes combined.[2] The NRC has identified the "need to protect the safety of redundant electrical cables in nuclear power plants that were needed to achieve and maintain safe shutdown of the nuclear reactor in the event of a fire."[3] A report by the Office of the Inspector General, U.S. Nuclear Regulatory Commission found that the Hemyc fire barrier installed in the existing Comanche Peak reactors failed to meet National Institute of Standards and Technology testing for the one hour endurance period, lasting only 23 minutes.[4] Sandia labs confirmed the finding. The Thermo-Lag barrier also used at the existing reactors has been found defective as well. Fire retardant deficiencies at existing plants, combined with the fact that there is only a volunteer fire department, increase risks at the STP site and the COLA fails to analyze the potential impact of a fire that could spread between reactor units, magnifying impacts and radiation risks. This oversight should be remedied.

The Petitioners contend that until the Applicant can establish that its anticipated plant design and operation is able to meet the requirements of 10 CFR 50.54 (hh) the COLA is deficient and incomplete. Additionally, Petitioners contend that the STP Environmental Report, Severe Accident Mitigation Alternatives, Section 7.3, page 7.3-1, is no longer sufficient in light of the requirements of 10 CFR

[1] Jack Grobe, Associate Director for Engineering and Safety Systems, Nuclear Regulatory Commission, Transcript of Nuclear Regulatory Commission Briefing on Fire Protection Issues, July 17, 2008, page 58, line 22 to page 59, line 1. Transcript available at http://www.nrc.gov/reading-rm/doc-collections/commission/tr/2008/20080717.pdf

[2] United States House of Representatives Committee on Interior and Insular Affairs Subcommittee on Oversight & Investigations, "Calculation of Reactor Accident Consequences (CRAC2) for U.S. Nuclear Power Plants (Health Effects and Costs) Conditional on an "SST1" Release," November 1, 1982. As cited in an Oct. 29, 2008 letter to Chairman David Price, Subcommittee on Homeland Security, from the Directors of Beyond Nuclear, Union of Concerned Scientists Nuclear Safety Project and North Carolina Waste Awareness and Reduction Network.

[3] January, 2008 United States Nuclear Regulatory Commission, Office of the Inspector General Special Inquiry, "NRC's Oversight of Hemyc Fire Barriers" Page 2

[4] 5 January, 2008 United States Nuclear Regulatory Commission, Office of the Inspector General Special Inquiry, "NRC's Oversight of Hemyc Fire Barriers" Page 5

50.54(hh). Accordingly, the Petitioners contend that Section 7.3 must be amended and factor in mitigating design alternatives related to the consequences of a large-scale explosions/fires.

3. The STP Environmental Report erroneously assumes that there will be high-level waste/spent nuclear fuel disposal capacity available at a federal site, presumably Yucca Mountain, Nevada. But even if Yucca Mountain is available as a federal repository for spent nuclear fuel and high-level nuclear waste, its capacity would be reached by waste from the current generation of operating reactors. Therefore, the spent nuclear fuel and high-level waste generated by STP Units 3 and 4 would have to be dispositioned to a subsequent repository that has been neither sited nor authorized.

The Environmental Report for the STP Units 3 and 4 asserts that there will be a federal repository available for disposition of spent nuclear fuel and other high-level irradiated waste generated by these plants because the NRC says such capacity will be available. STP Environmental Report Section 5.7.6. This is a fundamentally flawed assumption and is not based on a sound factual basis and undermines the entire premise that the uranium fuel cycle does not have significant adverse consequences to the public and environment.

Arguably, the Applicant has relied on the NRC's Waste Confidence Decision issued in 1984 and its subsequent amendments. However, the Waste Confidence Decision is inapplicable because it only applies to reactors that are currently operating and not new reactors such as the proposed STP Units 3 and 4. Moreover, the Waste Confidence Decision, as amended in 1999, has determined that there is a reasonable assurance that at least one repository will be available by 2025 and that sufficient repository capacity will be available within 30 years beyond the license life for currently operating reactors. Waste Confidence Decision Review: Status, 64 Fed. Reg. 68,005, 68,006. (December 6, 1999). The 1999 Waste

Confidence Review revised the original decision that a federal geologic repository for spent fuel/high-level waste would be available by 2007-2009. It must be assumed that this revised finding applied only to reactors currently operating including those which have licenses that are renewed. The NRC has provided no indication that it has any confidence that federal repository capacity will be established for spent fuel and other high-level radioactive waste from new reactors licensed after December, 1999 suchh as STP Units 3 and 4.

The volume of spent nuclear fuel and other high-level radioactive wastes generated by the current generation of nuclear reactors exceeds the anticipated capacity at Yucca Mountain. The maximum amount Yucca Mountain can accept is limited to 63,000 metric tons of commercial high-level radioactive waste and spent nuclear fuel pursuant to the Nuclear Waste Policy Act, 42 U.S.C. 10134(d). Under Department of Energy policy, the first 70,000 metric tons of irradiated nuclear fuel and high-level radioactive waste to be dispositioned at Yucca Mountain will be comprised of 90% commercial nuclear waste and 10% Department of Energy waste from the nuclear weapons production complex and energy research activities and Department of Defense nuclear Navy related wastes. A limitation of 90% of 70,000 metric tons yields a maximum capacity of commercial spent fuel and high-level waste of 63,000 metric tons that could be dispositioned at Yucca Mountain. See: Yucca Mountain Environmental Impact Statement, page A-1 and Nuclear Waste Technical Review Board (NWTRB), Disposal and Storage of Spent Nuclear Fuel: Finding a Right Balance, page 11 (March 1996).

Moreover, according to a report prepared in 2000 and by the United States Department of Energy Office of Civilian Radioactive Waste Management, as of 1998 there was over 38,000 metric tons of high level waste from commercial reactors in the United States. The report further stated that this amount would more than double by 2035. United States Department of Energy, Civilian Radioactive Waste Management Program Plan, Revision 3,DOE/RW 0520, page 1. This projection of the volume of the spent nuclear fuel and high-level radioactive waste stream betrays the premise in the STP Environmental

Report that assumes Yucca Mountain will be available for disposition of waste generated at STP Units 3 and 4. Therefore, assuming that Yucca Mountain becomes available as a federal repository at sometime in the future, spent nuclear fuel and high-level radioactive wastes generated at STP units 3 and 4 would not be eligible for disposition therein. Hence, the spent nuclear fuel and high-level waste generated by STP Units 3 and 4 would have to be dispositioned to a second federal repository that has neither been sited nor authorized. Reliance on such a second site is highly speculative and unwarranted in the context of the subject COLA. In effect, the Applicant is betting on the availability of a second federal repository without any reasonable assurance that the first such facility will ever be available.

The 1999 Waste Confidence analysis does not conclude that there is a likelihood that more than one geologic repository will be licensed. While the 1984 Nuclear Waste Confidence Decision stated that one or more repositories would be available between 2007 and 2009 this, obviously, has not occurred. The 1999 Waste Confidence Status Report assumed that at least one repository would be available by 2025. 64 Fed. Reg. at 68, 006. The reality is that there is a very little likelihood of a geologic repository will be available even by 2025. As further support for this contention, Petitioners note that on March 5, 2009 United States Secretary of Energy Steven Chu stated during testimony to a United States Senate Committee that Yucca Mountain was no longer an option as a repository for spent nuclear fuel and high-level radioactive waste. See: *Chu: Yucca No Longer Option for Nuclear Waste,* Associated Press. March 5, 2009. Accordingly, at least for the next four years of the current administration, Yucca Mountain will not be developed as a potential repository for spent nuclear fuel and high-level radioactive waste. This development further extends the time for off-site disposition of this waste stream and casts further doubt on whether a federal repository will be available to handle the wastes from the current generation of reactors let alone wastes from a new generation of reactors such as that represented by STP Units 3 and 4.

In further support of this contention Petitioners rely on the report of Arjun Makhijani, Ph.D. regarding the Waste Confidence Rule Update, attached hereto, and report of Gordon Thompson Ph.D.,

attached hereto. Both Dr. Makhijani and Dr. Thompson are well-qualified to analyze the material issues related to spent nuclear fuel and other high-level wastes.

The STP Environmental Report is seriously flawed and incomplete regarding the question of future management of spent nuclear fuel and other high-level wastes. Accordingly, the Petitioners contend that the Environmental Report should be either disregarded or withdrawn by the Applicant and amended based upon the premise that a federal repository for disposition of spent nuclear fuel and high-level waste streams from STP Units 3 and 4 will not be available.

4. The STP Environmental Report assumes that there will be no significant releases to the environment from management of spent nuclear fuel and high-level wastes. This is a false assumption that is contradicted, among other sources, by the Department of Energy' Final Environmental Impact Statement on Yucca Mountain that significant radioactivity releases from Yucca Mountain would occur over time. Even DOE's License Application estimates non-zero releases.

The STP Environmental Report at Section 5.7.6 assumes that there would be no significant releases of radioactivity to the environment related to management of radioactive waste. This statement is flatly contradicted by the United States Department of Energy which recognizes that significant radioactivity releases from a Yucca Mountain repository would occur over time. See US Department of Energy, Office of Civilian Radioactive Waste Management, "NWTRB Repository Panel Meeting: Postclosure Defense and Design Selection Process", January 25, 1999. Additionally, the US Environmental Protection Agency's final Yucca Mountain radiation release regulations are premised on the assumption that there could be significant releases of radiation from a federal repository. In fact, the EPA regulations recognize that such releases could extend to 1 million years after wastes would be placed

in the repository. The EPA's analysis indicates that such releases could continue for many hundreds of thousands of years if waste is dispositioned at the Yucca Mountain repository. EPA's proposed dose limit from time of burial to 10,000 years after burial is 15 mrem per year from all pathways of exposure. EPA's proposed dose limit for the timeframe 10,000 to 1,000,000 years after burial is one hundred millirems per year from all pathways of exposure. This indicates that the radiation protection standards for 10,000 years after the disposition of waste at Yucca Mountain would allow a 6 to 7 times higher radioactivity doses to persons downstream than the limits imposed for the years prior to 10,000 years after burial.

The DOE's final EIS for Yucca Mountain estimates doses that were in excess of the EPA limit of 100 mrem beyond 10,000 years. Even the license application estimates non-zero releases, though they are much lower than the releases estimated in the EIS. It should be noted that the DOE license application ignores certain corrosion phenomena that could cause large releases and that have led more than one expert to conclude that DOE proposal for disposal of spent fuel in Yucca Mountain is unsound. (See the attached Waste Confidence report by Dr. Arjun Makhijani, where the quotes, analysis, and citations can be found). The analyses by the Department of Energy contradict the assertion made by the STP Environmental Report at section 5.7.6 that there will be no significant releases of radiation related to the disposition of spent nuclear fuel and high-level waste.

Accordingly, the STP Environmental Report should be disregarded or withdrawn and resubmitted with an analysis of the environmental and public health impacts of releases of radiation related to disposition of high-level wastes and spent fuel as projected by the EPA and DOE.

5. Because no spent nuclear fuel and high-level radioactive waste repository site is now available and future availability of such site is problematic, the COLA adjudication should consider the environmental consequences and public health impacts from long-term storage of high-level waste and spent fuel on site at STP Units 3and 4.

The STP Environmental Report at page 5.7-6 concedes that there is "uncertainty associated with the high-level waste and spent fuel disposal component of the fuel cycle." Despite this uncertainty, the STP Environmental Report does not consider the long-term environmental and public health consequences of high-level waste and spent fuel remaining on-site indefinitely. Moreover, the Environmental Report makes no attempt to identify any other plant or facility to deal with radioactive wastes generated by STP Units 3 and 4 other than Yucca Mountain and that facility would have inadequate capacity to handle waste from Units 3 and 4. See Contention No. 3. However, the STP Environmental Report does anticipate the possibility of obtaining a 10 CFR Part 72 license for an independent storage of spent nuclear fuel and high-level radioactive waste facility. STP Environmental Report, Table, 1.2-4, page 1.2-15/16. Further, the site layout in the STP Environmental Report, figure 1.1-1, p. 1.1-5, indicates that a dry cask storage facility is anticipated. However, while a dry cask facility is designated in the site layout drawing there is no assignment of a specific location on the site where the dry casks are to be situated.

On the one hand, the STP Environmental Report recognizes the uncertainty surrounding spent nuclear fuel and high-level waste disposition. Accordingly, there is some anticipation in the Environmental Report that dry cask storage capacity will be required for wastes generated at STP Units 3 and 4. However, the Environmental Report for STP Units 3 and 4 is deficient and inadequate because it fails to analyze the environmental and public health implications that will occur as a result of the absence of a permanent disposal repository for high-level waste and spent nuclear fuel and the radiological consequences that would result on site. Additionally, the NRC has failed to adequately determine the

degree of confidence the public should have regarding whether the spent nuclear fuel and high-level wastes from Units 3 and 4 will ever be dispositioned in a federal geologic repository or, alternatively, whether alternative off-site disposal capacity will be available. Final Waste Confidence Decision, 49 Fed. Reg. 34, 658 (August 31, 1984).

Long -term high level waste and spent fuel management on-site represents risks that are not assessed in the Environmental Report. This is a glaring omission and defies both the history of efforts to solve problems related to the back end of the uranium fuel cycle and obvious risks associated with long term on-site presence of spent nuclear fuel and high-level wastes.

Dry cask storage represents a serious risk for extensive radiological harm if, for example, the storage units were attacked by motivated terrorists. The dry cask storage units represent high-value stationery targets that, if breached, could contaminate widespread areas with long-lived radionuclides. Therefore, risks associated with on-site long term/permanent dry cask storage should be considered in the COLA.

Even if the dry cask storage units are not breached they still represent significant long-term sources of radiation. These radiation exposures should be calculated and added to the current projections for exposures to the extent that the Environmental Report understates such based on the assumption that spent fuel will eventually be moved off-site. The COLA should assume that the dry cask storage units will remain on Comanche Peak's site indefinitely and make radiation exposure projections accordingly. See also: Thompson Declaration, pp.9-13, attached.

Accordingly, the Petitioners contend that the STP Environmental Report is seriously flawed and incomplete because it fails to consider the public health and environmental consequences of long-term/permanent spent fuel and high-level waste management at STP. Therefore, the STP Environmental

Report should either be disregarded or withdrawn by the Applicant and amended to account for the public health and environmental consequences of long-term management of spent nuclear fuel and other high-level wastes.

6. The COLA adjudication should consider the public health impacts and environmental consequences of requiring governmental units to become the custodian of high-level waste and spent nuclear fuel at the STP site after the operating license has terminated and post-closure activities have been completed.

Based on the assumption that a federal repository will not be available for spent fuel management, the COLA should consider the environmental and public health consequences of either of the State of Texas or the United States government becoming the *de facto* custodians of spent fuel and high level wastes at the STP site after the operating license has terminated and post-closure activities of the licensee have been completed. If, at the end of the post-closure responsibilities of the licensee, spent fuel remains on site it will have to be managed and secured for the indefinite future. The only institutional capacity for long-term spent fuel management is a unit or units of government. To the extent that units of government are responsible for managing on-site spent fuel, calculations for employee exposures and public exposures should be included in the COLA. Additionally, other public health and environmental consequences reasonably associated with indefinite governmental management of spent fuel on site should also be considered in the COLA.

The STP Environmental Report should also consider specifically what governmental entity will actually have legal ownership of the spent fuel and high-level waste after the operating license has terminated and post-closure activities have ceased. Will the ownership of the spent fuel default to some unit of government? If so, what costs can be reasonably anticipated by the *de facto* custodian/owner of

spent fuel? Do the costs anticipated have environmental and public health consequences? The STP Environmental Report should resolve these questions.

Accordingly, the Petitioners contend that the STP Environmental Report should either be disregarded or, alternatively, withdrawn and amended to resolve the questions related to long-term custody and ownership of spent nuclear fuel and high-level waste that remains on-site indefinitely. Additionally, the STP Environmental Report should quantify the costs related to the long-term custody in ownership of spent nuclear fuel and high-level radioactive waste that remains on site at the termination of an operational license and post-closure activities.

7. The COLA should consider environmental impacts and public health consequences of accidents and releases related to off-site radioactive waste disposal.

The STP Environmental Report assumes that there will be no significant radioactive releases to the environment related to off-site disposal of the radioactive waste streams that originate at Units 3 and 4. STP Environmental Report, Sec. 5.7-8. The COLA should not adopt this assumption. The COLA should fully consider the public health and environment consequences of major releases to the environment of radioactive materials as a result of off-site disposal activities. The off-site releases could originate from on-site processing, transportation accidents, off-site processing, and long-term releases from the disposal site because of either improper or inadequate waste site characterization, natural events such as earthquakes, and intentional or unintentional releases. Irrespective of the cause of the releases such should be considered for the impacts to the environment and public health consequences.

8. The COLA is inadequate because it fails to fully analyze the radiological hazards that will occur from operation of the STP Units 3 and 4 nuclear plants based on discharge of water that contains radioactive particulates to the Main Cooling Reservoir (MCR).

The STP 2007 Environmental Operating Report states that the MCR is the receiving waterbody for radioactive water discharged from STP 1 and 2. MCR would also be the discharge waterbody for Units 3 and 4. Environment Report, Sections 5.4.1., 5.4.2.1. The MCR is contaminated by plant wastes that, at a minimum, include tritium and Cobalt-58 and Cobalt-60 according to the 2007 STPNOC Radiological Operating Report, pp. 6-7, 6-8.

Figure 6-9 in the 2007 STP Radiological Environmental Operating Report indicates that most years the tritium radioactivity in surface water exceeds 10,000 pCi/KG. The addition of Units 3 and 4 will increase tritium discharges to the atmosphere via the stacks that will contaminate rainwater and affect both the cooling pond and groundwater.

Tritium is an isotope of hydrogen and although it occurs naturally nuclear power plants are by far the greatest source of tritium in the environment. Tritium has a half-life of about twelve years and emits low-energy beta particles. Tritium has health effects. Among other things, tritiated water can irradiate a large number of cells cross the placenta and cause effects on developing fetuses. Nuclear Wastelands: A Global Guide to Nuclear Weapons Production and its Health Effects, Makhijani, et al., eds, (MIT Press 1995) p. 97.

Tritium is a pernicious problem for STP. In addition to being ubiquitous in surface water (tritium found in all six surface water bodies, Environmental Report, p.2.3.3-2) it is also commonly found in the MCR pressure relief wells (Environmental Report, p. 2.3.3-2) and in the shallow aquifer groundwater

beneath and around the plants. (Environmental Report, p. 2.3.3-4). The site with the highest mean annual tritium levels was 3.8 miles south of Units 1 and 2. STP Environmental Report, p. 2.3.3-4.

According to the 2007 STP Radiological Environmental Operating Report tritium radioactivity in MCR relief wells generally is between 5000 and 10,000 pCi/KG. Operation of the proposed STP Units 3 and 4 these levels could increase tritium levels. Current tritium radioactivity and shallow aquifer groundwater generally averages between 5,000 and 10,000 pCi/KG. STP 2007 Environmental Report, pp.6-9, 6-10, figures 6-9, 6-11. Tritium contaminated groundwater could also migrate with off-site radiological consequences. See Report of George Rice, attached.

Radioactive particulate from plant operations has also been found in the MCR sediment. Specifically, cobalt-58 and cobalt-60 have been detected in the sediments of the MCR. According to the 2007 STP Radiological Environmental Operating Report, radioactive decay is the only mechanism for removal of the cobalt radioactivity from the MCR. While there has been a decrease in the radioactivity found in sediment samples from the MCR (2007 STP Radiological Environmental Operating Report, Figures 6-6, 6-7, p.6-7) it could reasonably be anticipated that operation of proposed units three and four would effectively increase the levels of particulate radioactive contaminants in the MCR.

In effect, the MCR is and will continue to be an unlicensed radioactive waste disposal facility for STP operations. Discharging radioactive particulate and tritium into the MCR hardly meets the definition of "disposal" under 42 USC 2021b that requires "permanent isolation" of radioactive materials. Notwithstanding this definitional requirement, and as conceded in the 2007 Radiological Report Environmental Report, there is no plan to do anything to remove or remediate the radioactive contamination that is systematically being discharged into the MCR. Rather, the Applicant evidently will rely solely on the mechanism of radioactive decay for its "removal". 2007 STP Radiological Environmental Operating Report, Figures 6-6, 6-7.

The STP Environmental Report implies by the absence of any discussion to the contrary, that the embankment that forms the MCR will remain intact and structurally reliable for an indefinite duration of time. There is no discussion in the Environmental Report of any contingencies for embankment failure or the environmental and public health consequences if radioactive laden sediment is transported downstream as a result. The embankment that forms the MCR is a man-made structure that presumably has a useful life. However, while the Applicant acknowledges the radiological impact of the deposition of tritium and radioactive particulate matter in the MCR, there is no attempt to analyze the environmental or public health impacts of this circumstance. Likewise, there is no discussion of the downstream mortality and morbidity impacts that would be expected in the event of a failure of the embankment and a transport of radioactive sediments and water downstream. The assumption that the embankment will remain intact indefinitely and/or longer than the hazardous life of the radioactive particulates in the settlement of MCR is unreasonable and should be rejected in this adjudication.

Additionally, the STP Environmental Report assumes that the MCR will always have sufficient inflow of water to keep the sediment intact at the bottom of the reservoir. However, anticipation of protracted drought and the expected effects of global warming require a contingency that assumes dewatering of MCR. In the event that MCR eventually becomes a dry lakebed the sediment will turn to dust and the radioactive particles will be subject to airborne transport. These radioactive particulates would eventually be transported to, among other places, the Houston metroplex and cause human exposures with attendant mortality and morbidity consequences. The STP Environmental Report has no discussion about such a contingency. Instead, the Environmental Report assumes that there will always be sufficient water to stabilize the sediment in MCR and prevent it from becoming airborne. This is a dubious assumption particularly in Texas that frequently experiences protracted droughts. For example, as recently March 6, 2009, Governor Rick Perry requested the U.S. Secretary of Agriculture to declare all 254 counties in Texas a disaster area because of severe drought. Likewise, the Environmental Report

characterizes the sale Texas area as one that experiences protracted drought. STP Environmental Report, p. 2.3.1-2.

Moreover, the Applicant assumes that there will be adequate inflow to MCR to provide a dilution factor that will be sufficient to avoid excessive tritium levels. STP 2007 Environmental Report p. 6-8. The Applicant fails to make any allowance for protracted drought or the effects of global warming that are anticipated to cause an intensification of protracted drought periods. Environmental Report, p. 2.3.1-2.

MCR is a radiological problem for the applicant and instead of addressing it in an affirmative manner the Applicant is willing to simply ignore it and rely on natural forces to take care of its radioactive waste problem. The Applicant is gambling that the embankment will be stable for the duration of the time that the radionuclides in the sediment remain hazardous. The applicant is also gambling that there will always be adequate water to prevent the MCR from becoming a dry lakebed and allowing airborne radionuclides to be transported by wind. These are unacceptable risks given the radiological hazards that are attendant thereto.

Accordingly, the Petitioners contend that the Environmental Report and FSAR should be either disregarded in this adjudication or withdrawn by the applicant and amended to address the radiological hazards that are anticipated to occur as a result of using MCR as a radioactive waste disposal facility.

9. Increasing Levels of Groundwater Tritium. The Environmental Report fails to predict or evaluate the effects of increasing groundwater tritium concentrations.

In support of this contention Petitioners reference D. Lauren Ross, Ph. D., P. E. Report, p. 5.

10. The Main Cooling Reservoir (MCR) will be in a near- state of design basis flood level with operation of all four plants. The reactor buildings, buildings, ultimate heat sink water storage basins, and the residual service water pump houses are below the design basis flood level and thus vulnerable to flooding.

Assuming STP Units 3 and 4 become operational they would increase to the normal operating water level of the Main Cooling Reservoir (MCR) from 47 ft. MSL to 49 ft. MSL. Environmental Report, Sec. 5.3.1. The MCR design basis flood (DBF) elevation is 48.5 ft. MSL. STP Environmental Report Section 2.3.1.1.3, p. 2.3.1-5. According to the FSAR the DBF for STP Units 3 and 4 is 48.5 ft.MSL. FSAR 2.4S.10. Therefore, based on the Applicant's data, the MCR will be in a near DBF level the entire time that all four units would be operational. This causes Units 3 and 4 particularly vulnerable because significant parts of the units are below 48.5 MSL.

According to the FSAR, Sec.2.4S.2, the maximum flood elevation of 48.5 ft MSL was determined at the STP 3 & 4 site based on the MCR embankment breach. The flood elevation of 48.5 ft MSL also constitutes the DBF at the site. The MCR embankment breach flood level is above the site grade and the ground floor elevation of the safety-related components in the power block area. Therefore, all power block safety related structures require appropriate flood protection measures below elevation 48.5 ft MSL, including water tight doors and components that will prevent flooding of the safety-related SSCs. The UHS and reactor service water (RSW) pump house is contiguous with the UHS basin. The UHS basin and RSW pump house are water tight below elevation 50 ft MSL. The flood protection requirements at FSAR 2.4 S.10 require watertight structures and openings for plant and equipment below 48.5 feet MSL.

However, the fact that the MCR will be above the DBF elevation when all four units are operational means that much of the plant and equipment related to Units 3 and 4 will be in a continual state of vulnerability due to flooding. In order to avoid major operational interruptions and damage to the plant it is crucial that the administrative requirements related to maintaining the power block in a watertight status are observed. The FSAR 2.4S.2 recognizes this vulnerability:

> An MCR embankment breach near the STP 3 & 4 power block area would not provide sufficient time for implementation of emergency operating procedures or flood warning systems. As all water-tight doors and hatches are to remain in a closed position, no emergency operating procedures or plant Technical Specifications (plant shutdown), which are discussed in Subsection 2.4S.14, are required for implementation of flood protection measures.

The Petitioners contend therefore, that the COLA adjudication address the operation of Units 3 and 4 and determine whether an MCR DBF of 48.5 feet MSL puts the units in an unreasonably vulnerable status due to flooding.

11. The COLA is inadequate because it assumes there will be an adequate supply of fresh water for purposes of plant operations. This assumption is faulty because of the failure of the STP Environmental Report to analyze impacts of global warming on rainfall and the hydrological cycle.

Global warming and its impacts on rainfall are better understood now and must be considered in the context of determining whether adequate water resources will be available for nuclear plant operations. It is clear that nuclear plants require enormous amounts of water for operations. In fact, the STP Environmental Report states that over 42,000 gpm will be required for Units 3 and 4 under normal operating conditions and over 44,000 gpm at maximum operating conditions. STP Environmental Report, Sec. 5.2.2.1. The Comanche Peak Environmental Report assumes that there will be adequate water resources for purposes of plant operations associated with STP Units 3 and 4. Environmental Report, Sec.

5.2.1. However, impacts from global warming will include protracted drought that may seriously compromise water resources required for plant operations. This area of Texas is already described in the Environmental Report as being subject to protracted droughts. Environmental Report, p. 2.3.1-2. The compromised water resources should be considered from a quantitative perspective and a temperature sensitive analysis since plant operations are dependent on a narrow band of temperatures for plant operations.

For example, in the event of a protracted drought and inadequate flow into the MCR the radioactive contaminated sediment layer could become exposed and, if adequately deliquified, would become dust and subject to transport by wind with anticipated public health and environmental consequences. Therefore, it is crucial that the COLA include a complete radiological profile of the existing sediment in the MCR and an analysis of the cumulative radiological impacts expected from operations on it from Units 3 and 4. This analysis is required in order to fully gauge the environmental and public health impacts from the use of the MCR as a discharge point for radioactive effluent from STP Units 3 and 4.

Part of this analysis should be an assumption that the MCR embankment will at some point fail and release the sediment that is burdened by radioactive particulates. Downstream impacts on water quality, use, and impacts on mortality and morbidity must be a part of the COLA. The MCR embankment should also be analyzed for structural integrity. Protracted drought, seismic activity or other natural events have the potential to weaken the embankment and if a failure of the structure occurs radioactive sediment could be carried downstream with significant potential for environmental and public health impacts. Additionally, given the very long term nature of the radiological hazard represented by the accumulation of radioactive particulates discharged during plant operations, it should be assumed that the reservoir will require, at a minimum, management and perimeter security for a time that extends far beyond the termination of the operation license.

Questions surrounding post-license ownership of and responsibility for MCR should be addressed and resolved in the COLA. Accordingly, the COLA should fully consider the structural reliability of the MCR embankment and analyze adverse environmental and public health consequences that could occur as a result of its failure.

The COLA should also include an analysis of pollution impacts downstream from water contaminated by chemical treatment such as biocides, algaecides, pH adjustors, corrosion inhibitor and silt dispersant chemicals injected at the reactor site as well as chlorine, salts and non-radioactive effluent. The differential impact of treatment of 100 percent of the water effluent versus the lesser amount of treatment proposed by the Applicant should be considered.

The COLA should also consider whether regional waterways will be impacted in terms of water quantity and quality by the use of vast quantities of water for Units 3 and 4. The potential to increase salt content of waterways in the region by further drawdown of water levels, including impacts to the local aquifer and drinking wells, should be examined thoroughly in the COLA. Coastal environmental impacts are known to result from alterations of freshwater flow into the Gulf of Mexico, affecting lagoons, estuaries and wetlands, altering salinity patterns, nutrients, dissolved oxygen levels and therefore impacting productivity of coastal plant and animal populations. The biological impacts must be considered in the COLA including the possibility of eutrophication, productivity and sediment impacts and potential contamination. **See Lauren Ross Report**, attached.

The most prevalent global warming impacts come from increased heat and humidity in the atmosphere. At a nuclear power plant two-thirds of the heat energy gets emitted into the air and heated water vapor is released into the air. Thus, nuclear reactors themselves are global warming agents in terms of heat including water vapor from steam and heat radiating from cooling towers and ponds. The COLA

should contain an analysis of the production of heat energy emitted into the atmosphere and water by STP Units 3 and 4 in terms of contributions to global warming.

12. Insufficient TPDES Permit Effluent Limits. The proposed Texas Pollution Discharge Elimination Permit fails to establish necessary effluent limits for the range of toxic and harmful chemicals that have been documented to be present or are possibly present in the power plant effluent.

In support of this contention Petitioners reference D. Lauren Ross, Ph. D., P. E. Report, p. 7.

13. Reliance on Dilution to Achieve Discharge Standards. The Environmental Report discusses the importance of dilution of nuclear power plant wastewater to meet discharge standards, but neglects to evaluate the relationship between a slightly larger effective Main Cooling Reservoir volume and the additional waste loads from doubling the electrical generation capacity.

In support of this contention Petitioners reference D. Lauren Ross, Ph. D., P. E. Report, p. 9.

14. Unregulated Wastewater Discharge. A regulatory loophole has allowed a primary discharge of wastewater from the existing facility to be unregulated. The proposed expansion would be operated under the same regulatory framework. The harm caused by this regulatory failure will be magnified by the proposed addition of two additional nuclear powered generating plants.

In support of this contention Petitioners reference D. Lauren Ross, Ph. D., P. E. Report, p. 9.

15. Unevaluated Reduction in Surface Water Flow. The Environmental Report fails to evaluate the effect of Colorado River withdrawals of up to 48% of the river flow on the river and estuary resources. The Environmental Report fails to demonstrate the availability of necessary surface water from the Colorado River during drought conditions. The Environmental Report also fails to evaluate the effect of increased groundwater withdrawals on flow in adjacent streams and rivers including the Colorado River.

In support of this contention Petitioners reference D. Lauren Ross, Ph. D., P. E. Report, p. 11.

16. Unevaluated Reduction in Groundwater Supply for Adjacent Landowners. The Environmental Report fails to provide adequate information regarding the effect of the expansion on the availability of groundwater from the regional Gulf Coast Aquifer. A determination of key information necessary for an analysis of impact is deferred to a later detailed engineering phase. Information provided in the Environmental Report underestimates the predicted effect of the proposed expansion on groundwater availability to wells on adjacent property.

In support of this contention Petitioners reference D. Lauren Ross, Ph. D., P. E. Report, p. 14.

17. The Applicant's calculations of radiation doses to the general public as a result of consuming radioactively contaminated fish and invertebrates are incorrect. The calculations are done using the LADTAP II model which is obsolete and systematically underestimates doses to the public.

The STP Environmental Report uses the LADTAP II to calculate estimated radiation doses caused by radionuclide releases as liquid effluents from light water nuclear reactors during routine operations. STP Environmental Report, p.5.4-1,2. However, as analyzed by Arjun Makhijani, Ph.D., the LADTAP II program is woefully out of date and grossly underestimates radiation exposures. Makhijani Declaration, attached. Therefore, the data in table 5.4-8 are unreliable.

Based on those data, the applicant asserts that it is unlikely that any individual would receive the doses of the magnitude calculated in table 5.4-8. In fact, because LADTAP II so grossly underestimates the actual maximum individual does from liquid effluents the actual exposures would be significantly higher. One comparison of the results of the LADTAP II model with an updated version, LADTAP XL, shows that LADTAP II underestimates doses from commercial fish by almost eight times; it underestimates doses from saltwater invertebrates by over 700 times. While the specifics of this study relate to the Savannah River facility, the systematic underestimation of doses is inherent in the model since the doses are calculated for the same source term for each case and each radionuclide. Further, the dose conversion factors used even in the more recent model are for adults. The factors for children are considerably higher and under many circumstances, doses to children from the same environmental contamination are higher than those for adults even when differences in consumption are taken into account. The FSAR needs to be completely redone using the most recent validated approaches for estimating dose and estimating dose to the most exposed members of the public.

Accordingly, The Petitioners contend that the STP Environmental Report that represent the estimated maximum individual dose limits from liquid effluents based on LADTAP II should be either disregarded in this adjudication or withdrawn by the Applicant and amended using LADTAP XL as the analytical tool to determine individual doses from liquid effluents. Moreover, any other exposure data derived from the LADTAP II model should likewise be rejected.

18. The STP Environmental Report concedes that in order to support the uranium fuel cycle for STP 3 and 4 at least 21 acres off-site will never be available for future use. The COLA adjudication should require that the Applicant explain the basis for the permanent dedication of these 21 acres to nuclear operations and specify the means by which the 21 acres will be secured and maintained in perpetuity.

According to the STP Environmental Report to support STP Units' fuel cycle requirements at least 21 acres "will never be available for future use." STP Environmental Report, Table 10.1-2, p. 10.1.13. Presumably the 21 acres specified in Table10.1.2 is the same 21 acres called out in the Environmental Report at Sec. 10.1.2.1. The evident permanent dedication of these 21 acres to STP operations requires additional explanations. Specifically, why will the 21 acres never be available for future use? If this dedication of land is related to the UFC such should be specified and quantified for each stage of the UFC. How was the quantity of 21 acres determined? For example, at the front end of the fuel cycle what assumptions were made about the locations and quantity of land required for mining? And at the back end of the cycle, what assumptions were made about availability of and land quantities for offsite waste disposal, including decommissioning?

While 21 acres may seem a modest amount of land to permanently lose to accommodate STP 3 and 4 operations, the consequences of having even this relatively small portion of land permanently dedicated to plant operations is the manifestation of a nuclear wasteland. The STP Environmental Report fails to consider the long-term consequences related to these 21 acres of nuclear wasteland. The COLA adjudication should admit a contention related to both the underlying reasons why the 21 acres will "never be available for future use" and the radiological consequences thereof. Further, the Applicant should specify the means by which these 21 acres would be secured and maintained in perpetuity. This is particularly important since the Environmental Report concedes that there are no practical means to mitigate this impact. Environmental Report, Table 10.1-2, p. 10.1-13.

19. The STP Environmental Report states that an unquantified amount of land onsite will be dedicated to licensed radioactive waste disposal facilities and be unavailable for other uses. But the Applicant has failed to specify the location onsite for the disposal facility and has not applied for the necessary permit for such activities pursuant to 10 CFR Pt. 72.

The STP Environmental Report, Table 10.1.2, p. 10.1-13, states "some onsite" land will be "dedicated" to disposal of radioactive wastes. To the extent that the land in question is intended for a radioactive waste disposal site such should be licensed pursuant to the requirements of 10 CFR Pt. 72. The assertion in the Table 10.1.2 states conclusively that some onsite land will be used for radioactive waste disposal. However, the Applicant has no current application for 10 CFR Pt. 72 activities.

Additionally, the Applicant specifies in its Site Layout, Environmental Report, Figure 1.1-1, p.1.1-5/6, that item 30 is designated as "Dry Cask Storage (TBD)". The Site Layout does not identify the particular plot of land anticipated for this purpose.

Hence, the Applicant states that there will be some portion of the STP site dedicated to radioactive waste disposal and denotes this function on its site layout but neither specifies the location on the site layout nor obtains the required permit under 10CFR Pt. 72 for an activity it anticipates as part of plant operations.

20. The uranium fuel cycle has substantial greenhouse gas impacts must be considered in each phase of the uranium fuel cycle.

The COLA should carefully consider the greenhouse gas impacts that are unavoidable as a result of mining, processing, fuel fabrication, transportation, fuel burn up, waste streams management,

decommissioning and long-term site maintenance that are an integral part of the uranium fuel cycle. While the proponents of expanded nuclear power posit that there will be fewer greenhouse gases produced as a result of the operations of STP Units 3 and 4 compared to fossil fueled plants, there are inevitable greenhouse gas emissions associated with each phase of the fuel cycle. These conditions need to be carefully considered to determine the full impact of STP Units 3 and 4.The decision in *Massachusetts V. EPA*, 549 U.S 497 (2007) requires that carbon dioxide be considered a pollutant under the Clean Air Act. Carbon dioxide emissions are inevitable in, *inter alia*, the mining of uranium and production of fuel for nuclear plants. Likewise, carbon dioxide emissions can be anticipated during construction and routine operations of a nuclear plant and are foreseeable as a plant is decommissioned. See eg. STP Environmental Report, Table 10.1-1, p.10.1-1, (increased traffic) and p 10.1-2 (increased air emissions from construction). Any benefits derived by operation of a nuclear plant in terms of avoidance of greenhouse gases should be considered in light of greenhouse gas production as it occurs in various stages in the fuel cycle. Petitioners contend the COLA should include such an analysis.

The STP Environmental Report also fails to carefully compare the greenhouse gas effects expected from each of the alternative technologies and their relative costs. This analysis is crucial because of the relationship between greenhouse gases and global warming and because it is expected that the use of fossil fuels to support the uranium fuel cycle will become more expensive over time. This circumstance will be aggravated by the anticipated use of foreign produced uranium that will have a greater greenhouse gas impact because of, among other reasons, longer transportation supply lines. In contrast, renewable fuel technologies are expanding manufacturing capacities domestically. Hence, the COLA should project anticipated greenhouse gas emissions related to the competing technologies.

21. Impacts from severe radiological accident scenarios on the operation of other units at the STP site have not been considered in the Environmental Report.

STP Units 3 and 4 are proposed to be co-located with STP Units 1 and 2. STP Environmental Report Sec. 1.1, p. 1.1-1. This has potentially significant implications in the event that a major radiological accident or release occurs at any one of the four operating units. The STP Environmental Report at Chapter 7 deals with severe accidents but has no discussion or analysis of the impact of a severe radiological accident at any one of the four units as it would impact the other remaining three units. There is no discussion or analysis of how operations at undamaged units would be continued in the event that the entire site becomes seriously contaminated. Moreover, there is no discussion of how the other units would be protected in the event of a major fire or explosion at one of the other units. Petitioners contend that the location of the STP Units 3 and 4 with Units 1and 2 should be considered in light of various accident and radiological release scenarios. The STP Environmental Report implies by the absence of any discussion or analysis this regard that a serious accident or radiological release at one plant would have no adverse affects on the operations of the remaining units. Petitioners contend that this is a serious analytical flaw in the Environmental Report.

Accordingly, the Petitioners contend that the failure to consider disruptions in operations due to an accident or radiological release from one unit and the collateral impacts on undamaged units renders the discussion of serious accidents in chapter 7 of the Environmental Report seriously flawed.

22. The COLA should consider all radiological, environmental and public health impacts related to decommissioning of STP Units 3 and 4.

The STP Environmental Report acknowledges that it does not provide definitive plans for decommissioning because detailed analyses are not done until a decision has been reached to cease plant operations. STP Environmental Report, p. 5.9-2. However, according to the NRC's requirements at 10 CFR 20.1003, *"Decommission* means to remove a facility or site safely from service and reduce residual radioactivity to a level that permits-- (1) Release of the property for unrestricted use and termination of the license; or (2) Release of the property under restricted conditions and termination of the license."

Of the three decommissioning methods suggested by the STP Environmental Report two assume removal of some or all of the plant from the site. Presumably all three methods assume that spent fuel will be dispositioned offsite. The third method that assumes no removal of the plant from the site anticipates that it would be maintained *in-situ* until the radioactivity decays reach a level that permits termination of the license. STP Environmental Report, Section 5.9.

The assumptions that underpin STP's decommissioning plans are unreasonable. First, there is no indication that spent fuel and high-level radioactive waste will ever leave the plant site. Moreover, the assumption the parts of the plant would be removed and dispositioned elsewhere is likewise unreasonable because no such facility currently exists nor is projected to exist in the future. Finally, a third alternative that would leave the plant intact and encased in concrete assumes that it would remain *in situ* indefinitely. There is no projection for custodial and maintenance costs related thereto.

Decommissioning has its own waste stream issues, as well. The COLA should consider the radiological and public health impacts, environmental justice and other implications of disposition of highly irradiated materials off-site.

Additionally, the COLA should consider whether off-site disposition of decommissioning materials is even feasible. The decommissioning of nuclear plants is an evolving technology and the land use, environmental and public health implications of decommissioning activities are not well understood. The COLA should fully analyze the probability that there will be significant resistance to transportation and disposition of highly irradiated decommissioned plant materials to a remote site.

The assumption appears to be that adequate technologies will be developed in the future. Environmental Report, p. 5.9-2. However, the COLA should consider the scenario that adequate technologies for decommissioning are not developed in the future or prove inadequate for the task. The COLA should take into account contingencies that would require indefinite secure storage of STP Units 3 and 4 because either decommissioning technology is inadequate or there is no remote site available to disposition wastes from decommissioning activities. This analysis would require a consideration of radiological impacts related to the indefinite delay in decommissioning and public health and environmental consequences related thereto.

Accordingly, the Petitioners contend that the decommissioning discussion in the STP Environmental Report should be rejected in the COLA adjudication or withdrawn by the applicant and amended to make realistic assumptions about the decommissioning Of STP Units 3 and 4.

23. The STP Environmental Report is inadequate because it fails to make reasonable assumptions about alternatives to the proposed action of constructing and operating STP Units 3 and 4.

The STP Environmental Report generally understates the efficacy of alternative sources of electric power generation. Environmental Report, p. 9.2-1, et seq. The COLA should evaluate alternative

sources of generating capacity based on the current data available regarding capacity factors, technological advances that overcome intermittency objections regarding wind and solar power, and historical operational experience.

The STP Environmental Report assumes that renewable fuels such as wind and solar cannot provide adequate baseload generating capacity. However, recent advances in technology such as compressed air energy storage that have been used to design baseload wind energy as well as molten salt storage associated with concentrating solar thermal power plants show that of the Environmental Report's assumption that solar and wind cannot supply dispatchable electric power are because they are intermittent are not correct. Additionally, events on the ground are overtaking the assumptions about renewable fuels made in the Environmental Report. Expansions of renewable energy capacity occur daily. In contrast, nuclear powered capacity, as a percentage of total generating capacity, is shrinking. The COLA should evaluate the competing technologies in light of current energy policy that places a greater emphasis on renewable fuels than on previous energy policy that favored nuclear power and fossil fuels.

Moreover, the technique of analysis used in the STP Environmental Report to determine the relative advantages of renewable fuels compared to nuclear power is inherently flawed. For example, the Environmental Report essentially eliminates conservation/energy efficiency as an alternative that should be considered. p. 9.2-3. The Environmental Report excuses the consideration of conservation/energy efficiency because STP Units 3 and 4 will be merchant power plants intended to generate baseload power. Environmental Report Sec. 9.2 and 9.2.1.3. STP conclude that since Units 3 and 4 are intended to generate baseload power it is not required to consider demand side management (DSM). *Id.* However, the COLA adjudication should not be subject to such an artificial constraint. This is particularly the case because one the projected owners is City Public Service Board of San Antonio (CPS). Environmental Report, Sec. 1.1.2.1.

As a municipal supplier CPS would not function as a merchant power plant owner and would be required to factor in DSM as an alternative to adding new nuclear generating capacity. The Environmental Report is also flawed to the extent that it fails to make a realistic comparison between the environmental impacts and public health consequences (externalities) of nuclear power compared to renewable fuels. For example, there should be a side-by-side comparison of mortality and morbidity consequences of nuclear power compared to renewable fuels in order to accurately determine the consequences of each. Of course, the comparisons would indicate that renewable fuels do not cause increased mortality and morbidity while nuclear fuel clearly does.

Additionally, there should be a side-by-side comparison of nuclear fuels and renewable fuels related to the effects of catastrophic accidents. Such a side-by-side comparison would indicate that a catastrophic loss of, for example, a wind generating capacity would be negligible compared to a major loss of cooling accident at STP Units 3 and 4. The COLA should engage such a comparative analysis in order to fairly determine the environmental consequences and public health impacts of each.

The South Texas Project license application states “STPNOC has determined that geothermal is developed and proven; however, because there are no known shallow high-temperature geothermal sources in the ERCOT region, the potential for future geothermal power generation utilizing currently available is inadequate to supply the power of STP 3 & 4. The generation of electricity from geopressured reservoirs or hot wastewater from deep oil and gas wells is in the early stages of development, and STPNOC believes that this technology has not matured sufficiently to support production for a baseload facility. For these reasons, geothermal power is not feasible alternative for baseload power in the ERCOT region.” Section 9.2.2.3.4, Page 9.2-10.

However, South Texas Project should re-examine their conclusion since the Texas Bureau of Economic Geology estimates that as much as 20,000 MW of renewable geothermal power lies under the state, enough yearly power to meet one-third of Texas' generation.[5]

Integrated Gasification Combined Cycle power plants using different kinds of biomass is a proven technology to supply dispatchable electricity as well as combined heat and power. This alternative also needs to be examined.

The South Texas Project license application states "STPNOC has determined that wind energy is developed, proven and available in the ERCOT region at the star of commercial operation of the proposed project; however, the capacity factor for wind energy is inadequate to provide baseload power. In addition, wind energy has large land use requirements and the associated construction and ecological impacts. For these reasons, wind power alone is not a feasible alternative for baseload power in the ERCOT region. However, wind power could be included in a combination of alternatives to the proposed project." Section 9.2.2.2, Page 9.2-6

It should be noted that wind power can be combined with storage technologies, notably ice-energy storage at the consumer end. By making ice when the wind blows and using the ice for air conditioning, wind energy can be converted into dispatchable energy for peak and intermediate electricity loads that are due to air conditioning.

It is also very misleading to state that wind energy has "large land use requirements." While the area of wind farms is large, the footprint of wind facilities is only on the order of five percent of the wind

[5] Good Company Associates, Harnessing the Geothermal Power Potential of Texas, www.lonestar.sierraclub.org/newsreleases/20090318GeothermaTx.pdf

farm area. The rest of the area can generally continue to be used for farming, ranching and other purposes for which it is currently used.

It is a major deficiency in the license application that the many viable, clean affordable combinations involving wind were not considered, especially in a state that leads the nation in wind power and has already approved additional transmission lines for wind and other renewable power. ERCOT has recently studied compressed air energy storage and found it viable, and the use of energy storage can help wind power become baseload.

Furthermore, in Section 9.2.2.6.1, Page 9.2-18, the license application states "Although individual alternatives might not be sufficient to provide 2700 MWe capacity due to the small size of the resource or lack of cost-effective opportunities, it is conceivable that a mix of alternatives might be cost-effective and may also provide a better environmental solution. There are many possible combinations of fuel types to generate 2700 MWe, and STPNOC has not exhaustively evaluated each combination."

There is no good excuse as to why these potentially cost effective and better environmental solutions were not explored. In fact previous studies, including *Energy Efficiency Potential: San Antonio's Bright Future, Arjun Makhijani, Ph.D., October, 2008* have been provided to CPS Energy, a partner in this proposed nuclear expansion project. It is among the many sources that detail several clean, affordable and practicable options.

As further support for this contention Petitioners reference the report produced by Dr. Makhijani that addresses San Antonio's specific circumstances related to additional generating capacity and costs related thereto. *Energy Efficiency Potential: San Antonio's Bright Future*, Arjun Makhijani, Ph.D., October, 2008 is attached hereto.

Finally, research by the National Renewable Energy Laboratory on baseload wind energy is available online at: www.nrel.gov/docs/fy07osti/40674.pdf. This work has also been ignored by the applicant.

As there is no quantified cost comparison of nuclear with energy alternatives, the analysis of energy alternatives in Section 9.2 in the Environmental Report is wholly inadequate. We do not know the estimated total project costs for South Texas Project Units 3 and 4, as the applicants NINA and CPS Energy's cost estimates in Part 1 of the COLA have been withheld from the public for proprietary reasons. CPS, as a municipal utility capable of passing on increased costs to the consumers in the form of rate hikes, has the duty to its ratepayers to publicly disclose its estimated costs, but failed to do so in their first attempted rate hike. Citizen outcry resulted in CPS Energy withdrawing nuclear funding from the rate hike, which was reduced from 5% to 3.5%.

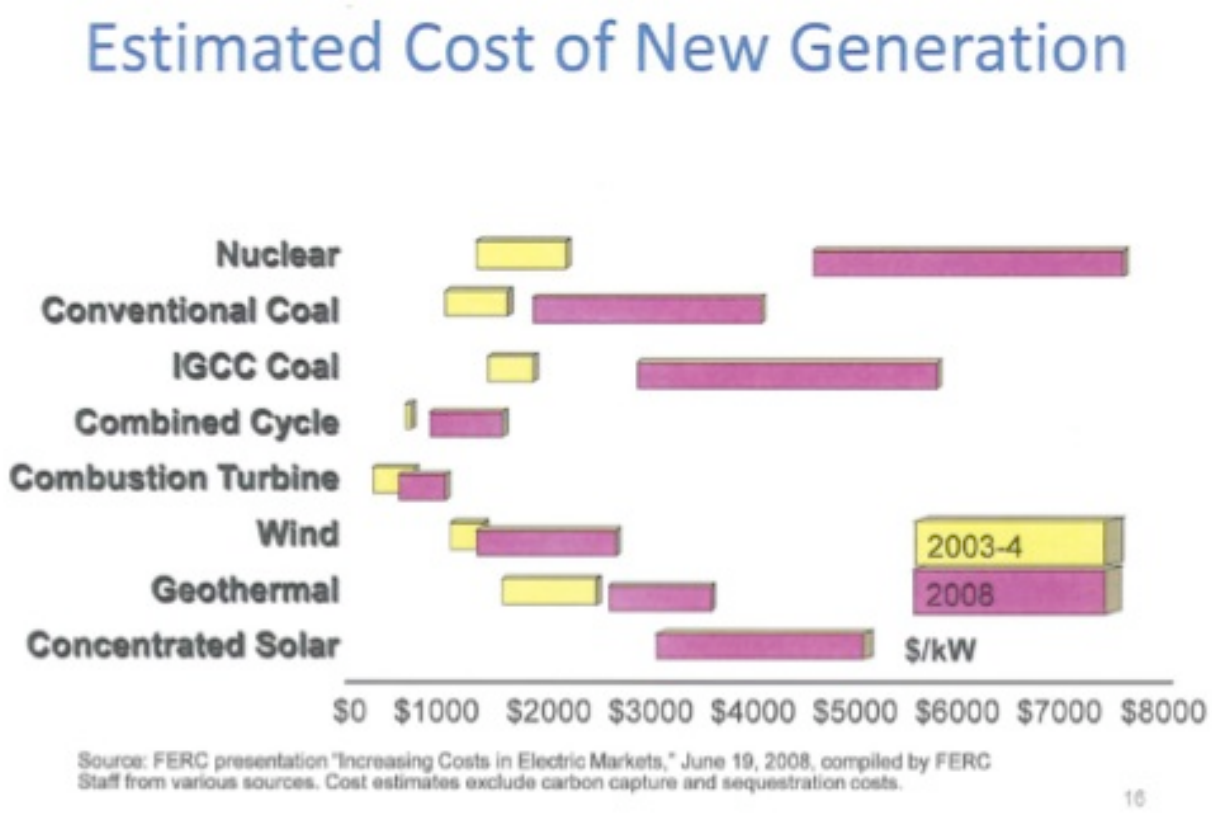
As the Environmental Report does not set forth its estimated costs, a quantified cost comparison of nuclear with other energy alternatives is not possible and was not made in the application. General and unsubstantiated statements in the Environmental Report such as, "the cost to generate electrical power from PV systems is *several times* greater than the cost to generate nuclear power" (9.2-7), "the cost to generate electrical power from CSP systems is *several times* greater than the cost to generate nuclear power" (9.2-8), and "the cost to generate electrical power from biomass systems is *substantially* greater than the costs of nuclear power" (9.2-12) are made without any reference to the estimated cost of nuclear. Furthermore, these claims are false according to the Federal Energy Regulatory Commission and many other sources, which are referenced in the following section.

The lack of a publicly available quantified cost comparison is one example demonstrating how the applicants did not adequately analyze and compare nuclear with other alternative energy sources.

The petitioners contend that a detailed cost analysis and quantified comparison with alternatives must be conducted by the applicants, included in the license application and made available to the public. Federal, industry, independent and investor estimates of nuclear costs and comparisons with alternatives clearly show nuclear as substantially higher in cost than other energy alternatives.

Federal Energy Regulatory Commission

The chart below from the Federal Energy Regulatory Commission (FERC) clearly shows the estimated cost of nuclear as significantly higher than other energy alternatives.



Industry and Independent Analysis

In March of 2008, Dr. Arjun Makhijani assessed the costs for the two proposed reactors at South

Texas Project (report attached). His assessment is derived from the detailed analysis of new nuclear power plant costs filed by the Florida Power & Light (FPL), "the most complete and rigorous analysis of new nuclear power plant capital costs publicly available to date" (Makhijani Cost Report) and based on the same reactor design (ABWR) as the proposed STP Units 3 and 4. Based on this industry analysis, he utilized CPS Energy data to accurately make projections for the costs of STP Units 3 and 4. Dr. Makhijani's report finds that the total costs of the proposed reactors at STP would range from $12 billion to $17.5 billion or $4,500 to $6,500 per kW.

In April of 2009 Clarence Johnson, who has worked at the Public Utlity Commission of Texas and has over 25 years of experience in electric utility regulation, released a report (attached) entitled "Costs of Current and Planed Nuclear Power Plants in Texas: A Consumer Perspective." The analysis in this report finds that "if a future 2% inflation rate is assumed, and construction start begins in 2012, the real cost estimate equates to a nominal actual dollar cost of *$20.5 - $22 billion or $7,800 - $8,131 per kW"* (Johnson Cost Report). Johnson's report also documents STP's history of cost overruns for Units 1 and 2. STP's initial cost estimate was $1.238 billion, however the total project cost was over six times the initial estimate at $8.25 billion.

Moody's Estimate

Moody's Investor Services estimated nuclear capital costs as $7,500 per kW in a May 2008 report entitled "New Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities."[6] Like the FERC chart, the table below from this report clearly shows the estimated cost of nuclear to be significantly higher than other energy alternatives.

[6] "New Nuclear Generating Capacity: Potential Credit Implications for U.S. Investor Owned Utilities," May 2008, Moody's Corporate Finance. massimobray.italianieuropei.it/080527MoodysNewNukeGenCapacity.pdf

Table 9: Illustrative Economic Comparison
Revenues ($ / MWh) targets 10% ROE

	Natural Gas	Scrubbed Coal	Wind	Solar	Nuclear
Size (MW's)	1,000	1,000	1,000	1,000	1,000
Capital cost ($/kw)	$1,500	$4,000	$2,000	$3,000	$7,500
Capital cost ($)	$1,500,000	$4,000,000	$2,000,000	$3,000,000	$7,500,000
Debt	60%	70%	80%	60%	70%
Interest rate	7%	7%	7%	7%	7%
Equity	40%	30%	20%	40%	30%
Depreciation (years)	30	40	20	20	50
Fuel ($/MWh)	$56.00	$30.00	$-	$-	$5.00
Variable O&M ($/MWh)	$5.00	$7.00	$7.00	$7.00	$10.00
Fixed O&M ($/kw-year)	$25.00	$35.00	$35.00	$35.00	$250.00
Capacity factor	45.0%	80.0%	30.0%	20.0%	90.0%
Volume (MWh's)	3,942,000	7,008,000	2,628,000	1,752,000	7,884,000
Market price ($/MWh)	$120.56	$111.85	$125.54	$294.98	$150.83
Revenue ($ millions)	$475	$784	$330	$517	$1,255
Less: Fuel	221	210	-	-	42
Less: VOM	20	49	18	12	83
Less: FOM	25	35	35	35	250
EBITDA	$210	$490	$277	$470	$880
Less: D&A	50	100	100	150	150
EBIT	$160	$390	$177	$320	$730
Less: interest	63	196	112	126	368
EBT	$97	$194	$65	$194	$363
Less: Taxes at 38%	$37	74	25	74	138
Net income	$60	$120	$40	$120	$225
After-tax ROE	10%	10%	10%	10%	10%
CFO (net inc. + deprc.)	$110	$220	$140	$270	$375
CFO / debt	12%	8%	9%	15%	7%
CFO / equity	18%	18%	35%	23%	17%
CFO + interest / interest	2.7	2.1	2.3	3.1	2.0
Environmental:					
NOX	Some	Substantial	None	None	None
SOX	Some	Substantial	None	None	None
CO2	Some	Substantial	None	None	None
Mercury	None	Substantial	None	None	None
Uranium waste	None	None	None	None	Substantial

Applicants' Energy Alternative Estimates

While the applicants do not put forward cost estimates for nuclear they do put forward estimates for energy alternatives in Section 9 of the Environmental Report.

- An "onshore 50 MW wind facility would range from $1150 to $1200 per kilowatt." (9.2-6)
- A "PV system (in 2006 dollars) is about $4222 per kilowatt." (9.2-7)
- A "CSP system (based on 2006 dollars) ranges from $2745 to $3410 per kilowatt." (9.2-8)
- A "new large-scale hydropower facility was estimated between $1700 and $2300 per kilowatt." (9.2-9)
- "Costs for geothermal power plant (in 2006 dollars) ranges from $2200 to $2300 per kilowatt." (9.2-10)
- "The capital cost for a biomass power plant is between $1760 and $2160 per kilowatt." (9.2-11)
- The "cost for a municipal solid waste generation facility (based on 2004 dollars) is about $1500 per kilowatt based on an 80 MW unit." (9.2-12)

The same kind of detailed cost analysis done by Florida Power & Light and Dr. Makhijani for STP (see Makhijani Cost Report) must be conducted by the applicants, included in the license application and made available to the public. The petitioners contend that the applicants must fully analyze and publicly disclose the total capital costs of STP Units 3 and 4 and conduct a quantified cost comparison with alternative energy sources.

24. The COLA is inadequate and unreliable because it fails to discuss the access to and costs of uranium used for power plant fuel.

The COLA concedes that during plant operations, approximately 17,000 metric tons of enriched uranium would be used by each STP APWR over an assumed 60 year life of the plant. The COLA cites

the World Nuclear Association studies that indicate uranium is ubiquitous and that recoverable reserves of uranium are over 4,000,000 tons. STP Environmental Report, page 10.2-3. However, what the Environmental Report fails to point out is that there are virtually no domestic sources of uranium available in the United States, at present. The economic conditions of the uranium market currently favor utilizing foreign source uranium rather than domestic uranium. See C0L Application, Comanche Peak Nuclear Power Plant, Units 3 and 4, part 3 Environmental Report, page 5.7- 4.

Additionally, the supply of uranium purchased by owners and operators of US civilian nuclear power plants between 1994 and 2700 trended significantly toward foreign sources. United States Energy Information Administration data, reprinted in Table S1a. below .

Moreover, the COLA fails to acknowledge the run-up in price that has occurred for uranium over the past 15 years. The United States Energy Information Administration data for 2007, Table S1b., indicate that the price for enriched uranium has tripled since 1994. The price for enriched uranium purchased from US brokers and traders has increased nearly fourfold since 1994. The cost for enriched uranium purchase from foreign suppliers has tripled since 1994. There were significant increases in price from 2005 to 2007. For example, spot contracts in 2005 had prices set at $20.04, while in 2007 the price increased to $88.25. http://www.eia.doe.gov/cneaf/nuclear/umar/summarytable1.html. These data suggest that the long-term trend costs and supplies are much more problematic than suggested in the STP Environmental Report. Accordingly, the COLA should consider whether the cost and supply assumptions that underpin the decision to use nuclear fuel are reasonable.

25. The Decommissioning Funding Assurance described in the application is inadequate to assure sufficient funds will be available to fully decontaminate and decommission South Texas Project Units 3 and 4. The NRG Licensees must use the prepayment method of assuring decommissioning funding.

10 CFR 50.75 provides for most commercial nuclear reactors three ways of assuring that adequate funds will be available to decontaminate and decommission a reactor when its operating life is finished. These are a) prepayment; b) external sinking fund; and c) surety or other form of guarantee. Applicants have chosen b) as their method. The applicants state in their application, Part 1: General and Financial Information Section 1.4, that the NRG Licensees "will provide decommissioning funding assurance for their proportionate obligations for decommissioning based upon their percentage interests in each unit using the external sinking fund method." Yet applicants admit that "the NRG Licensees **do not technically qualify to use the sinking fund method** as their exclusive mechanism under the provisions of 10 CFR 50.75(e)(1)(ii)(A)&(B)."

Even though the NRG Licensees do not qualify for the sinking fund method as its exclusive mechanism, they contend that "exclusive reliance of this mechanism should be acceptable, because pursuant to House Bill 1386 passed by the Texas Legislature on May 28, 2007 and signed into law by the Governor on June 15, 2007…provides that ratepayers would be obligated to fund the total cost of decommissioning in the event that the NRG Licensees fail to periodically set aside funds as planned…Thus, if the NRG Licensees do not provide periodic funding from their own revenues, Texas Law would provide for a mechanism for funding decommissioning that does meet the requirements of 10CFR 50.75(e)(1)(ii)(A)."

The applicants use circular reasoning to try and appear that their decommissioning funds are covered, when in fact neither the requirements of federal or state law have been met. If the

NRG Licensees do not comply with federal law, they are not complying with Texas law. The applicants, however, misuse Texas law in order to appear in compliance with federal law.

The applicants depend on HB 1386[7], passed by the Texas Legislature in 2007 to guarantee the NRG Licensees' funding and rely exclusively on the external sinking fund mechanism. This reliance is dubious in many respects. First, NRG does not take into account the possibility that the Texas Legislature could repeal the Act passed in 2007, with a simple majority vote in the future.

Even though the applicants contends that Texas Law will provide the mechanism for funding decommissioning if the NRG Licensees do not provide periodic funding, the Act in Section (B)(d) states that the must provide funding on an annual basis.

> A power generation company that owns a nuclear generating unit shall fund out of operating revenues on an annual basis: (1) the costs associated with funding the decommissioning obligations for the nuclear generating unit; or (2) the power generation company's portion of the decommissioning costs for the nuclear generating unit in proportion to the company's ownership interest in the nuclear generating unit if the unit is owned by more than one person.

Moreover, the applicants misconstrue and simplify the purpose of HB 1386, which requires that the applicants comply with federal regulations first.

Section (B)(f) of the Act states:

> The terms of the trust must be consistent with trust terms and conditions the federal Nuclear Regulatory Commission requires for providing financial assurance for decommissioning.

Section (B)(g) states:

> The commission by order shall establish for a nuclear generating unit the amount of annual decommissioning funding necessary to meet the decommissioning obligations for the nuclear generating unit over the unit's operating license period as established by the federal Nuclear Regulatory

[7] Available at http://www.legis.state.tx.us/tlodocs/80R/billtext/pdf/HB01386F.pdf

> Commission or over a shorter period of time at the election of the power generation company.

Section (B)(j) states:

> The company, as funds administrator, shall invest the trust funds in accordance with guidelines established by commission rule and consistent with the federal Nuclear Regulatory Commission guidelines so that the decommissioning funds, plus the amounts earned from investment of the funds, will be available at the time of decommissioning.

According to the Act the NRG Licensees rely on for its proposed decommissioning funding method, section (B)(k)(1) states that rules shall be adopted to ensure that:

> A power generation company remits sufficient funds to a nuclear decommissioning trust on an annual basis, including projected earnings to approximate the amount remaining to be accumulated to cover the cost of decommissioning a nuclear generating unit at the end of its operating license period divided by the remaining years of the license and in accordance with applicable state and federal laws and regulations or over a shorter period of time at the election of the power generation company.

Under its own admission in the COLA, the NRG Licensees do not currently qualify to use the sinking fund method, and are relying on Texas Law for its qualification. The Act relied upon clearly requires that the power generation company first comply with federal regulations and additional guidelines in the Act for funding the decommissioning costs for the units, *before* it can rely on the ratepayer to fund decommissioning. This circular reasoning is unsound. The NRG Licensees must qualify to use the sinking fund method in their own right first. Accordingly, the COLA adjudication should reject the Applicant's assertions regarding funding of decommissioning activities.

26. The Applicant has not established that there is a need for the power that would be generated by STP Units 3 and 4.

As required by 10 CFR Pt. 51 and NUREG 1555, the applicants are required to demonstrate the need for power. This obligation provides a greater burden on municipal utilities than it does merchant plants to prove the need for power. As a municipal utility applicant, CPS Energy is obligated to demonstrate this need and has fallen short in the COLA and actually provided contradictory evidence to the public that electric use and demand have decreased.

As further support for this contention Petitioners reference a report produced by Dr. Makhijani that addresses San Antonio's specific circumstances related to additional generating capacity and costs related thereto. *Energy Efficiency Potential: San Antonio's Bright Future*, Arjun Makhijani, Ph.D., October, 2008. Attached hereto.

Declining Electric Use

On January 20, 2009 the Deputy General Manager of CPS Energy, Steve Bartley, gave a presentation to the CPS Energy's Board of Trustees on CPS Energy's commitment to sustainability. On slide 10 (attached) Mr. Bartley discussed the reduced electric use of CPS energy since 2001. The use of 13 million kilowatt-hours in 2001 was reduced to 9.8 million kilowatt-hours in 2006, and in the past two year, electric use decreased by 16 percent. With significant declining electric use, increased capacity for CPS Energy is not justified.

Economic Downturn's Effect on Demand

Furthermore, the economic downturn could affect demand, and this has not been considered in the COLA. San Antonio Texas municipal utility, CPS Energy, stated in a January 2009 presentation that

demand had declined 16% in the last two years. (attached) Consideration of the impacts of stimulus funding that will boost energy efficiency and renewable energy industries is needed.

Recovery Act Funding for energy efficiency and renewable energy totals $16.8 billion, including $3.2 billion for Energy Efficiency and Conservation Block Grants, $5 billion for weatherization assistance, $3.1 billion for the State Energy Program, and $2 billion for grants for manufacturing advanced batteries and components and $3.5 billion for applied research, development, and demonstration and deployment activities. An additional $4.5 billion would go toward electricity delivery and energy reliability work – to modernize the grid through Smart Grid technologies.[8]

The impact on electric demand and on the viability of new nuclear generation from the economic downturn and the increased funding for energy efficiency and renewable energy sources has not been considered or analyzed.

CPS Energy Retiring Gas Plants

The Electric Reliability Council of Texas (ERCOT) operates the state's electric grid and manages the deregulated market for 75 % of the state. In March 2009, ERCOT approved CPS Energy's request to shut is 314-MW Tuttle power plant in Bexar County, retiring three gas-fired power plant units at the site. ERCOT confirmed that shutting them down would not hinder electric reliability in the state. "Highly efficient, combined-cycle gas-fired power plants built in Texas in the last decade have displaced more than 40 steam-boiler units since 2002 when rising gas prices made older units uneconomical to operate in

[8] NEPA Lessons Learned Quarterly Report, U.S. DOE, March 3, 2009, Issue No. 58, www.gc.energy.gov/NEPA/documents/2009_MARCH_LLQROnline.pdf

the state's competitive wholesale market Gas plants totaling 5,200 MW have been shut permanently and another 4,400 MW remain on mothball status.[9]

It appears that the 2700 MW of additional nuclear generation that the South Texas Project Units 3 and 4 would provide is not actually needed at all if these numerous gas plants can be retired. In fact the question arises as to whether some of the newer, combined cycle gas plants are being shut down in order to pave the way and present an appearance of need for the additional reactors that NRG now seeks to build. The 2700 MW from STP 3 and 4 may arguably be excess capacity that would create a drag on the economy of the region. Ratepayers would be required to pay for not only capacity that they don't need but expensive capacity that they don't need.

27. The numerous "construction-related unavoidable impacts" have unacceptable adverse impacts. There should be remediation measures put in place that would effectively address these adverse impacts, but none are described, and apparently none are planned.

These unacceptable impacts include "the adverse effects of construction dewatering on the aquifer and local wells," in 10.1.1.2. Local ranchers and farmers, as well as citizens who count on their wells for drinking water cannot afford to have dewatering threatening the water supply. The quality of the water is threatened as well. It is also stated in 10.1.1.2 that "Additional potential construction impacts to local hydrology include the potential disturbance of local surface water bodies due to turbidity and sedimentation caused by construction activities." This is termed "small, temporary unavoidable impacts to local hydrology and water." The applicant fails to make any commitment to the use of sediment control silt fences, simply assuming that adverse impacts to local water bodies are acceptable. They are not.

[9] Reuters. March 14, 2009.Two Texas generators to shut aging gas-fired units. http://www.oe.netl.doe.gov/docs/eads/ead031609.pdf

Furthermore, the construction activities along the Colorado River are anticipated to increase the sediment load, construction related spills (e.g., hydraulic fluid, diesel) could impact surface waters, and a wetland will be removed during construction.

These are characterized as "small temporary unavoidable adverse impacts to aquatic ecology," but no numbers are provided that would quantify such impacts, and "small" is a not an adequate term. The application fails to quantify how much sedimentation would result, or the anticipated mortality of fish, macroinvertebrates and other aquatic life. It fails to characterize sub-lethal impacts to these species, including injury to tissues, physiological stress, and altered behavior and activity. It fails to state how much of the Colorado River could have increased sedimentation and for how long. Again, apparently no remediation is planned.

Increased air emissions and fugitive dust are anticipated from traffic and construction equipment. See 10.1.1.7. The applicant is apparently aware of the best management practice of "frequent watering of potential dust-emitting areas," but fails to commit to using this practice, saying only that it "could be employed." The only planned noise mitigation is to notify the public of impending construction.

Even the radiation doses to workers during are regarded as a "small unavoidable adverse impact." See 10.1.1.6. While the doses workers may receive may fall within regulatory limits, the application fails to provide information as to any protective gear that workers may be provided. It can only be assumed that protective gear will be minimal or none. There is no explanation of what services and medical care would be provided to workers who might accidentally receive higher doses than anticipated or than permitted, nor what radiation badges, Geiger counters or other radiation monitoring gear, if any, will be provided to workers or made available at the work site.

28. Whooping cranes and endangered species analysis and protection are inadequate.

The Environmental Report fails to adequately assess potential impacts to endangered whooping cranes (*Grus americana*). The wintering habitat for the cranes is 35 miles southwest of the South Texas Project site, as stated in Section 2.4-4 of the license application, but the migration of whooping cranes brings them even closer to the nuclear reactor site at times, and this analysis has not been done. The report does not include whether the flock rests and feeds in the area adjacent to the existing and planned reactors.

A March 14, 2007 aerial census report by Tom Stehn, Whooping Crane Coordinator for the U.S. Fish and Wildlife Service at Aransas Wildlife Refuge included the following statement, pointed out that at least one crane was in the Bay City area in January (2006.)

A more recent report by Stehn, April 7, 2009, found an 8.5% mortality rate for whooping cranes this winter, the worst mortality rate in twenty years, and ahead of the 1990 loss of 7.5% of the cranes at Aransas.

> "Mortality in the 2008-09 winter (23 birds) can be added to the 34 whooping cranes that left Aransas in the spring of 2008 and failed to return in the fall. Thus, 57 whooping cranes have died in the last 12 months, or 21.4% of the flock of 266 present at Aransas in the spring, 2008…
>
> For the first time all winter, nearly all the whooping cranes were found in the salt marsh on today's flight. The cranes are believed to be feeding on fiddler crabs since blue crabs in the marsh ponds are still scarce due to the continuing drought. A blue crab count done on April 1st found zero crabs in the marsh…
>
> Salinities remain high, measured recently at 29 ppt in the refuge boat canal and 39 in the adjacent marsh. One monitoring station in San Antonio Bay has a salinity of 25 ppt. The drought rated as "exceptional" shows no sign of ending in central and south Texas. Many counties have imposed prescribed burn bans due to the fire danger. Corpus Christi, Texas is 4.5 inches below normal rainfall starting January 1st…

> Overall, these continue to be some of the worst conditions I have ever observed for the cranes at Aransas, with some birds looking thin and with disheveled plumage. The refuge is continuing its program of supplemental feeding with corn.[10]

Whooping cranes came close to extinction in 1945, numbering only 15. The species was declared endangered in 1970. Very extensive work has gone into building the numbers of birds back up again and efforts to keep whooping cranes alive are ongoing, as threats to survival continue. According to the San Antonio Express-News, 3/07/09, "one dead bird also tested positive for a virus that has been detected in a captive whooping crane flock in Florida. It's the first time the virus has appeared in the wild Texas flock."

Whooping cranes are currently in a precarious state. Additional impacts could have catastrophic impacts. Whooping cranes and the blue crabs, clams, fiddler crabs, shrimp and other aquatic invertebrates, insects, minnows, frogs and snakes that they feed upon should be tested for radioactivity. Radiation exposure routes should be fully analyzed, and the impacts on genetics, mating and reproduction and behavior of whooping cranes should be researched. The availability of food supply should be included in this analysis, and whether radiation is bioaccumulating and bioconcentrating in the food chain. The impacts of potential nuclear reactor accidents should include the potentially catastrophic impacts on whooping cranes as well as all other endangered and threatened species in the South Texas region. The license application fails to include this analysis and is wholly inadequate in this regard.

CONCLUSION

For the reasons stated above the Petitioners should be determined to have standing and the contentions herein admitted into the COLA adjudication.

---

10 Tom Stehn's Whooping Crane April 7, 2009 report, Tom Stehn, Whooping Crane Coordinator, U.S. Fish and Wildlife Service, posted on birdRockport.com, http://www.birdrockport.com/tom_stehn_whooping_crane_report.htm

Respectfully submitted,

Robert V. Eye, Kansas Sup. Ct. No. 10689
Kauffman & Eye
Suite 202
112 SW 6th Ave.
Topeka, Kansas 66603
785-234-4040
bob@kauffmaneye.com
Attorney for the Petitioners

April 21, 2009