Sequoyah Nuclear Plant (SQN)

TVA Nuclear

AST Presentation

September 16, 2014

Introduction

Purpose of Meeting

- Discussion of AST as it pertains to RAI KAB-044
  - Current Licensing Bases
  - Improved Technical Specification Impact

Introductions

- NRC
- TVA

Current Licensing Bases

- **TVA-SQN-TS-02-08 submitted to NRC, January 14, 2003**
  - **Request to modify TS 3.9.4 "Containment Building Penetrations" and Partial scope implementation of the alternate source term**
  - **Modified applicability requirement for the containment building equipment door (CBED)**
  - **CBED closure only required during "recently irradiated fuel"**
- **NRC approval received on October 28, 2003**

Current Licensing Basis

Current wording for T/S 3.9.4

3.9.4 The containment building penetrations shall be in the following status:

a. The equipment door closed and held in place by a minimum of four bolts,

b. A minimum of one door in each airlock is closed, and both doors of both containment personnel airlocks may be open if:

1. One personnel airlock door in each airlock is capable of closure, and

2. One train of the Auxiliary Building Gas Treatment System is OPERABLE in accordance with Technical Specification 3.9.12, and

c. Each penetration* providing direct access from the containment atmosphere to the outside atmosphere shall be either:

1. Closed by an isolation valve, blind flange, manual valve, or equivalent, or

2. Be capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve.

APPLICABILTY:

3.9.4.a. Containment Building Equipment Door - During movement of recently irradiated fuel within the containment.

3.9.4.b. and c. Containment Building Airlock Doors and Penetrations - During movement of irradiated fuel within the containment.

Current Licensing Basis

- **TVA and NRC recognized that the Fuel Handling Accident (FHA) within containment is the only Design Basis Accident (DBA) affected by the proposed change**
- **TVA evaluated a FHA both inside and outside containment**
- **NRC found that the change to replace the current accident source term used in the design basis FHA within containment with an AST was acceptable**

Current Licensing Basis

Excerpt from NRC SE

analyses. The NRC staff finds that analysis methods and assumptions used were consistent with the conservative regulatory requirements and guidance. Additionally, the NRC staff finds that the EAB, LPZ, and control room doses will continue to comply with the applicable

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regulatory criteria without credit being taken for containment isolation if the irradiated fuel has been allowed to decay for 100 hours prior to being moved.

Based on the above, the NRC staff finds the proposed change to replace the current accident source term used in the design basis FHA within containment radiological analyses with an AST is acceptable.

Current Licensing Basis

Excerpt from NRC SE

3.3 Design Basis

The licensee proposed to modify the SQN design basis to replace the current accident source term used in the design basis FHA analysis with an AST and to replace the previous whole body and thyroid accident dose guidelines with the TEDE criteria of 10 CFR 50.67(b)(2). TVA has supplemented the source term provided in RG 1.183 with tritium to reflect the tritium production core authorized for use at SQN.

This licensing action is considered a selective implementation of the AST. TVA addressed the use of AST described in RG 1.183 as the DBA source term in the evaluation of the radiological consequences of FHAs at SQN. As part of the implementation of the AST, the TEDE acceptance criterion of 10 CFR 50.67(b)(2) replaces the previous whole body and thyroid dose guidelines of 10 CFR 100.11 and 10 CFR Part 50, Appendix A, GDC 19, as the SQN licensing basis, with regard to the radiological consequences of the design basis FHAs inside and outside the containment.

With this approval, the selected characteristics of the AST and TEDE criteria become the design basis for the DBA FHA within the containment and outside the containment. This approval is limited to this specific implementation. Subsequent modifications based on the

Current Licensing Basis

- **Analysis done for the FHA with AST assumes that the CBED is open and that ABGTS is out of service (no filtration of releases)**
- **TVA revised some of the assumptions in the FHA Analysis of Record (AOR) in June of 2013**
  - **Changed the time of the CVI from 30 to 300 seconds**
  - **Changed the containment air volume for mixing from 5% to 50%**
  - **Change was done under 10 CFR 50.59**
  - **Consequences to the FHA decreased by ~7%**

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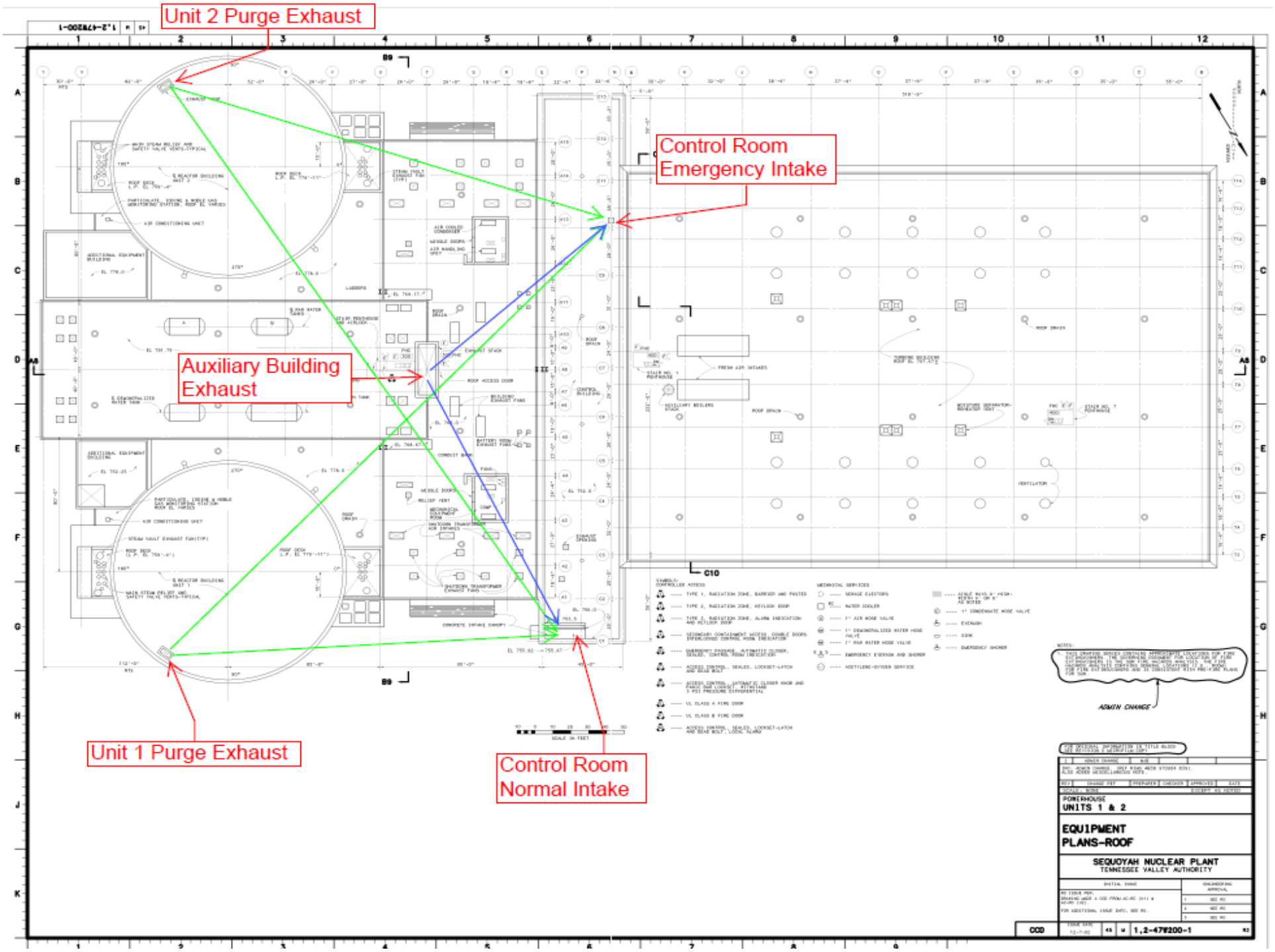
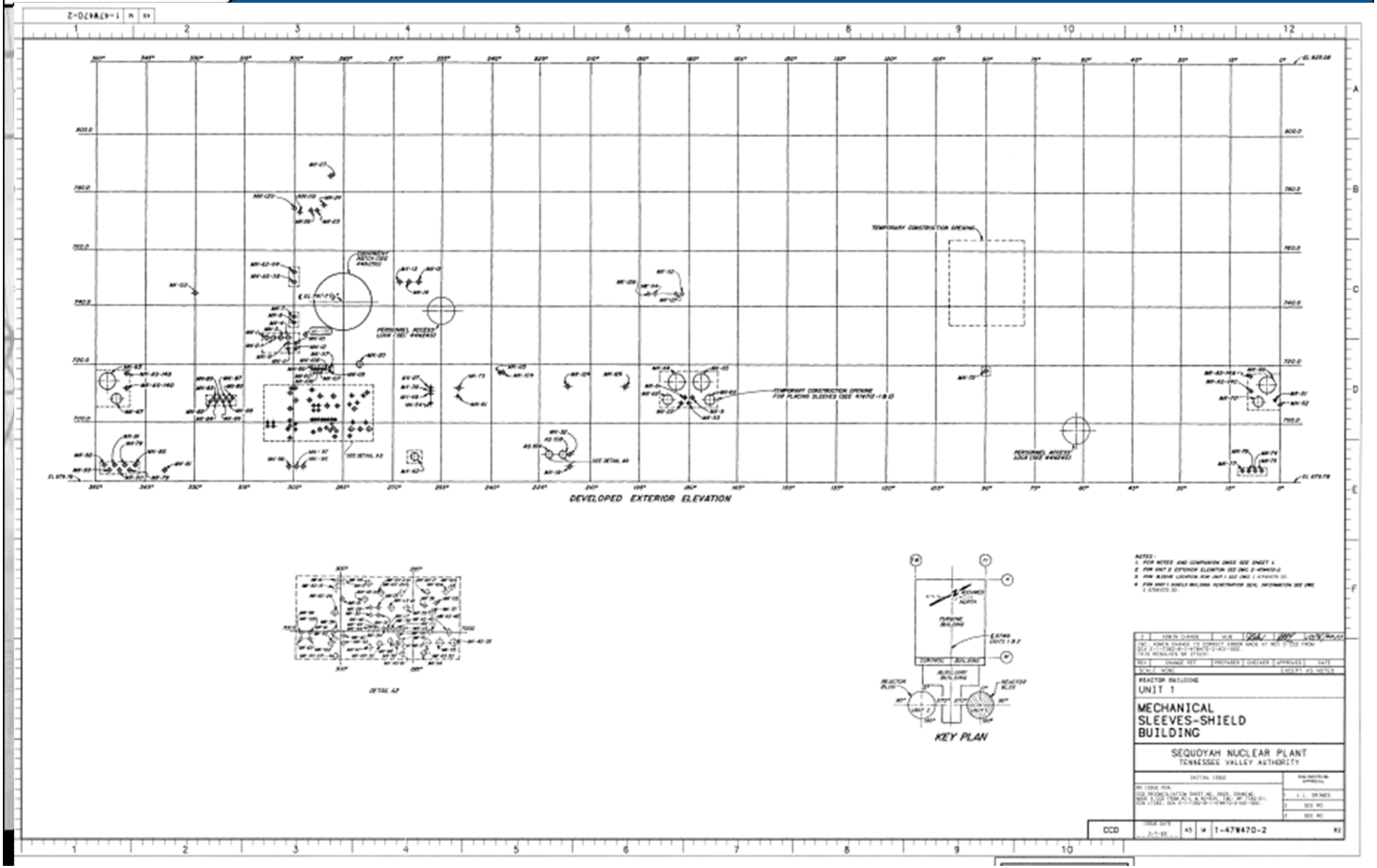
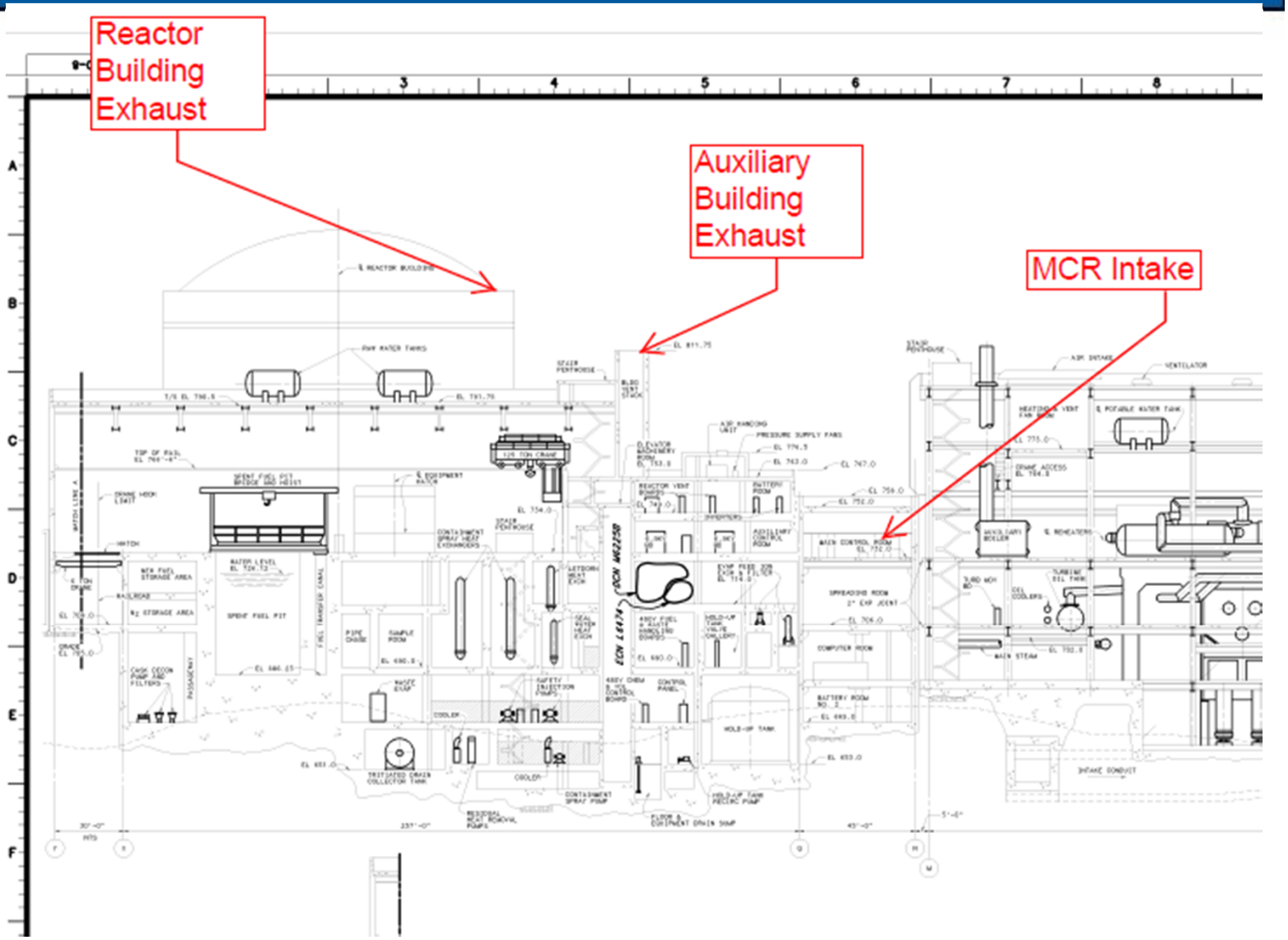

Unit 2 Purge Exhaust
Control Room Emergency Intake
Auxiliary Building Exhaust
Unit 1 Purge Exhaust
Control Room Normal Intake
POWERHOUSE
UNITS 1 & 2
EQUIPMENT PLANS-ROOF
SEQUOYAH NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
1,2-47W200-1

Current Licensing Basis



Current Licensing Basis



Improved Tech Spec Impact

- **Four T/S were changed in this conversation by changing the APPLICABILITY from "During movement of irradiated fuel" to "During movement of recently irradiated fuel"**
  - **3.3.6 Containment Ventilation Isolation Instrumentation**
  - **3.3.8 Auxiliary Building Gas Treatment System Actuation Instrumentation**
  - **3.7.12 Auxiliary Building Gas Treatment System**
  - **3.9.4 Containment Penetrations**
- **In none of these specifications, does SQN CTS have DURING CORE ALTERATIONS**

Improved Tech Spec Impact

- **3.3.6 Containment Ventilation Isolation Instrumentation**

3.3 INSTRUMENTATION

3.3.6~~A~~ Containment ~~Purge and Exhaust~~ Isolation Instrumentation ~~(Without Setpoint Control Program)~~ (1)

Ventilation

Ventilation

LCO 3.3.6 The Containment ~~Purge and Exhaust~~ Isolation instrumentation for each Function in Table 3.3.6-1 shall be OPERABLE. (1)

APPLICABILITY: According to Table 3.3.6-1.

			~~SR 3.3.6.~~	
Purge Air Monitor				
3. ~~[~~Containment Radiation				8.5 x 10^{-3} µCi/cc
~~a. Gaseous~~	1,2,3,4, ~~(a)~~	~~[1]~~	SR 3.3.6.1 (4) SR 3.3.6.~~6~~ (7) SR 3.3.6.~~9~~	≤ ~~[2 x background]~~
INSERT 2				
~~b. Particulate~~	~~1,2,3,4, (a)~~	~~[1]~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.6~~ ~~SR 3.3.6.9~~	SR 3.3.6.8 ~~≤ [2 x background]~~

(a) During movement of ~~[~~recently~]~~ irradiated fuel assemblies within containment.

Improved Tech Spec Impact

- **3.3.8 Auxiliary Building Gas Treatment System Actuation Instrumentation**

3.3 INSTRUMENTATION

3.3.8~~A~~ ~~Fuel Building Air Cleanup~~ System (~~FBACS~~) Actuation Instrumentation ~~(Without Setpoint Control Program)~~

LCO 3.3.8 The ~~FBACS~~ actuation instrumentation for each Function in Table 3.3.8-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.8-1.

~~and Actuation Relays~~

3.	Spent Fuel ~~Building~~ Pool Area Radiation Monitor	2	
~~a. Gaseous~~		~~[1,2,3,4],~~	(a)

(a) During movement of ~~[~~recently~]~~ irradiated fuel assemblies in the ~~fuel~~ auxiliary building.

Improved Tech Spec Impact

- **3.7.12 Auxiliary Building Gas Treatment System**

3.7 PLANT SYSTEMS

Auxiliary Building Gas Treatment — ABGTS

3.7.~~13~~ 12 ~~Fuel Building Air Cleanup~~ System ~~(FBACS)~~

ABGTS

LCO 3.7.~~13~~ 12 Two ~~FBACS~~ trains shall be OPERABLE.

Auxiliary Building Secondary Containment Enclosure (ABSCE) — S

---------- NOTE ----------

1. The ~~fuel building~~ boundary may be opened intermittently under administrative control.

INSERT 1

APPLICABILITY: ~~[~~MODES 1, 2, 3, and 4, ~~]~~

During movement of ~~[~~recently~~]~~ irradiated fuel assemblies in the ~~fuel~~ building.

auxiliary

Improved Tech Spec Impact

- **3.9.4 Containment Penetrations**

3.9.4 Containment Penetrations

LCO 3.9.4 The containment penetrations shall be in the following status:

a. The equipment ~~is~~ hatch closed and held in place by ~~[~~four~~]~~ bolts~~.~~ (1)

b. One door in each air lock is ~~[~~capable of being~~]~~ closed~~.~~ and

c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere is either:

1. Closed by a manual or automatic isolation valve, blind flange, or equivalent~~.~~ or

2. Capable of being closed by an OPERABLE Containment ~~Purge and Exhaust~~ Isolation ~~System~~.

---NOTE---

Penetration flow path(s) providing direct access from the containment atmosphere ~~to the outside atmosphere~~ may be unisolated under administrative controls.

APPLICABILITY: During movement of ~~[~~recently~~]~~ irradiated fuel assemblies within containment.