ENCLOSURE 1

PROPOSED TECHNICAL SPECIFICATION REVISIONS
BROWNS FERRY NUCLEAR PLANT UNITS 1, 2, AND 3
(TVA BFNP TS 193)

PROPOSED UNIT 1 SPECIFICATIONS

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.10.A Refueling Interlocks	4.10.A Refueling Interlocks
being withdrawn may be bypassed on a withdrawn control rod after the fuel assemblies in the cell containing (controlled by) that control rod have been removed from the reactor core. All other refueling interlocks shall be operable.	
B. Core Monitoring	B. Core Monitoring
1. During core alterations, except as in 3.10.B.2, two SRM's shall be operable, in or adjacent to any quadrant where fuel or control rods are being moved. For an SRM to be considered operable, the following shall be satisfied:	Prior to making any alterations to the core the SRM's shall be functionally tested and checked for neutron response. Thereafter, while required to be operable, the SRM's will be checked daily for response except as specified in 3.10.B.1.b.2.
a. The SRM shall be inserted to the normal operating level. (Use of special moveable, dunking type detectors during initial fuel loading and major core alterations in place of normal detectors is permissible as long as the detector is connected to the normal SRM circuit.)	
b.1 The SRM shall have a minimum of 3 cps with all rods fully inserted in the core, if one or more fuel assemblies are in the core, or,	
b.2 During a full core reload where both irradiated and fresh fuel is being loaded, SRM's (FLC's) may have a count rate of <3 cps provided that the SRM's are response checked at least once every 8 hours with a neutron source until >3 cps can be maintained, and provided also that the core is loaded in a spiral sequence only, or	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.10.B b.3 During a full core reload where both irradiated and fresh fuel are being loaded, four (4) irradiated fuel assemblies will be placed adjacent to each SRM to establish a count rate of >3 cps, provided each SRM is functionally tested prior to adjacent fuel loading, a neutron response is observed as the adjacent fuel is loaded, and the core is loaded in a spiral sequence only after the SRM adjacent fuel loading.	

3.10 BASES

REFERENCES

1. Refueling interlocks (BFNP FSAR Subsection 7.6)

B. Core Monitoring

The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's in or adjacent to any core quadrant where fuel or control rods are being moved assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second provides assurance that neutron flux is being monitored and ensures that startup is conducted only if the source range flux level is above the minimum assumed in the control rod drop accident.

During a full core reload SRM/FLC (Fuel Loading Chamber) operability will be verified using a portable external source at least once every 8 hours until sufficient fuel has been loaded to maintain 3 cps. A large number of fuel assemblies will not be required to maintain 3 cps. This increased surveillance rate assures proper detector operability until that time.

During a full core reload, irradiated fuel may be placed adjacent to each SRM to maintain a count rate >3 cps. Four (4) irradiated fuel assemblies will be placed in the four adjacent fuel locations to each SRM to establish the >3 cps count rate. The response of each SRM to the adjacent fuel loading will demonstrate neutron response. Each SRM will be functionally tested prior to loading the adjacent fuel assemblies. This precludes the use of FLC's as mandatory for a full core reload.

Under the special condition of removing the full core with all control rods inserted and electrically disarmed, it is permissible to allow SRM count rate to decrease below 3 cps. All fuel moves during core unloading will reduce reactivity. It is expected that the SRM's will drop below 3 cps before all of the fuel is unloaded. Since there will be no reactivity additions during this period, the low number of counts will not present a hazard. When all of the fuel has been removed to the spent fuel storage pool, SRM's will no longer be required. Requiring the SRM's to be functionally tested prior to fuel removal assures that the SRM's will be operable at the start of fuel removal. The daily response check of the SRM's ensures their continued operability until the count rate diminishes due to fuel removal. Control rods in cells from which all fuel has been removed and which are outside the periphery of the then existing fuel matrix may be armed electrically and moved for maintenance purposes during full core removal, provided all rods that control fuel are fully inserted and electrically disarmed.

REFERENCES

1. Neutron Monitoring System (BFNP FSAR Subsection 7.5)

2. Morgan, W. R.,"In-Core Neutron Monitoring System for General Electric Boiling Water Reactors," General Electric Company, Atomic Power Equipment Department, November 1968, revised April 1969 (APED-5706)

PROPOSED UNIT 2 SPECIFICATIONS

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.10.A Refueling Interlocks	4.10.A Refueling Interlocks
being withdrawn may be bypassed on a withdrawn control rod after the fuel assemblies in the cell containing (controlled by) that control rod have been removed from the reactor core. All other refueling interlocks shall be operable.	
B. Core Monitoring	B. Core Monitoring
1. During core alterations, except as in 3.10.B.2, two SRM's shall be operable, in or adjacent to any quadrant where fuel or control rods are being moved. For an SRM to be considered operable, the following shall be satisfied:	Prior to making any alterations to the core the SRM's shall be functionally tested and checked for neutron response. Thereafter, while required to be operable, the SRM's will be checked daily for response except as specified in 3.10.B.1.b.2.
a. The SRM shall be inserted to the normal operating level. (Use of special moveable, dunking type detectors during initial fuel loading and major core alterations in place of normal detectors is permissible as long as the detector is connected to the normal SRM circuit.)	
b.1 The SRM shall have a minimum of 3 cps with all rods fully inserted in the core, if one or more fuel assemblies are in the core, or,	
b.2 During a full core reload where both irradiated and fresh fuel is being loaded, SRM's (FLC's) may have a count rate of <3 cps provided that the SRM's are response checked at least once every 8 hours with a neutron source until >3 cps can be maintained, and provided also that the core is loaded in a spiral sequence only, or	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.10.B b.3 During a full core reload where both irradiated and fresh fuel are being loaded, four (4) irradiated fuel assemblies will be placed adjacent to each SRM to establish a count rate of >3 cps, provided each SRM is functionally tested prior to adjacent fuel loading, a neutron response is observed as the adjacent fuel is loaded, and the core is loaded in a spiral sequence only after the SRM adjacent fuel loading.	

3.10 BASES

REFERENCES

1. Refueling interlocks (BFNP FSAR Subsection 7.6)

B. Core Monitoring

The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's in or adjacent to any core quadrant where fuel or control rods are being moved assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second provides assurance that neutron flux is being monitored and ensures that startup is conducted only if the source range flux level is above the minimum assumed in the control rod drop accident.

During a full core reload SRM/FLC (Fuel Loading Chamber) operability will be verified using a portable external source at least once every 8 hours until sufficient fuel has been loaded to maintain 3 cps. A large number of fuel assemblies will not be required to maintain 3 cps. This increased surveillance rate assures proper detector operability until that time.

During a full core reload, irradiated fuel may be placed adjacent to each SRM to maintain a count rate >3 cps. Four (4) irradiated fuel assemblies will be placed in the four adjacent fuel locations to each SRM to establish the >3 cps count rate. The response of each SRM to the adjacent fuel loading will demonstrate neutron response. Each SRM will be functionally tested prior to loading the adjacent fuel assemblies. This precludes the use of FLC's as mandatory for a full core reload.

Under the special condition of removing the full core with all control rods inserted and electrically disarmed, it is permissible to allow SRM count rate to decrease below 3 cps. All fuel moves during core unloading will reduce reactivity. It is expected that the SRM's will drop below 3 cps before all of the fuel is unloaded. Since there will be no reactivity additions during this period, the low number of counts will not present a hazard. When all of the fuel has been removed to the spent fuel storage pool, SRM's will no longer be required. Requiring the SRM's to be functionally tested prior to fuel removal assures that the SRM's will be operable at the start of fuel removal. The daily response check of the SRM's ensures their continued operability until the count rate diminishes due to fuel removal. Control rods in cells from which all fuel has been removed and which are outside the periphery of the then existing fuel matrix may be armed electrically and moved for maintenance purposes during full core removal, provided all rods that control fuel are fully inserted and electrically disarmed.

REFERENCES

1. Neutron Monitoring System (BFNP FSAR Subsection 7.5)

2. Morgan, W. R.,"In-Core Neutron Monitoring System for General Electric Boiling Water Reactors," General Electric Company, Atomic Power Equipment Department, November 1968, revised April 1969 (APED-5706)

PROPOSED UNIT 3 SPECIFICATIONS

3.10 CORE ALTERATIONS

B. Core Monitoring

1. During core alterations, except as in 3.10.B.2, two SRM's shall be operable, in or adjacent to any quadrant where fuel or control rods are being moved. For an SRM to be considered operable, the following shall be satisfied:

   a. The SRM shall be inserted to the normal operating level. (Use of special moveable, dunking type detectors during initial fuel loading and major core alterations in place of normal detectors is permissible as long as the detector is connected to the normal SRM circuit.)

   b.1 The SRM shall have a minimum of 3 cps with all rods fully inserted in the core, if one or more fuel assemblies are in the core, or

   b.2 During a full core reload where both irradiated and fresh fuel is being loaded, SRM's (FLC's) may have a count rate of <3 cps provided that the SRM's are response checked at least once every 8 hours with a neutron source until >3 cps can be maintained, and provided also that the core is loaded in a spiral sequence only, or

4.10 CORE ALTERATIONS

B. Core Monitoring

Prior to making any alterations to the core the SRM's shall be functionally tested and checked for neutron response. Thereafter, while required to be operable, the SRM's will be checked daily for response except as specified in 3.10.B.1.b.2.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.10.B.	
b.3 During a full core reload where both irradiated and fresh fuel are being loaded, four (4) irradiated fuel assemblies will be placed adjacent to each SRM to establish a count rate of >3 cps, provided each SRM is functionally tested prior to adjacent fuel loading, a neutron response is observed as the adjacent fuel is loaded, and the core is loaded in a spiral sequence only after the SRM adjacent fuel loading.	

provides primary reactivity control for the fuel assemblies in the cell associated with that control rod.

Thus, removal of an entire cell (fuel assemblies plus control rod) results in a lower reactivity potential of the core. The requirements for SRM operability during these core alterations assure sufficient core monitoring.

REFERENCES

1. Refueling Interlocks (BFNP FSAR Subsection 7.6)

B. Core Monitoring

The SRM's are provided to monitor the core during periods of station shutdown and to guide the operator during refueling operations and station startup. Requiring two operable SRM's in or adjacent to any core quadrant where fuel or control rods are being moved assures adequate monitoring of that quadrant during such alterations. The requirement of 3 counts per second provides assurance that neutron flux is being monitored and insures that startup is conducted only if the source range flux level is above the minimum assumed in the control rod drop accident.

During a full core reload SRM/FLC (Fuel Loading Chamber) operability will be verified using a portable external source at least once every 8 hours until sufficient fuel has been loaded to maintain 3 cps. A large number of fuel assemblies will not be required to maintain 3 cps. This increased surveillance rate assures proper detector operability until that time.

During a full core reload, irradiated fuel may be placed adjacent to each SRM to maintain a count rate >3 cps. Four (4) irradiated fuel assemblies will be placed in the four adjacent fuel locations to each SRM to establish the >3 cps count rate. The response of each SRM to the adjacent fuel loading will demonstrate neutron response. Each SRM will be functionally tested prior to loading the adjacent fuel assemblies. This precludes the use of FLC's as mandatory for a full core reload.

Under the special condition of removing the full core with all control rods inserted and electrically disarmed, it is permissible to allow SRM count rate to decrease below 3 cps. All fuel moves during core unloading will reduce reactivity. It is expected that the SRM's will drop below 3 cps before all of the fuel is unloaded. Since there will be no reactivity additions during this period, the low number of counts will not present a hazard. When all of the fuel has been removed to the spent fuel storage pool, SRM's will no longer be required. Requiring the SRM's to be functionally tested prior to fuel removal assures that the SRM's will be operable at the start of fuel removal. The daily response check of the SRM's ensures their continued operability until the count rate diminishes due to fuel removal. Control rods in cells from which all fuel has been removed may be armed electrically and moved for maintenance purposes during full core removal, provided all rods that control fuel are fully inserted and electrically disarmed.

ENCLOSURE 2
DESCRIPTION OF CHANGES AND JUSTIFICATION
TVA BFNP TS 193

The proposed revision will provide means of performing a full core reload with the sole use of the source range monitors (SRMs) for neutron detection. Four irradiated fuel assemblies will be loaded adjacent to the four SRM detectors. This will provide a minimum of 3 cps to verify neutron response and SRM operability. Reloading will proceed as normal starting at the center of the core and spiraling outward until the core is completely loaded. If fresh fuel is required to be adjacent to an SRM, the irradiated fuel previously loaded will be removed and the fresh fuel loaded in its place when fuel loading has proceeded to that point.

By using this procedure, critical path time will be reduced by reducing the number of crane operations over the vessel. This will reduce the probability of dropping loose objects into the vessel; thereby increasing the margin of safety.

This extends the scope of a revision that was made to Browns Ferry technical specifications for units 1, 2, and 3 in amendment Nos. 53, 48, and 25 respectively. The Safety Evaluation Report supporting that amendment is applicable to the proposed revision as discussed below with differences as stated. The proposed amendment is bounded by that SER.

SER, Section 2.0, "Discussion"*

Section 3.10.B.1.b.2 of Browns Ferry technical specification allows the count rate to drop below 3 cps when reloading the entire core if it is done in a spiral sequence only. The only provision is that the SRMs (FLCs) must be checked for operability every eight hours by the use of a neutron source. Thus, refueling operations can be accomplished by the method above which has operational inconveniences. The proposed amendment allows the use of irradiated fuel loaded around the SRM as an alternative to source checking.

SER, Section 3.1, "Minimum Flux in the Core"*

The core must have a minimum neutron flux when fuel is being loaded. The minimum flux in the core will be provided by the irradiated fuel being loaded and by four irradiated fuel assemblies located adjacent to each SRM. The proposed amendment does not affect this section.

SER, Section 3.2, "SRM Operability" *

The appropriate number of SRMs (FLCs) must be operable during core alteration. Four irradiated fuel assemblies located around each SRM will continuously provide a minimum countrate of 3 cps; thereby assuring SRM operability with a higher degree of certainty than considered in this section.

*SER sections referenced are from the SER accompanying license amendments issued October 11, 1979, Nos. 53, 48, and 25 to license Nos. DPR-33, 52, and 68, respectively.

SER, Section 3.3, "Flux Attenuation"

As described in the SER, 16 or more fuel assemblies must be loaded together before criticality is posible. In spiral loading sequences, an array containing four or more control cells will be at most two control cells away from an SRM. With the proposed amendment, this will remain true except that there will be one additional fuel assembly located adjacent to the SRM in the direct path of the center of the core. The additional fuel assembly will not result in additional flux attenuation because it is a multiplying medium. Thus, the ability of the SRMs (FLCs) to monitor core reactivity will equal or exceed that evaluated in the SER. Sufficient monitoring of an approach to criticality will be provided in the proposed configuration.

Safety Analysis

Loading irradiated fuel adjacent to each SRM (4 assemblies per each SRM) does not pose a safety degradation. All control rods will be completely inserted. The SRM's will be functionally checked before loading the first fuel assembly adjacent to each SRM. The neutron response will be observed as the irradiated fuel assemblies are loaded adjacent to each SRM. A signal-to-noise ratio $>3:1$ and >3 cps count rate will be verified upon the completion of loading four (4) irradiated fuel assemblies for each SRM. The General Electric Fuel Reload Analysis has been demonstrated to be accurate and reliable so that no considerations for criticality around each SRM are necessary. The fuel loading will continue normally in a spiral sequence from the center cell outward until the entire core is loaded. Should an irradiated fuel assembly be placed adjacent to a SRM where a fresh fuel assembly is scheduled to be loaded to attasin the >3 cps, then this irradiated fuel assembly will be replaced with the fresh fuel assembly when fuel loading has advanced to that fuel location. Similar technical specifications have been approved for Standardized Technical Specification BWR 4's.

ENCLOSURE 3
SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION
TVA BFNP TS 1983

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   No. This does not increase the chance of a fuel loading error or degrade core monitoring capability during fuel reloading. This will result in a decrease in probability of an accident since the FLC's require additional handling and surveillance.

2. Does the proposed amendment create the probability of a new or different kind of accident from any accident previously evaluated?

   No. There is no new or different accident scenario created that exceeds the previously bounded analysis for core monitoring during refueling. The SRM's used are designed for core monitoring during refueling.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   No. Rather by using the SRM's for core monitoring of the complete reloading, over the FLC's for the initial phase, the margin of safety is increased. The FLC's require additional handling and surveillance which the SRM's do not.