TENNESSEE VALLEY AUTHORITY

5N 157B Lookout Place

JUN 21 1988

TVA-SQN-TS-88-23 10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

| | | |
|---|---|---|
| In the Matter of | ) | Docket Nos. 50-327 |
| Tennessee Valley Authority | ) | 50-328 |

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2 - OPERATING LICENSE AMENDMENT 88-23

In accordance with 10 CFR 50.90, we are enclosing a requested amendment to licenses DPR-77 and DPR-79 to change the operating licenses for SQN units 1 and 2. The proposed change will revise the expiration dates for the operating licenses to 40 years from the date of issuance of the full-power license for each unit. This request is in accordance with current NRC policy. The present license expiration dates are based on 40 years from the date of issuance of the construction permit.

In accordance with NRC suggested guidelines, TVA has included information to address each of the four recommended areas: (1) Significant environmental impacts, (2) Pressurized Thermal Shock (PTS), (3) Equipment Qualification (10 CFR 50.49), and (4) Inservice Inspection (ISI) and Inservice Test (IST) Programs.

The proposed operating licenses amendment is identified in enclosure 1. The justification for the proposed operating license amendment is provided in enclosure 2. A proposed determination of no significant hazards consideration performed pursuant to 10 CFR 50.92 is provided in enclosure 3.

Enclosed is a check for the $150 amendment application fee required by 10 CFR 170.12.

A001
1/1
w/check $150
#25186

U.S. Nuclear Regulatory Commission JUN 21 1988

Please direct questions you may have concerning this issue to D. V. Goodin at (615) 870-7734.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

M. J. Ray, Manager,
Sequoyah Site Licensing

Sworn to and subscribed before me
this 21st day of June 1988

Susan C Parker
Notary Public
My Commission Expires 2/7/90

Enclosures
cc (Enclosures):
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cc: See page 3

ENCLOSURE 1

PROPOSED OPERATING LICENSE AMENDMENT

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-88-23)

LIST OF AFFECTED PAGES

Unit 1, DPR-77

page 13, item 2.K

Unit 2, DPR-79

page 13, item 2.K

DPR-77



an environmental evaluation of such activity. When the evaluation indicates that such activity may result in a significant adverse environmental impact that was not evaluated, or that is significantly greater than that evaluated in the Final Environmental Statement prepared by the Tennessee Valley Authority and the Environmental Impact Appraisal prepared by the Commission in May 1979, the Tennessee Valley Authority shall provide a written evaluation of such activity and obtain prior approval from the Director, Office of Nuclear Reactor Regulation.

G. If TVA plans to remove or to make significant changes in the normal operation of equipment that controls the amount of radioactivity in effluents from the Sequoyah Nuclear Plant, the Commission shall be notified in writing regardless of whether the change affects the amount of radioactivity in the effluents.

H. TVA shall report any violations of the requirements contained in Sections 2.C(3) through 2.C.(24), 2.E, 2.F and 2.G of this license within 24 hours by telephone and confirmed by telegram, mailgram, or facsimile transmission to the Director of the Regional Office, or his designate, no later than the first working day following the violation with a written followup report within 14 days.

I. TVA shall immediately notify the Commission of any accident at this facility which could result in an unplanned release of quantities of fission products in excess of allowable limits for normal operation established by the Commission.

J TVA shall have and maintain financial protection of such type and in such amounts as the Commission shall require in accordance with Section 170 of the Atomic Energy Act of 1954, as amended, to cover public liability claims.

K. This license is effective as of the date of issuance and shall expire ~~May 27, 2010.~~

September 17, 2020.

FOR THE NUCLEAR REGULATORY COMMISSION

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Attachment:
Appendices A and B Technical Specifications

Date of Issuance
September 17, 1980

K. This amended license is effective as of the date of issuance and shall expire ~~May 27, 2010~~. September 15, 2021. R2

FOR THE NUCLEAR REGULATORY COMMISSION

Harold R. Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Attachments:
1. Attachment 1
2. Appendices A and B Technial Specifications

Date of Issuance: September 15, 1981

ENCLOSURE 2

PROPOSED OPERATING LICENSE AMENDMENT

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-88-23)

# DESCRIPTION AND JUSTIFICATION FOR OPERATING LICENSE AMENDMENT TO EXTEND EXPIRATION DATE TO 40 YEARS FROM DATE OF ISSUANCE OF THE FULL-POWER LICENSE

ENCLOSURE 2

Description of Change

TVA, pursuant to 10 CFR 50.90, requests an amendment to the SQN operating license for unit 1 (DPR-77) and unit 2 (DPR-79). The proposed amendment revises the expiration date of the unit 1 operating license from May 27, 2010, to September 17, 2020, and unit 2 from May 27, 2010, to September 15, 2021.

Reason for Change

The current operating license expiration date is 40 years from the date of issuance of the Construction Permit (May 27, 1970, for both units). Because 10 years and 4 months were required in the construction and issuance of the unit 1 full-power operating license (11 years and 4 months for unit 2). The effective period of the unit 1 license would be approximately 29 years and 8 months (28 years and 8 months for unit 2). Current NRC policy is to issue operating licenses for a 40-year period beginning with the date of issuance. The requested amendment to the expiration date of the SQN operating licenses would provide for the 40-year period of operation that the units were initially designed for.

The proposed amendment is an administrative change that allows TVA to operate SQN for the full-design life and spread the capital cost of SQN over a longer period of time. This change will effectively lower the cost of electricity and thereby benefit the residential and industrial customers within TVA's service area.

Justification for Change

The justification for this change is patterned after the suggested guidelines issued by NRC (reference 1) to supplement the April 30, 1985 policy letter by H. L. Thompson to H. R. Denton to extend the operating license for nuclear power plants. These guidelines suggest that the license address four items: significant environmental impacts, pressurized thermal shock, equipment qualification, and technical specifications for in-service inspection and testing.

Potential Environmental, Health, and Safety Impacts

TVA has reviewed the Sequoyah Nuclear Plant Final Environmental Statement and has concluded that the Environmental Statement is suitable for operation of SQN for a 40-year period ending in the year 2010. The Environmental Statement does not generally use or discuss a specific period of plant operation in the evaluations presented. However, offsite population doses are based on the year 2010 population.

In the approximately 14 years since the Environmental Statement was issued, a number of modifications have been made to the SQN and surrounding site and facilities. These modifications, in general, had the effect of improving the reliability and safety of the plant or reducing the environmental impact of plant operation. They include:

Facilities - Many modifications to the plant have been made since the original operating license has been issued. Significant modifications are described in the Sequoyah updated Final Safety Analysis Report. Modifications made without prior NRC approval, in accordance with the provisions of 10 CFR 50.59, were reported on an annual basis to the Commission. Modifications requiring prior NRC approval were made following receipt of an NRC Safety Evaluation Report. No modification was found to affect the conclusions of the Sequoyah Environmental Statement.

Land Use - Additional site buildings have been constructed and existing buildings have been expanded. The actual land area occupied by site buildings has not significantly increased, however.

Thermal Effects - Thermal discharges from SQN are regulated through the National Pollutant Discharge Elimination System (NPDES) Permit. Data collected to date has indicated that the water quality and indigenous biota of Chickamauga Reservoir are protected by the thermal limits specified in the NPDES Permit. Operation of SQN will continue to be governed by the NPDES Permit with no different or greater impact.

Occupational radiation exposure at SQN remains below the average of U.S. nuclear generating plants. This is attributed to an excellent history of fuel integrity and a management commitment to as low as reasonably achievable (ALARA) exposures. We expect that below average occupational exposures will continue to be the norm for the life of the SQN facility.

TVA has an aggressive ALARA program at SQN to maintain occupational radiation exposure. Exposure goals have been established for station man-rem to minimize collective doses. ALARA reviews and analyses are conducted for workplans for proposed jobs which are projected to exceed one man-rem. Steps are built in to the jobs to reduce dose. All proposed facility modifications receive similar reviews. Pre-job briefings are held with workers to cover dose savings measures and mock-ups are used as appropriate to train workers.

Radiological impacts to offsite individuals due to releases of radioactive liquid and gaseous wastes from the plant remain well within all applicable regulatory limits. Computed gaseous offsite doses are typically less than 3 percent of the 10 CFR 50, Appendix I, guidelines (for a two-unit plant) of 20 millirad/year gamma and 40 millirad/year beta air dose and 30 millirem/year organ dose. Computed offsite liquid doses are typically less than 10 percent of the 10 CFR 50, Appendix I, guidelines of 6 millirem/year total body and 20 millirem/year organ dose. Radioactive effluent releases are controlled by the technical specifications in section 3.11. These specifications implement the release limits specified in 10 CFR 20 and set performance goals based on 10 CFR 50, Appendix I.

TVA does not expect any increase in the annual dose for the operations of SQN for the years of 2010 to 2021. Doses calculated for offsite populations in the year 2021 would be less than 15 percent greater than those estimated for the 2010 population. This increase would be due solely to an estimated growth of population during 2010 through 2021. However, population doses would remain less than 0.1 percent of the natural background dose to the offsite population. We expect decommissioning doses beginning in 2022 to be reduced as compared to doses that would be expected for a 2011 decommissioning due to improvements made in the technology.

Table 1 shows TVA's projected operational schedule for SQN. Table 2 shows projected occupational exposure for Sequoyah. Table 3 shows TVA's past personnel exposure for SQN for the years 1982 through 1987. The person-rem exposure is by plant area regardless of how these exposures were obtained (normal operations, maintenance, repair or refueling operations, etc.) and by whom (plant operations/maintenance personnel, contractor/vendor personnel, etc.). This data is the same data provided yearly as required by 10 CFR 20.407(b) and SQN technical specification 6.9.1.5.

The following information is furnished consistent with 10 CFR 51.52(a):

1) The licensed reactor core thermal power limit for SQN is 3411 megawatts.

2) The initial uranium-235 enrichment for fuel assemblies at SQN is less than 4 percent by weight. Fuel pellets are clad in zircaloy rods. These parameters are controlled by technical specification 5.3.1

3) The average expected level of burnup of the irradiated fuel from SQN is about 45,000 megawatt-days per metric ton of uranium (MWD/MTU). Although this is greater than the burnup of 10 CFR 51.52(a), the effective levels of radioactivity from a fuel assembly with an average burnup of 45,000 MWD/MTU will be cooled for a period of time to meet the requirements of a fuel assembly with an average burnup of 33,000 MWD/MTU that has cooled for 90 days. Additionally, based on TVA's contract with the Department of Energy and the current progress of the development of a high level waste repository, most fuel assemblies will have decayed for several years.

4) All radioactive waste, other than irradiated fuel, is packaged and transported in solid form by either truck or rail. SQN technical specification 3.11.3 establishes requirements for the Solid Radioactive Waste System.

5) Irradiated fuel assemblies will be transported either by truck, rail, or barge from the reactor.

6) The transportation of radioactive material is regulated by the Department of Transportation and the NRC. The regulations provide protection of the public and transport workers from radiation. This protection is achieved by a combination of standards and requirements applicable to packaging, limitations on the contents of packages and radiation levels from packages, and procedures to limit the exposure of persons under normal and accident conditions.

Primary reliance for safety in transport of radioactive material is placed on the packaging. The packaging must meet regulatory standards (10 CFR 71 and 49 CFR 173) established according to the type and form of material for containment, shielding, nuclear criticality safety, and heat dissipation.

The standards provide that the packaging shall prevent the loss or dispersal of the radioactive contents, retain shielding efficiency, assure nuclear criticality safety, and provide adequate heat dissipation under normal conditions of transport and under specified accident damage test conditions. The contents of packages not designed to withstand accidents are limited, thereby limiting the risk from releases which could occur in an accident. The contents of the package also must be limited so that the standards for external radiation levels, temperature, pressure, and containment are met.

Furthermore, the additional amount of nuclear fuel and waste resulting from an extended operating period will continue to be within the limits assumed for the original licensing basis. Because of improved fuel cycle designs and longer operation between refueling outages, the total amount of spent fuel produced over a 40-year operating lifetime will be less than that originally projected by the Final Safety Analysis Report (FSAR) for SQN.

Based on the above concludes that the radiological impact from the transportation of irradiated fuel and solid radioactive waste is in accordance with the impacts set forth in table S-4 of 10 CFR 51.52. The environmental costs will not be significantly affected during the additional years of operation.

As originally predicted, approximately 70 percent of the population within the 10-mile zone is concentrated in the southern one-third of the zone. The land use in the vicinity of SQN has remained predominately rural although the growth in the southern area has exceeded original estimates especially in development along Lake Chickamauga. Highways, both east and west of the Tennessee River (Interstate I-75, Highway 29, Highway 153, south Hixson Pike, and Highway 58), have been upgraded and bridges across the Tennessee River have been expanded (Chickamauga Dam expanded from 2 to 4 lanes, the new C. B. Robinson Bridge added 6 lanes, and the new Veteran's Bridge added 4 additional lanes). Highway 29 is also in the final stages of construction to provide an interceptor to Interstate I-124 and thereby further improving the traffic flow from the southern evacuation area. With the improved highway system compensating for the expansion, there continues to be assurance that appropriate measures can be taken to protect the populace in the event of a radiological release.

Pressurized Thermal Shock

TVA provided an assessment of the fracture toughness requirements for protection against pressurized thermal shock as required by 10 CFR 50.61 (reference 2). That assessment concluded that the screening values would not be exceeded for the SQN reactor pressure vessels through at least 32 effective full-power years. This time is consistent with the design life of 40 years for the reactor pressure vessels as presented in FSAR, table 5.1-1, with a

projected capacity factor of 80 percent. The NRC evaluation and acceptance of the fracture toughness assessment is documented in a safety evaluation for protection against pressurized thermal shock events (reference 3).

Equipment Qualification

The environmental qualification (EQ) program for electrical equipment operating in a harsh environment is described in section III.1 of the SQN Nuclear Performance Plan (NPP) (reference 4). The program ensures that EQ is maintained for electrical equipment necessary to ensure reactor coolant pressure boundary integrity, shut down of the reactor and maintain it in a safe shutdown condition, and to prevent or mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR 100 guidelines. Non-safety-related electrical equipment whose failure under postulated harsh environmental conditions could prevent satisfactory accomplishment of safety functions by safety-related equipment was also included in the program.

Aging analyses have been performed for all safety-related electrical equipment within the scope of 10 CFR 50.49 (harsh environment). The qualified life of the equipment or component is incorporated within SQN's maintenance and replacement practices to ensure that this safety-related electrical equipment remains qualified and available to perform its safety function regardless of the overall age of the plant.

The SQN EQ was evaluated by NRC and found acceptable. The acceptance is documented in section 3.2 of the safety evaluation report for the SQN NPP (NUREG-1232, Volume 2).

TVA is currently working with the NRC staff to establish the program to extend the qualified life of silicone rubber cable (reference 5). TVA is also working with the NRC staff to perform confirmatory work for the ice condenser containment analyses for main steam line breaks that involve superheat (reference 6). These ongoing program activities have also been considered by NRC in their evaluation of the EQ program. This consideration is documented in sections 3.12 and 3.2.2.2, respectively, of NUREG-1232, Volume 2.

Inservice Inspection (ISI) and Inservice Test (IST) Programs

TVA has ongoing ISI and IST programs for SQN that are maintained in accordance with 10 CFR 50.55a. The surveillance requirements for these programs are contained in SQN technical specification 4.0.5 and are required to conform to section XI of the ASME Boiler and Pressure Vessel Code. Where specific relief from the section XI code was necessary, TVA has provided written relief requests to NRC for review and approval in accordance with 10 CFR 50.55(a)(g)(6)(i).

In addition to the ISI and IST programs, the following SQN technical specifications also provide an additional requirements for monitoring component aging and the cumulative effects of power operation over the life of the plant.

A. Specification 3.4.5 - Steam Generators

In addition to the requirements of specification 4.0.5, TVA has an augmented ISI program for ensuring operability of the SQN steam generators. The results of these augmented inspections are submited by report to NRC and include:

1. Number of steam generator tubes inspected.
2. Location and percent of wall thickness penetration for each indication of an imperfection.
3. Identification of tubes plugged.

B. Specification 3.4.9.1 - Reactor Coolant System Pressure/Temperature Limits

Temperature and pressure changes during heatup, cooldown, and normal operation of the reactor coolant system are limited to protect against non-ductile failure of the reactor coolant system. These limits are calculated using the methods derived from Appendix G in section III of the ASME Boiler and Pressure Vessel Code as required by Appendix G to 10 CFR 50.

The above specification also includes a reactor vessel material surveillance program that monitors reactor vessel embrittlement over the 40-year design life in accordance with 10 CFR 50, Appendix H. Reactor vessel irradation specimens are removed and examined at specific intervals to determine changes in material properties. The results of the examinations are used to update the pressure and temperature limits.

C. Specification 3.4.10 - Reactor Coolant System Structural Integrity

The ISI and IST programs for ASME Code Class 1, 2, and 3 components ensure that the structural integrity and operational readiness of these components will be maintained at an acceptable level throughout the life of the plant.

In addition to the ISI and IST programs, additional special inspections are specified for the Reactor Coolant Pump flywheels and reactor vessel nozzles.

D. Specification 5.7.1 - Component Cyclic or Transient Limit

This requirement ensures that certain components within the reactor coolant and secondary systems are maintained within their cyclic or transient limits over the life of the plant. These limits are monitored, recorded, and evaluated for component fatigue to provide confidence that each component will perform its intended function over a 40-year design life.

Conclusion

No new safety concerns are introduced by this proposed amendment since (1) a 40-year life was considered in the design of the plant and since (2) new or revised accident analyses, plant modifications, procedure changes, FSAR revisions, and technical specification revisions are not required. Note, however, that since the issuance of the operating licenses, numerous changes have been implemented to enhance safety and to address issues such as fire protection, ALARA, Equipment Qualification, and the TMI-2 Lessons Learned (NUREG 0737).

References

1. Memorandum from Thomas A. Novak to Project Directors and Project Managers dated November 25, 1986, "Suggested Guidelines for Preparing License Amendment Dealing with Extension of Expiration Date of Operating Licenses"

2. Letter from TVA to NRC dated January 21, 1986.

3. Letter from NRC to TVA dated May 5, 1988, "Safety Evaluations on Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events, 10 CFR 50.61 (TAC 59983/59984, MPA A-21)"

4. Sequoyah Nuclear Performance Plan, Revision 3.

5. Letter from TVA to NRC dated March 17, 1988, "Sequoyah Nuclear Plant (SQN) - Silicone Rubber Cable Environmental Qualification"

6. Letter from TVA to NRC dated June 1, 1988, "Sequoyah Nuclear Plant (SQN) Units 1 and 2; Watts Bar Nuclear Plant (WBN) Units 1 and 2 - Request for Additional Information Regarding Main Steam Line Breaks in Ice Condenser Plants"

ENCLOSURE 2

TABLE 1

Sequoyah Nuclear Plant Unit 1

| | Operation Schedule | | Refueling Schedule | |
|---|---|---|---|---|
| | Start | End | Start | End |
| Cycle | DATE | DATE | DATE | DATE |
| 3 | 4/17/84 | 8/22/85 | 8/22/85 | 8/15/88 |
| 4 | 8/15/88 | 2/07/90 | 2/07/90 | 4/26/90 |
| 5 | 4/26/90 | 10/27/91 | 10/27/91 | 1/13/92 |
| 6 | 1/13/92 | 7/15/93 | 7/15/93 | 10/01/93 |
| 7 | 10/01/93 | 4/03/95 | 4/03/95 | 6/20/95 |
| 8 | 6/20/95 | 12/20/96 | 12/20/96 | 3/08/97 |
| 9 | 3/08/97 | 9/08/98 | 9/08/98 | 11/25/98 |
| 10 | 11/25/98 | 5/27/00 | 5/27/00 | 8/13/00 |
| 11 | 8/13/00 | 2/13/02 | 2/13/02 | 5/02/02 |
| 12 | 5/02/02 | 11/02/03 | 11/02/03 | 1/19/04 |
| 13 | 1/19/04 | 7/21/05 | 7/21/05 | 10/07/05 |
| 14 | 10/07/05 | 4/09/07 | 4/09/07 | 6/26/07 |
| 15 | 6/26/07 | 12/26/08 | 12/26/08 | 3/14/09 |
| 16 | 3/14/09 | 5/31/10 | | |

With License Extension +

| | Operation Schedule | | Refueling Schedule | |
|---|---|---|---|---|
| | Start | End | Start | End |
| Cycle | DATE | DATE | DATE | DATE |
| 16 | 3/14/09 | 9/14/10 | 9/14/10 | 12/01/10 |
| 17 | 12/01/10 | 6/02/12 | 6/02/12 | 8/19/12 |
| 18 | 8/19/12 | 2/19/14 | 2/19/14 | 5/08/14 |
| 19 | 5/08/14 | 11/08/15 | 11/08/15 | 1/25/16 |
| 20 | 1/25/16 | 7/27/17 | 7/27/17 | 10/13/17 |
| 21 | 10/13/17 | 4/15/19 | 4/15/19 | 7/02/19 |
| 22 | 7/02/19 | 8/31/20 | | |

+Cycles 3 through 15 would be the same

ENCLOSURE 2

TABLE 1 (Continued)

Sequoyah Nuclear Plant Unit 2

| | Operation Schedule | | Refueling Schedule | |
|---|---|---|---|---|
| | Start | End | Start | End |
| Cycle | DATE | DATE | DATE | DATE |
| 3 | 12/26/84 | 11/09/88 | 11/09/88 | 1/26/89 |
| 4 | 1/26/89 | 8/02/90 | 8/02/90 | 10/19/90 |
| 5 | 10/19/90 | 4/25/92 | 4/25/92 | 7/12/92 |
| 6 | 7/12/92 | 1/16/94 | 1/16/94 | 4/05/94 |
| 7 | 4/05/94 | 10/10/95 | 10/10/95 | 12/27/95 |
| 8 | 12/27/95 | 7/02/97 | 7/02/97 | 9/18/97 |
| 9 | 9/18/97 | 3/25/99 | 3/25/99 | 6/11/99 |
| 10 | 6/11/99 | 12/15/00 | 12/15/00 | 3/03/01 |
| 11 | 3/03/01 | 9/07/02 | 9/07/02 | 11/24/02 |
| 12 | 11/24/02 | 5/30/04 | 5/30/04 | 8/16/04 |
| 13 | 8/16/04 | 2/20/06 | 2/20/06 | 5/09/06 |
| 14 | 5/09/06 | 11/13/07 | 11/13/07 | 1/30/08 |
| 15 | 1/30/08 | 8/05/09 | 8/05/09 | 10/22/09 |
| 16 | 10/22/09 | 5/31/10 | | |

With License Extension +

| | Operation Schedule | | Refueling Schedule | |
|---|---|---|---|---|
| | Start | End | Start | End |
| Cycle | DATE | DATE | DATE | DATE |
| 16 | 10/22/09 | 4/28/11 | 4/28/11 | 7/15/11 |
| 17 | 7/15/11 | 1/18/13 | 1/18/13 | 4/06/13 |
| 18 | 4/06/13 | 10/11/14 | 10/11/14 | 12/28/14 |
| 19 | 12/28/14 | 7/03/16 | 7/03/16 | 9/19/16 |
| 20 | 9/19/16 | 3/26/18 | 3/26/18 | 6/12/18 |
| 21 | 6/12/18 | 12/16/19 | 12/16/19 | 3/04/20 |
| 22 | 3/04/20 | 8/31/21 | | |

+Cycles 3 through 15 would be the same

ENCLOSURE 2

TABLE 2

Sequoyah Nuclear Plant Unit 1

Projected Occupational Exposure *

MAN-REM

| YEAR | OUTAGE | NON-OUTAGE | TOTAL |
|---|---|---|---|
| 2010 | 450 | 180 | 630 |
| 2011 | NO OUTAGE | 250 | 250 |
| 2012 | 450 | 180 | 630 |
| 2013 | NO OUTAGE | 250 | 250 |
| 2014 | 450 | 180 | 630 |
| 2015 | 275 | 200 | 475 |
| 2016 | 150 | 225 | 375 |
| 2017 | 450 | 180 | 630 |
| 2018 | NO OUTAGE | 250 | 250 |
| 2019 | 450 | 180 | 630 |
| 2020 | 450 | 180 | 630 |

* Assumes 20 man-rem per month during non-outage and 150 man-rem per month during outage.

ENCLOSURE 2

TABLE 2 (Continued)

Sequoyah Nuclear Plant Unit 2

Projected Occupational Exposure

MAN-REM

| YEAR | OUTAGE | NON-OUTAGE | TOTAL |
|---|---|---|---|
| 2011 | 450 | 180 | 630 |
| 2012 | NO OUTAGE | 250 | 250 |
| 2013 | 450 | 180 | 630 |
| 2014 | 450 | 180 | 630 |
| 2015 | NO OUTAGE | 250 | 250 |
| 2016 | 450 | 180 | 630 |
| 2017 | NO OUTAGE | 250 | 250 |
| 2018 | 450 | 180 | 630 |
| 2019 | 80 | 240 | 320 |
| 2020 | 370 | 200 | 570 |
| 2021 | 450 | 180 | 630 |

ENCLOSURE 2 - TABLE 3
NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

PLANT: SEQUOYAH 1 (PWR) 1982

| WORK & JOB FUNCTION | Number of Personnel (>100 M-REM) Station Employees | Utility Employees | Contract & Others | Total Persons | Station Employees | Utility Employees | Contract & Others | Total Man-Rems |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPERATIONS & SURV. | | | | | | | | |
| MAINTENANCE PERSONNEL | 29 | 26 | 0 | | 10.800 | 7.900 | 0.0 | |
| OPERATING PERSONNEL | 23 | 1 | 27 | | 5.100 | 0.500 | 7.400 | |
| HEALTH PHYSICS PERSONNEL | 3 | 1 | 0 | | 1.800 | 0.100 | 0.0 | |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| TOTAL | 55 | 28 | 27 | 110 | 17.700 | 8.500 | 7.400 | 33.600 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 375 | 40 | 0 | | 89.400 | 7.200 | 0.0 | |
| OPERATING PERSONNEL | 89 | 24 | 4 | | 14.700 | 6.000 | 0.800 | |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 0 | | 0.100 | 0.0 | 0.0 | |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| TOTAL | 465 | 64 | 4 | 533 | 104.200 | 13.200 | 0.800 | 118.200 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 54 | 76 | 0 | | 15.100 | 21.600 | 0.0 | |
| OPERATING PERSONNEL | 13 | 8 | 37 | | 2.100 | 2.600 | 19.100 | |
| HEALTH PHYSICS PERSONNEL | 0 | 1 | 0 | | 0.0 | 0.200 | 0.0 | |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| TOTAL | 67 | 85 | 37 | 189 | 17.200 | 24.400 | 19.100 | 60.700 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 19 | 1 | 0 | | 3.400 | 0.100 | 0.0 | |
| OPERATING PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| TOTAL | 19 | 1 | 0 | 20 | 3.400 | 0.100 | 0.0 | 3.500 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 0 | 0 | | 1.300 | 0.0 | 0.0 | |
| OPERATING PERSONNEL | 22 | 0 | 0 | | 3.500 | 0.0 | 0.0 | |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 0 | | 0.400 | 0.0 | 0.0 | |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| TOTAL | 30 | 0 | 0 | 30 | 5.200 | 0.0 | 0.0 | 5.200 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 107 | 22 | 0 | | 43.900 | 4.600 | 0.0 | |
| OPERATING PERSONNEL | 44 | 9 | 6 | | 10.200 | 2.000 | 1.000 | |
| HEALTH PHYSICS PERSONNEL | 2 | 2 | 0 | | 0.500 | 0.700 | 0.0 | |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | | 0.0 | 0.0 | 0.0 | |
| TOTAL | 153 | 33 | 6 | 192 | 54.600 | 7.300 | 1.000 | 62.900 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 590 | 165 | 0 | 755 | 163.900 | 41.400 | 0.0 | 205.300 |
| OPERATING PERSONNEL | 191 | 42 | 74 | 307 | 35.600 | 11.100 | 28.300 | 75.000 |
| HEALTH PHYSICS PERSONNEL | 8 | 4 | 0 | 12 | 2.800 | 1.000 | 0.0 | 3.800 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 |
| GRAND TOTAL | 789 | 211 | 74 | 1074 | 202.300 | 53.500 | 28.300 | 284.100 |

ENCLOSURE 2 - TABLE 3
NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

PLANT: *SEQUOYAH 1,2 (PWR) 1983

| WORK & JOB FUNCTION | Number of Personnel (>100 M-REM) Station Employees | Utility Employees | Contract & Others | Total Persons | Station Employees | Utility Employees | Contract & Others | Total Man-Rems |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPERATIONS & SURV. | | | | | | | | |
| MAINTENANCE PERSONNEL | 188 | 477 | 6 | | 12.237 | 19.316 | 2.408 | |
| OPERATING PERSONNEL | 86 | 0 | 0 | | 8.664 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 34 | 0 | 33 | | 4.686 | 0.000 | 10.758 | |
| SUPERVISORY PERSONNEL | 32 | 11 | 2 | | 5.011 | 0.720 | 0.128 | |
| ENGINEERING PERSONNEL | 48 | 60 | 7 | | 5.296 | 7.044 | 0.315 | |
| TOTAL | 388 | 548 | 48 | 984 | 35.894 | 27.080 | 13.609 | 76.583 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 197 | 535 | 3 | | 43.789 | 78.759 | 0.031 | |
| OPERATING PERSONNEL | 86 | 0 | 0 | | 6.514 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 34 | 0 | 33 | | 3.573 | 0.000 | 1.906 | |
| SUPERVISORY PERSONNEL | 32 | 11 | 2 | | 5.408 | 1.753 | 0.109 | |
| ENGINEERING PERSONNEL | 49 | 74 | 39 | | 9.364 | 14.430 | 9.045 | |
| TOTAL | 398 | 620 | 77 | 1095 | 68.648 | 94.942 | 11.091 | 174.681 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 37 | 295 | 0 | | 0.243 | 29.878 | 0.000 | |
| OPERATING PERSONNEL | 38 | 0 | 0 | | 0.144 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 11 | 0 | 23 | | 0.284 | 0.000 | 3.916 | |
| SUPERVISORY PERSONNEL | 7 | 7 | 1 | | 0.208 | 0.310 | 0.000 | |
| ENGINEERING PERSONNEL | 32 | 48 | 32 | | 2.770 | 9.914 | 15.743 | |
| TOTAL | 125 | 350 | 56 | 531 | 3.649 | 40.102 | 19.659 | 63.410 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 174 | 508 | 0 | | 3.435 | 91.244 | 0.000 | |
| OPERATING PERSONNEL | 75 | 0 | 0 | | 0.445 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 25 | 0 | 21 | | 0.586 | 0.000 | 0.311 | |
| SUPERVISORY PERSONNEL | 24 | 8 | 2 | | 0.255 | 0.266 | 0.006 | |
| ENGINEERING PERSONNEL | 46 | 49 | 9 | | 4.038 | 8.542 | 0.636 | |
| TOTAL | 344 | 565 | 32 | 941 | 8.759 | 100.052 | 0.953 | 109.764 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 158 | 239 | 2 | | 3.545 | 3.006 | 0.250 | |
| OPERATING PERSONNEL | 81 | 0 | 0 | | 7.768 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 32 | 0 | 20 | | 1.586 | 0.000 | 0.164 | |
| SUPERVISORY PERSONNEL | 15 | 2 | 0 | | 0.458 | 0.010 | 0.000 | |
| ENGINEERING PERSONNEL | 28 | 11 | 0 | | 0.033 | 0.040 | 0.000 | |
| TOTAL | 314 | 252 | 22 | 588 | 13.390 | 3.056 | 0.414 | 16.860 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 113 | 309 | 1 | | 4.106 | 44.872 | 0.115 | |
| OPERATING PERSONNEL | 43 | 0 | 0 | | 3.081 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 20 | | 0.024 | 0.000 | 1.893 | |
| SUPERVISORY PERSONNEL | 17 | 6 | 1 | | 2.070 | 0.069 | 0.002 | |
| ENGINEERING PERSONNEL | 42 | 31 | 0 | | 2.955 | 6.552 | 0.000 | |
| TOTAL | 223 | 346 | 22 | 591 | 12.236 | 51.493 | 2.010 | 65.739 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 867 | 2363 | 12 | 3242 | 67.355 | 267.075 | 2.804 | 337.234 |
| OPERATING PERSONNEL | 409 | 0 | 0 | 409 | 26.616 | 0.000 | 0.000 | 26.616 |
| HEALTH PHYSICS PERSONNEL | 144 | 0 | 150 | 294 | 10.739 | 0.000 | 18.948 | 29.687 |
| SUPERVISORY PERSONNEL | 127 | 45 | 8 | 180 | 13.410 | 3.128 | 0.245 | 16.783 |
| ENGINEERING PERSONNEL | 245 | 273 | 87 | 605 | 24.456 | 46.522 | 25.739 | 96.717 |
| GRAND TOTAL | 1792 | 2681 | 257 | 4730 | 142.576 | 316.725 | 47.736 | 507.037 |

* Workers may be counted in more than one category

ENCLOSURE 2 - TABLE 3

NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

PLANT: *SEQUOYAH 1,2 (PWR) 1984

| WORK & JOB FUNCTION | Number of Personnel (>100 M-REM) Station Employees | Utility Employees | Contract & Others | Total Persons | Station Employees | Utility Employees | Contract & Others | Total Man-Rems |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPERATIONS & SURV. | | | | | | | | |
| MAINTENANCE PERSONNEL | 503 | 562 | 9 | | 25.907 | 21.450 | 0.548 | |
| OPERATING PERSONNEL | 95 | 0 | 0 | | 16.703 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 60 | 2 | 58 | | 19.472 | 0.000 | 21.220 | |
| SUPERVISORY PERSONNEL | 74 | 22 | 2 | | 10.738 | 2.388 | 0.226 | |
| ENGINEERING PERSONNEL | 62 | 106 | 27 | | 12.357 | 15.559 | 1.218 | |
| TOTAL | 794 | 692 | 96 | 1582 | 85.177 | 39.397 | 23.212 | 147.786 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 540 | 587 | 3 | | 120.746 | 72.022 | 0.030 | |
| OPERATING PERSONNEL | 82 | 0 | 0 | | 1.737 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 59 | 1 | 51 | | 4.741 | 0.000 | 1.288 | |
| SUPERVISORY PERSONNEL | 63 | 23 | 2 | | 6.177 | 2.743 | 0.103 | |
| ENGINEERING PERSONNEL | 62 | 95 | 39 | | 10.448 | 8.477 | 30.117 | |
| TOTAL | 806 | 706 | 95 | 1607 | 143.849 | 83.242 | 31.538 | 258.629 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 226 | 236 | 9 | | 34.218 | 37.399 | 7.001 | |
| OPERATING PERSONNEL | 26 | 0 | 0 | | 0.400 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 30 | 0 | 35 | | 2.024 | 0.000 | 6.798 | |
| SUPERVISORY PERSONNEL | 19 | 6 | 2 | | 0.938 | 2.191 | 0.053 | |
| ENGINEERING PERSONNEL | 55 | 54 | 47 | | 5.960 | 13.607 | 31.173 | |
| TOTAL | 356 | 296 | 93 | 745 | 43.540 | 53.197 | 45.025 | 141.762 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 415 | 622 | 6 | | 37.351 | 229.127 | 1.955 | |
| OPERATING PERSONNEL | 75 | 0 | 0 | | 0.990 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 57 | 0 | 37 | | 5.936 | 0.000 | 0.618 | |
| SUPERVISORY PERSONNEL | 60 | 18 | 1 | | 8.158 | 2.120 | 0.032 | |
| ENGINEERING PERSONNEL | 58 | 33 | 11 | | 12.280 | 10.183 | 1.670 | |
| TOTAL | 665 | 723 | 55 | 1443 | 64.715 | 241.430 | 4.275 | 310.420 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 368 | 271 | 3 | | 19.822 | 8.197 | 0.840 | |
| OPERATING PERSONNEL | 91 | 0 | 0 | | 11.831 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 60 | 0 | 47 | | 5.849 | 0.000 | 0.721 | |
| SUPERVISORY PERSONNEL | 40 | 9 | 1 | | 0.992 | 0.105 | 0.007 | |
| ENGINEERING PERSONNEL | 45 | 40 | 2 | | 0.193 | 1.024 | 0.005 | |
| TOTAL | 604 | 320 | 53 | 977 | 38.687 | 9.326 | 1.573 | 49.586 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 352 | 347 | 4 | | 69.132 | 64.188 | 0.025 | |
| OPERATING PERSONNEL | 66 | 0 | 0 | | 10.394 | 0.000 | 0.000 | |
| HEALTH PHYSICS PERSONNEL | 47 | 0 | 30 | | 1.698 | 0.000 | 1.106 | |
| SUPERVISORY PERSONNEL | 35 | 3 | 1 | | 12.428 | 0.997 | 0.137 | |
| ENGINEERING PERSONNEL | 55 | 36 | 5 | | 8.856 | 5.648 | 0.798 | |
| TOTAL | 555 | 386 | 40 | 981 | 102.508 | 70.833 | 2.066 | 175.407 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 2404 | 2625 | 34 | 5063 | 307.176 | 432.383 | 10.399 | 749.958 |
| OPERATING PERSONNEL | 435 | 0 | 0 | 435 | 42.055 | 0.000 | 0.000 | 42.055 |
| HEALTH PHYSICS PERSONNEL | 313 | 3 | 258 | 574 | 39.720 | 0.000 | 31.751 | 71.471 |
| SUPERVISORY PERSONNEL | 291 | 81 | 9 | 381 | 39.431 | 10.544 | 0.558 | 50.533 |
| ENGINEERING PERSONNEL | 337 | 414 | 131 | 882 | 50.094 | 54.498 | 64.981 | 169.573 |
| GRAND TOTAL | 3780 | 3123 | 432 | 7335 | 478.476 | 497.425 | 107.689 | 1083.590 |

* Workers may be counted in more than one category

ENCLOSURE 2 – TABLE 3
NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

PLANT: SEQUOYAH 1, 2 (PWR) 1985

| WORK & JOB FUNCTION | Number of Personnel (>100 M-REM) Station Employees | Utility Employees | Contract & Others | Total Persons | Station Employees | Utility Employees | Contract & Others | Total Man-Rems |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPERATIONS & SURV. | | | | | | | | |
| MAINTENANCE PERSONNEL | 613 | 4 | 2 | 519 | 15.468 | 1,042 | 0.040 | 36.370 |
| OPERATING PERSONNEL | 74 | 1 | 9 | 84 | 14.258 | 0.005 | 0.586 | 14.347 |
| HEALTH PHYSICS PERSONNEL | 65 | 25 | 14 | 104 | 24.649 | 7.400 | 3.266 | 35.515 |
| SUPERVISORY PERSONNEL | 33 | 21 | 2 | 56 | 3.305 | 0.916 | 0.190 | 4.411 |
| ENGINEERING PERSONNEL | 119 | 49 | 50 | 218 | 17.799 | 3.104 | 0.792 | 21.695 |
| TOTAL | 904 | 100 | 77 | 1081 | 95.477 | 12.467 | 4.894 | 112.338 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 642 | 2 | 2 | 546 | 200.390 | 0.014 | 0.109 | 201.013 |
| OPERATING PERSONNEL | 66 | 0 | 5 | 71 | 1.224 | 0.000 | 2.922 | 4.146 |
| HEALTH PHYSICS PERSONNEL | 64 | 23 | 11 | 98 | 8.549 | 0.715 | 1.745 | 11.027 |
| SUPERVISORY PERSONNEL | 31 | 15 | 2 | 48 | 5.019 | 0.137 | 0.091 | 5.247 |
| ENGINEERING PERSONNEL | 111 | 38 | 63 | 212 | 18.593 | 5.336 | 46.645 | 70.974 |
| TOTAL | 914 | 78 | 83 | 1075 | 234.375 | 6.322 | 51.510 | 292.407 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 303 | 5 | 18 | 326 | 56.969 | 0.201 | 18.004 | 75.174 |
| OPERATING PERSONNEL | 33 | 2 | 4 | 39 | 0.599 | 0.057 | 0.055 | 0.711 |
| HEALTH PHYSICS PERSONNEL | 48 | 19 | 9 | 76 | 11.978 | 3.982 | 3.019 | 18.979 |
| SUPERVISORY PERSONNEL | 17 | 17 | 3 | 37 | 0.898 | 1.753 | 0.165 | 2.314 |
| ENGINEERING PERSONNEL | 77 | 42 | 63 | 182 | 7.840 | 34.478 | 42.012 | 84.330 |
| TOTAL | 478 | 85 | 97 | 660 | 77.764 | 40.471 | 63.253 | 181.508 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 560 | 2 | 2 | 564 | 164.383 | 0.037 | 0.333 | 164.753 |
| OPERATING PERSONNEL | 52 | 0 | 3 | 55 | 0.386 | 0.000 | 0.342 | 0.728 |
| HEALTH PHYSICS PERSONNEL | 62 | 18 | 10 | 90 | 5.784 | 2.742 | 2.037 | 10.563 |
| SUPERVISORY PERSONNEL | 25 | 1 | 2 | 28 | 1.520 | 0.005 | 0.003 | 1.533 |
| ENGINEERING PERSONNEL | 108 | 31 | 109 | 248 | 14.717 | 2.157 | 102.805 | 119.579 |
| TOTAL | 807 | 52 | 126 | 985 | 186.790 | 4.941 | 105.525 | 297.256 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 306 | 0 | 0 | 306 | 14.453 | 0.000 | 0.000 | 14.453 |
| OPERATING PERSONNEL | 73 | 0 | 5 | 78 | 11.417 | 0.000 | 2.549 | 13.965 |
| HEALTH PHYSICS PERSONNEL | 63 | 9 | 5 | 77 | 4.451 | 0.054 | 0.265 | 4.770 |
| SUPERVISORY PERSONNEL | 17 | 0 | 0 | 17 | 1.179 | 0.000 | 0.000 | 1.179 |
| ENGINEERING PERSONNEL | 43 | 2 | 1 | 46 | 0.182 | 0.022 | 0.305 | 0.510 |
| TOTAL | 502 | 11 | 11 | 524 | 31.682 | 0.076 | 3.119 | 34.877 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 315 | 2 | 2 | 319 | 70.886 | 1.350 | 1.500 | 74.236 |
| OPERATING PERSONNEL | 46 | 3 | 2 | 51 | 6.563 | 0.328 | 2.335 | 9.226 |
| HEALTH PHYSICS PERSONNEL | 39 | 15 | 5 | 59 | 1.469 | 2.965 | 1.423 | 5.357 |
| SUPERVISORY PERSONNEL | 16 | 0 | 2 | 18 | 7.390 | 0.000 | 0.023 | 7.413 |
| ENGINEERING PERSONNEL | 70 | 21 | 4 | 95 | 11.379 | 1.153 | 0.058 | 12.588 |
| TOTAL | 486 | 41 | 15 | 542 | 97.687 | 6.296 | 5.337 | 109.520 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 2739 | 15 | 26 | 2780 | 543.069 | 3.144 | 20.006 | 566.199 |
| OPERATING PERSONNEL | 344 | 6 | 28 | 378 | 34.445 | 0.390 | 8.788 | 43.623 |
| HEALTH PHYSICS PERSONNEL | 341 | 109 | 54 | 504 | 56.830 | 17.878 | 11.753 | 86.511 |
| SUPERVISORY PERSONNEL | 139 | 54 | 11 | 204 | 18.811 | 2.811 | 0.475 | 22.097 |
| ENGINEERING PERSONNEL | 528 | 183 | 290 | 1001 | 70.610 | 46.550 | 192.616 | 309.776 |
| GRAND TOTAL | 4091 | 367 | 409 | 4867 | 723.795 | 70.773 | 233.638 | 1028.206 |

ENCLOSURE 2 - TABLE 3
NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

PLANT: SEQUOYAH 1, 2 (PWR) 1986

| WORK & JOB FUNCTION | Number of Personnel (>100 M-REM) Station Employees | Utility Employees | Contract & Others | Total Persons | Station Employees | Utility Employees | Contract & Others | Total Man-Rems |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPERATIONS & SURV. | | | | | | | | |
| MAINTENANCE PERSONNEL | 547 | 1 | 15 | 563 | 29.716 | 0.003 | 1.582 | 31.301 |
| OPERATING PERSONNEL | 71 | 0 | 3 | 74 | 11.798 | 0.000 | 0.046 | 11.844 |
| HEALTH PHYSICS PERSONNEL | 47 | 0 | 0 | 47 | 14.974 | 0.000 | 0.000 | 14.974 |
| SUPERVISORY PERSONNEL | 29 | 24 | 1 | 54 | 2.794 | 1.918 | 8.136 | 4.848 |
| ENGINEERING PERSONNEL | 72 | 17 | 60 | 149 | 9.005 | 2.436 | 17.621 | 29.072 |
| TOTAL | 766 | 42 | 79 | 887 | 68.297 | 4.357 | 19.385 | 92.039 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 559 | 0 | 16 | 575 | 143.973 | 0.000 | 3.807 | 151.780 |
| OPERATING PERSONNEL | 66 | 0 | 5 | 71 | 2.267 | 0.000 | 1.727 | 3.994 |
| HEALTH PHYSICS PERSONNEL | 48 | 0 | 0 | 48 | 7.638 | 0.000 | 0.000 | 7.638 |
| SUPERVISORY PERSONNEL | 26 | 24 | 1 | 51 | 2.189 | 0.436 | 0.002 | 2.627 |
| ENGINEERING PERSONNEL | 64 | 9 | 62 | 155 | 8.510 | 1.004 | 14.557 | 23.871 |
| TOTAL | 763 | 33 | 84 | 900 | 168.377 | 1.440 | 20.093 | 189.910 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 157 | 0 | 0 | 157 | 19.495 | 0.000 | 0.000 | 19.495 |
| OPERATING PERSONNEL | 16 | 0 | 0 | 16 | 0.019 | 0.000 | 0.000 | 0.019 |
| HEALTH PHYSICS PERSONNEL | 36 | 0 | 0 | 36 | 3.588 | 0.000 | 0.000 | 3.588 |
| SUPERVISORY PERSONNEL | 4 | 28 | 0 | 32 | 0.038 | 5.044 | 0.000 | 5.082 |
| ENGINEERING PERSONNEL | 27 | 11 | 28 | 66 | 0.518 | 0.517 | 6.531 | 7.566 |
| TOTAL | 240 | 39 | 28 | 307 | 23.658 | 5.561 | 6.531 | 35.750 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 549 | 1 | 11 | 561 | 124.938 | 0.000 | 2.251 | 127.189 |
| OPERATING PERSONNEL | 65 | 0 | 4 | 69 | 3.161 | 0.000 | 0.340 | 3.501 |
| HEALTH PHYSICS PERSONNEL | 45 | 1 | 0 | 46 | 2.514 | 0.005 | 0.000 | 2.519 |
| SUPERVISORY PERSONNEL | 17 | 12 | 1 | 30 | 0.323 | 0.527 | 0.000 | 0.850 |
| ENGINEERING PERSONNEL | 69 | 9 | 84 | 162 | 10.109 | 1.422 | 15.957 | 27.488 |
| TOTAL | 745 | 23 | 100 | 868 | 141.045 | 1.954 | 18.548 | 161.547 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 141 | 0 | 0 | 141 | 5.827 | 0.000 | 0.000 | 5.827 |
| OPERATING PERSONNEL | 16 | 0 | 3 | 19 | 5.350 | 0.000 | 1.332 | 6.682 |
| HEALTH PHYSICS PERSONNEL | 46 | 0 | 0 | 46 | 1.403 | 0.000 | 0.000 | 1.403 |
| SUPERVISORY PERSONNEL | 9 | 0 | 0 | 9 | 2.423 | 0.000 | 0.000 | 2.423 |
| ENGINEERING PERSONNEL | 6 | 0 | 0 | 6 | 0.210 | 0.000 | 0.000 | 0.210 |
| TOTAL | 218 | 0 | 3 | 221 | 15.213 | 0.000 | 1.332 | 16.545 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 109 | 0 | 2 | 111 | 17.972 | 0.000 | 0.022 | 17.994 |
| OPERATING PERSONNEL | 17 | 0 | 0 | 17 | 0.190 | 0.000 | 0.000 | 0.190 |
| HEALTH PHYSICS PERSONNEL | 22 | 0 | 0 | 22 | 0.785 | 0.000 | 0.000 | 0.785 |
| SUPERVISORY PERSONNEL | 4 | 7 | 0 | 11 | 0.718 | 0.150 | 0.000 | 0.868 |
| ENGINEERING PERSONNEL | 9 | 2 | 2 | 13 | 0.567 | 0.175 | 0.500 | 1.242 |
| TOTAL | 161 | 9 | 4 | 174 | 20.232 | 0.325 | 0.522 | 21.079 |
| | 2893 | 146 | 298 | 3337 | 436.822 | 13.637 | 66.411 | 516.870 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 2062 | 2 | 44 | 2108 | 345.921 | 0.003 | 7.662 | 353.586 |
| OPERATING PERSONNEL | 251 | 0 | 15 | 266 | 22.785 | 0.000 | 3.445 | 26.230 |
| HEALTH PHYSICS PERSONNEL | 244 | 1 | 0 | 245 | 30.902 | 0.005 | 0.000 | 30.907 |
| SUPERVISORY PERSONNEL | 89 | 95 | 3 | 187 | 8.485 | 8.075 | 0.146 | 16.698 |
| ENGINEERING PERSONNEL | 247 | 48 | 236 | 531 | 28.129 | 5.554 | 55.166 | 89.449 |
| TOTAL | 2893 | 146 | 298 | 3337 | 436.822 | 13.637 | 66.411 | 516.870 |

ENCLOSURE 2 - TABLE 3
NUMBER OF PERSONNEL AND MAN-REM BY WORK AND JOB FUNCTION

PLANT: SEQUOYAH 1, 2 (PWR) 1987

| WORK & JOB FUNCTION | Number of Personnel (>100 M-REM) Station Employees | Utility Employees | Contract & Others | Total Persons | Station Employees | Utility Employees | Contract & Others | Total Man-Rems |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPERATIONS & SURV. | | | | | | | | |
| MAINTENANCE PERSONNEL | 583 | 5 | 4 | 592 | 19.386 | 0.063 | 0.045 | 19.494 |
| OPERATING PERSONNEL | 55 | 9 | 0 | 64 | 5.644 | 0.243 | 0.000 | 5.887 |
| HEALTH PHYSICS PERSONNEL | 57 | 15 | 0 | 72 | 13.023 | 2.933 | 0.000 | 15.956 |
| SUPERVISORY PERSONNEL | 12 | 0 | 0 | 12 | 1.102 | 0.000 | 0.000 | 1.102 |
| ENGINEERING PERSONNEL | 87 | 16 | 110 | 213 | 3.128 | 0.642 | 5.800 | 9.570 |
| TOTAL | 794 | 45 | 114 | 953 | 42.283 | 3.881 | 5.845 | 52.009 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 637 | 7 | 3 | 647 | 69.521 | 0.321 | 0.230 | 70.072 |
| OPERATING PERSONNEL | 33 | 1 | 0 | 34 | 0.386 | 0.002 | 0.000 | 0.388 |
| HEALTH PHYSICS PERSONNEL | 61 | 15 | 0 | 76 | 4.294 | 0.555 | 0.000 | 4.849 |
| SUPERVISORY PERSONNEL | 11 | 0 | 1 | 12 | 0.189 | 0.000 | 0.000 | 0.189 |
| ENGINEERING PERSONNEL | 77 | 21 | 85 | 183 | 2.222 | 0.199 | 1.687 | 4.108 |
| TOTAL | 819 | 44 | 89 | 952 | 76.612 | 1.077 | 1.917 | 79.606 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 94 | 0 | 1 | 95 | 23.833 | 0.000 | 0.072 | 23.905 |
| OPERATING PERSONNEL | 2 | 0 | 0 | 2 | 0.072 | 0.000 | 0.000 | 0.072 |
| HEALTH PHYSICS PERSONNEL | 38 | 8 | 0 | 46 | 19.691 | 0.061 | 0.000 | 19.752 |
| SUPERVISORY PERSONNEL | 6 | 1 | 2 | 9 | 1.003 | 0.220 | 0.565 | 1.788 |
| ENGINEERING PERSONNEL | 19 | 11 | 57 | 87 | 1.614 | 8.661 | 48.604 | 58.879 |
| TOTAL | 159 | 20 | 60 | 239 | 46.213 | 8.942 | 49.241 | 104.396 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 596 | 8 | 5 | 609 | 101.780 | 0.435 | 0.769 | 102.984 |
| OPERATING PERSONNEL | 23 | 1 | 0 | 24 | 0.136 | 0.006 | 0.000 | 0.142 |
| HEALTH PHYSICS PERSONNEL | 49 | 8 | 0 | 57 | 2.606 | 0.109 | 0.000 | 2.715 |
| SUPERVISORY PERSONNEL | 4 | 0 | 0 | 4 | 0.031 | 0.000 | 0.000 | 0.031 |
| ENGINEERING PERSONNEL | 75 | 27 | 162 | 264 | 9.507 | 2.057 | 35.711 | 47.275 |
| TOTAL | 747 | 44 | 167 | 958 | 114.060 | 2.607 | 36.480 | 153.147 |
| REFUELING | | | | | | | | |
| NONE | | | | | | | | |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 112 | 0 | 0 | 112 | 2.225 | 0.000 | 0.000 | 2.225 |
| OPERATING PERSONNEL | 5 | 0 | 6 | 11 | 5.048 | 0.000 | 2.861 | 7.909 |
| HEALTH PHYSICS PERSONNEL | 30 | 1 | 0 | 31 | 1.116 | 0.004 | 0.000 | 1.120 |
| SUPERVISORY PERSONNEL | 4 | 0 | 0 | 4 | 0.211 | 0.000 | 0.000 | 0.211 |
| ENGINEERING PERSONNEL | 3 | 0 | 1 | 4 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 154 | 1 | 7 | 162 | 8.600 | 0.004 | 2.861 | 11.465 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 2022 | 20 | 13 | 2055 | 216.745 | 0.819 | 1.116 | 218.680 |
| OPERATING PERSONNEL | 118 | 11 | 6 | 134 | 11.286 | 0.251 | 2.861 | 14.398 |
| HEALTH PHYSICS PERSONNEL | 235 | 47 | 0 | 282 | 40.730 | 3.662 | 0.000 | 44.392 |
| SUPERVISORY PERSONNEL | 37 | 1 | 3 | 41 | 2.536 | 0.220 | 0.565 | 3.321 |
| ENGINEERING PERSONNEL | 261 | 75 | 415 | 751 | 16.471 | 11.559 | 91.802 | 119.832 |
| TOTAL | 2673 | 154 | 437 | 3264 | 287.768 | 16.511 | 96.344 | 400.623 |

ENCLOSURE 3

PROPOSED OPERATING LICENSE AMENDMENT

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-88-23)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATIONS

ENCLOSURE 3

Significant Hazards Evaluation

TVA has evaluated the proposed operating license amendment change and has determined that it does not represent a significant hazards consideration based on criteria established in 10 CFR 50.92(c). Operation of SQN in accordance with the proposed amendment will not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated. SQN unit 1 and unit 2 were designed and constructed on the basis of 40 years of plant operation. SQN's reactor vessel was fabricated and designed for a 40-year life. A comprehensive vessel materials surveillance program is maintained in accordance with 10 CFR 50, Appendix H. An analysis was performed to demonstrate compliance with the NRC pressurized thermal shock (PTS) screening criteria in accordance with 10 CFR 50.61(b)(2). The assessment of the projected PTS reference temperature demonstrated that the SQN units 1 and 2 pressure vessels would meet the toughness requirements of 10 CFR 50.61 for 32 effective full-power years of operation which is equivalent to a 40-year design life with an 80-percent capacity factor. Aging analyses have been performed for all safety-related electrical equipment in accordance within the scope of 10 CFR 50.49 (harsh environment). The qualified life of the equipment or component is incorporated within SQN's maintenance and replacement practices to ensure that this safety-related electrical equipment remains qualified and available to perform its safety function regardless of the overall age of the plant. Programs are in place to detect abnormal deterioration and aging of critical plant components. These programs include:

A. ASME Boiler and Pressure Vessel Code, Section XI, and 10 CFR 50 Section 50.55(g).

1. In-Service Inspection (ISI) Program - This program ensures that plant pressure retaining vessels, piping, and support systems are inspected in accordance with the ASME Section XI code.

2. In-Service Test (IST) Program - This program ensures that safety-related pumps and valves are tested in accordance with the ASME Section XI code.

B. Technical Specifications.

In addition to the ISI and IST programs, the following SQN technical specifications also provide a means of monitoring the cumulative effects of power operation during the lifetime of the plant.

1. Specification 3.4.5 - Steam Generators

An augmented steam generator inservice inspection program demonstrates operability of SQN's steam generators over the life of the plant.

2. Specification 3.4.9.1 - Reactor Coolant System Pressure/Temperature Limits

   The pressure and temperature of the reactor coolant system are limited to protect against non-ductile failure of the reactor coolant system. These limits are updated periodically over the life of the plant to ensure that the fracture toughness requirements for the ferritic material within the reactor coolant pressure boundary are maintained.

3. Specification 3.4.10 - Reactor Coolant System Structural Integrity

   The ISI and IST programs, in conjuction with the additional inspections required for the Reactor Coolant Pump flywheel and reactor vessel nozzels, ensure the structural integrity and operational readiness of these components will be maintained throughout the life of the plant.

   Specification 5.7.1 - Component Cyclic or Transient Limit

   Monitoring, recording, and evaluation of certain cyclic and transient limits provides a high level of confidence that certain components within the reactor coolant and secondary systems will not experience fatigue failure over their 40 year design life.

(2) Create the possibility of a new or different kind of accident from any previously analyzed. The proposed amendment is administrative in nature and does not affect the safety analysis, plant equipment, or the physical facility. Because the accident analysis of SQN's FSAR remains bounding, no new or different kind of accident scenarios are created by this change.

(3) Involve a significant reduction in a margin of safety. The proposed amendment involves only a change to the expiration dates of the operating licenses. Because SQN is based on a 40-year service life, this change will not affect the safety margins.

Based on the above considerations, we conclude that the extension of the SQN operating licenses in accordance with the proposed amendment will not involve a significant increase in the probability or consequences of accidents previously of a new or different kind of accident and will not involve a significant reduction in a safety margin. Therefore, we conclude that there is no significant hazards consideration associated with the proposed revision to the SQN operating licenses.

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