# ENGINEERING CALCULATIONS AND ANALYSIS REPORT

Title: As-Run Physics Analysis for the AGC-2 Experiment Irradiated in the ATR

ECAR No.: 2291 ECAR Rev. No.: 0 Project File No.: 23747 Date: 03/06/2014

| | | |
|---|---|---|
| 1. Quality Level (QL) No. | 2 | **Professional Engineer's Stamp**<br><br>See LWP-10010 for requirements. |
| 2. QL Determination No. | REC-000169 Rev 2 | |
| 3. Engineering Job (EJ) No. | NA | |
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7. Objective/Purpose:

This Engineering Calculations Analysis Report (ECAR) documents the results of the Advanced Test Reactor (ATR) detailed physics analyses performed to calculate the displacements per atom (DPA) and the fast neutron fluence (E > 0.1 MeV) of the Advanced Graphite Creep (AGC) experiment, AGC-2, irradiated in the ATR South Flux Trap (SFT) (see Figure 1) during ATR Cycle 149A, Cycle 149B, Cycle 150B, Cycle 151A, and Cycle 151B. This ECAR also reports the neutron and photon heat rates for the materials of the AGC-2 experiment for ATR Cycle 149B. The results for these evaluations and analysis are reported herein.

8. Conclusions/Recommendations:

The AGC-2 as-run specimen neutron fast fluence (E > 0.1 MeV), DPA, and material heat rate calculations were performed using MCNP. All calculated results are tabulated herein.

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## Contents

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| Project Role | Name (Typed) | Organization | Pages covered (if applicable) |
|---|---|---|---|
| Performer | J. R. Parry | C660 | All |
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| Document Owner[e] | M. E. Davenport | P100 | |

## Responsibilities:

a. Confirmation of completeness, mathematical accuracy, and correctness of data and appropriateness of assumptions.

b. Concurrence of method or approach. See definition, LWP-10106.

c. Concurrence with the document's markings in accordance with LWP-11202.

d. Concurrence of procedure compliance. Concurrence with method/approach and conclusion.

e. Concurrence with the document's assumptions and input information. See definition of Acceptance, LWP-10200.

## 1.0 Introduction

This Engineering Calculations Analysis Report (ECAR) documents the results of the Advanced Test Reactor (ATR) detailed physics analyses performed to calculate the displacements per atom (DPA) and the fast neutron fluence (E > 0.1 MeV) of the Advanced Graphite Creep (AGC) experiment, AGC-2, irradiated in the ATR South Flux Trap (SFT) (see Figure 1) during ATR Cycle 149A, Cycle 149B, Cycle 150B, Cycle 151A, and Cycle 151B. This ECAR also reports the neutron and photon heat rates for the materials of the AGC-2 experiment for ATR Cycle 149B. The results for these evaluations and analyses are reported herein.

## 2.0 Assumptions

The assumptions used while performing this analysis are stated below.

1. The material heat rates can be scaled from the analyzed power to the desired power by multiplying the reported heat rates by the ratio of the desired power to the analyzed power.
2. The South source power is the average of the SE lobe power, Center power, and SW power.
3. Heating rate values reported for the AGC-2 experiment assembly within the ATR SFT include energy deposition from prompt neutrons, prompt gammas, and delayed gammas.

## 3.0 Experiment Description

The AGC-2 experiment was irradiated in the SFT test position of the ATR (shown in Figure 1). The AGC-2 experiment assembly consists of a single capsule that serves as the pressure boundary of the experiment. In the radial dimension, the capsule contains a specimen holder with 6 equally spaced graphite specimen openings around a single central graphite specimen opening. The outer diameter of the specimen holder varies axially to provide a varying gas gap used to maintain the specified temperature conditions for the graphite specimens. A thermal heat shield is incorporated in the experiment assembly to aid in temperature control. The heat shield is incorporated to impede the thermal radiation heat transfer in the experiment. Graphite specimens are stacked in the specimen openings of the specimen holder. The specimens have a diameter of ≈0.5 inches and are either ≈1 inch in length or ≈0.25 inches in length. Graphite spacers having a diameter of ≈0.5 inches and a length of ≈0.25 inches separate the specimens. The outer 6 specimen stacks are designed in such a way as to apply a compressive stress to the specimens located above the core mid-plane while leaving the specimens below the core mid-plane unstressed. The specimens in the center specimen stack location are all unstressed. Pneumatic pistons located outside of the high neutron and gamma fields of the reactor provide the stress on the specimens.

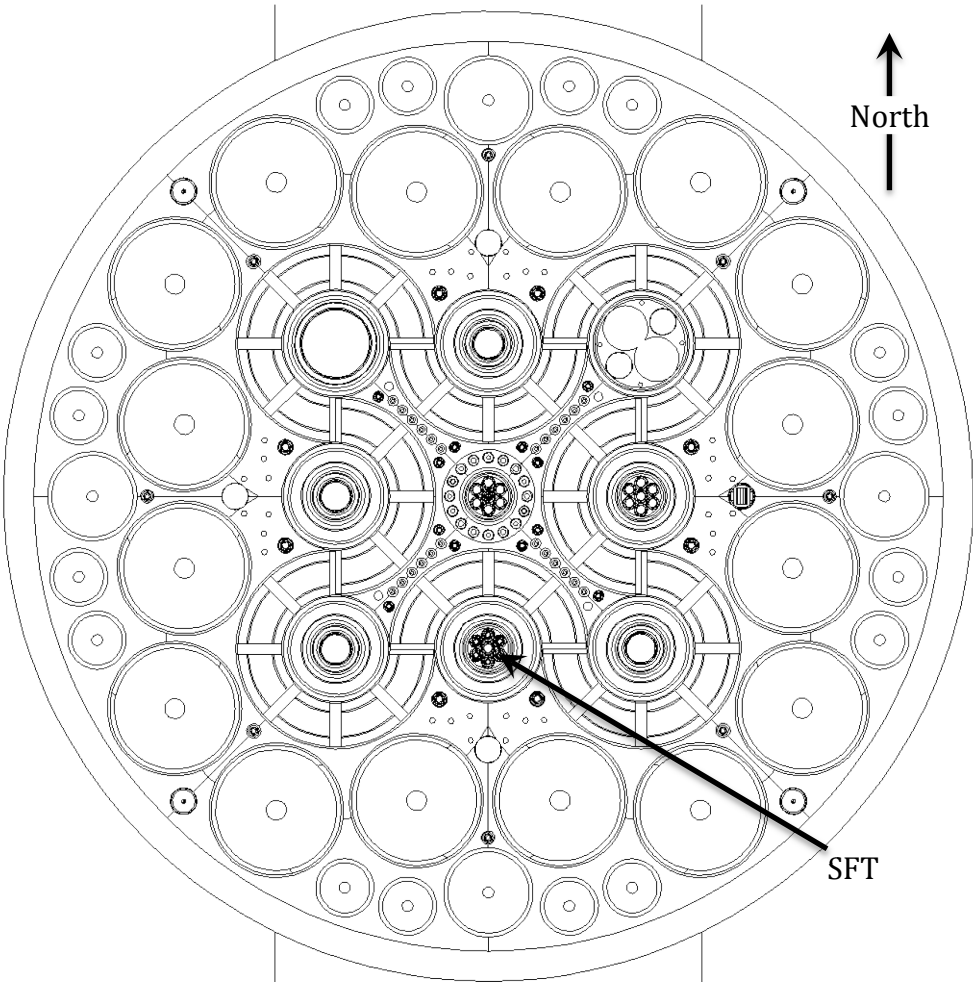


**Figure 1: Mid-plane cross section of the ATR core.**

Zirconia insulating rods with the same diameter as the specimens are placed in the outer 6 specimen stacks at the bottom of the experiment to help maintain desired temperatures. A tungsten rod with the same diameter as the specimens is placed in the center position at the top of the specimen stack for additional heat generation. The zirconia rods below the specimens (bottom of the experiment) are one half inch in length extending from 23.5 inches below core centerline to 24.0 inches below core centerline. The tungsten rod at the top of the center specimen stack extends from 18.5 inches above core centerline to 20.0 inches above core centerline. The pushrods transferring the load to the specimens are composed of graphite. Another feature included in the experiment to help with temperature control is a Macor insulator at the top of the experiment. This insulator helps impede heat transfer in the axial direction.

The temperature of the experiment is monitored using 12 thermocouples (TCs) inserted into the experiment assembly. The 12 TCs are located in the specimen holder at 6 equally spaced azimuthal locations between the 6 outer specimen stack locations and two different radial distances from the

experiment center. Each TC is located axially in the experiment assembly at a specified elevation. A radial cross section view of the experiment assembly is shown in Figure 2 and Figure 3.

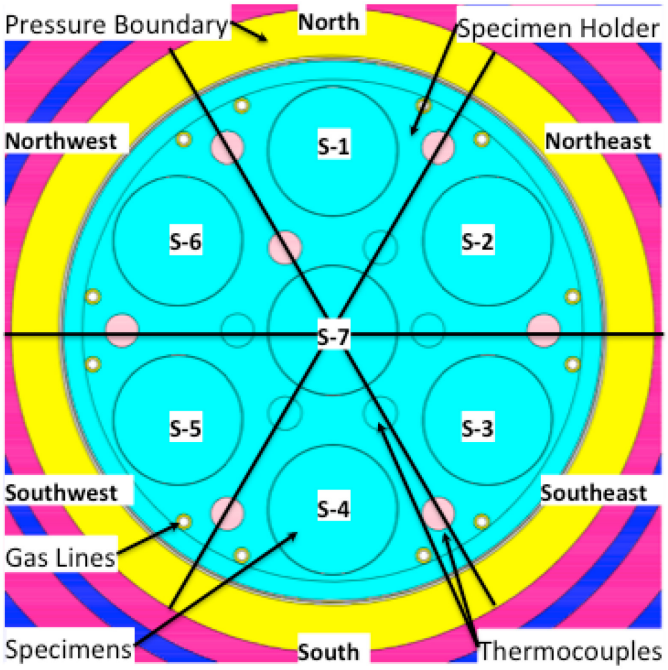


**Figure 2: Radial view of the AGC-2 experiment.**

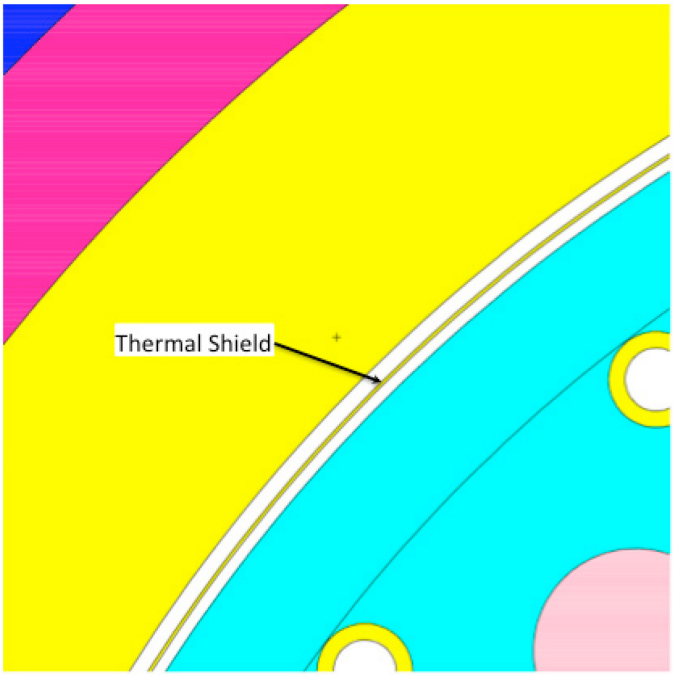


**Figure 3: Close-up radial view of the AGC-2 experiment.**

## 4.0 Model Description and Data

MCNP [1][2], a general purpose Monte Carlo N-Particle transport code, was used to model and evaluate the as-run DPA and fast neutron fluence of the AGC-2 experiment specimens. MCNP was also used to calculate the AGC-2 experiment material heat rates for the first cycle. The MCNP model used for the as-

run analyses was nearly identical to that used in the projected physics analysis reported in ECAR-1050 [3]. The only difference in the models was the ATR driver fuel loading was changed to represent each as-run cycle driver fuel loading, and the shim positions were changed to better represent the as-run shim positions.

Table 1 provides a list of the relevant drawings, per DWG 603542. Dimensional changes that have occurred to these drawings since the creation of the original MCNP model have been confirmed to be negligible to the analyses contained in this report.

**Table 1: INL drawings for the AGC-2 experiment.**

| INL Drawing | Revision | Drawing Title |
|---|---|---|
| DWG-601256 | 1 | ATR Advanced Graphite Capsule 2 (AGC-2) Specimen Stack-up Arrangements |
| DWG-601258 | 1 | ATR Advanced Graphite Capsule 2 (AGC-2) Graphite Specimen Holder Assemblies and Details |
| DWG-601266 | 2 | ATR Advanced Graphite Capsule Number 2 (AGC-2) Capsule Facility Assembly |
| DWG-630427 | 3 | ATR Advanced Graphite Capsule (AGC) Specimen Holder and Insulator Details and Assemblies |
| DWG-630428 | 5 | ATR Advanced Graphite Test Stainless Steel and Aluminum Component Details |
| DWG-630432 | 1 | ATR Advanced Graphite Test Transitioned Thermal Heat Shield Details and Assembly |
| DWG-630434 | 1 | ATR Advanced Graphite Test Pressure Boundary Tube |

### 4.1 Data Libraries

Both the MCNP standard cross-section data libraries [2] and the JENDL-3.2 cross-section library [4] were used to calculate the neutron flux incident on the AGC-2 experiment and the graphite DPA. This data was then used to calculate the quantities of interest.

## 5.0 Analysis and Calculations

MCNP was used to calculate the AGC-2 heating rate, fast flux (E > 0.1 MeV), and DPA. MCNP reports tally results normalized per source particle, requiring normalization factors to convert tally results to the quantity of interest.

### 5.1 MCNP Neutron Flux Calculations

MCNP reports tally results normalized per source particle. The flux tallies for neutrons have units of neutrons/cm$^2$ per fission neutron. The MCNP type 4 flux tally results are used to calculate the neutron flux. The MCNP tally type 4 (for neutrons) has units of neutrons/cm$^2$ per source neutron. The neutron flux conversion factor (NFCF) is defined by Equation (1).

$$\text{NFCF} = \left(\frac{2.43 \text{ fission neutrons}}{\text{fission}}\right)\left(\frac{\text{fission}}{200 \text{ MeV}}\right)\left(\frac{6.24151\times10^{18} \text{ MeV}}{\text{MW}_{\text{corepower}} - \text{s}}\right)$$

$$\text{NFCF} = 7.583\times10^{16} \frac{\text{fission neutrons}}{\text{MW}_{\text{core power}} - \text{s}} \quad (1)$$

The neutron flux values are calculated using the MCNP tally type 4 results, the NFCF, and the ATR core power. The neutron flux is calculated using Equation (2).

$$\Phi_{neutron} = \left(\text{type 4 tally} \frac{\text{neutrons}}{\text{cm}^2 - \text{fission neutron}}\right)\left(7.583\times10^{16} \frac{\text{fission neutrons}}{\text{MW}_{\text{corepower}} - \text{s}}\right)(\text{Core Power MW})$$

$$\Phi_{neutron} = (\text{f4})(7.583\times10^{16})(\text{Core Power}) \frac{\text{neutrons}}{\text{cm}^2 - \text{s}} \quad (2)$$

### 5.2 MCNP DPA Calculations

Using a flux-to-dose conversion factor calculated by Greenwood [5], the MCNP type 4 tally results are also used to calculate the DPA. The DPA normalization factor (DNF) is defined by Equation (3). The Greenwood DPA conversion factor (GDCF) is defined by Equation (4).

$$\text{DNF} = \left(\frac{2.43 \text{ fission neutrons}}{\text{fission}}\right)\left(\frac{\text{fission}}{200 \text{ MeV}}\right)\left(\frac{6.24151\text{x}10^{18}\text{MeV}}{\text{MW}_{\text{core power}} - \text{s}}\right)$$

$$\text{DNF} = 7.583\text{x}10^{-16} \frac{\text{fission neutrons}}{\text{MW}_{\text{core power}} - \text{s}} \quad (3)$$

$$\text{GDCF} = \frac{0.8\,\sigma_{\text{DAM}}}{2\,E_D} \quad (4)$$

where

$\sigma_{\text{DAM}}$ = material-specific damage cross section (keV-barn)

$E_D$ = material-specific effective displacement threshold energy (keV)

MCNP modified type 4 tally results as defined by Equation (5) are utilized to calculate the DPA values. This tally is produced via a MCNP energy multiplier card that provides the flux-to-dose conversion factor as an energy-dependent response function.

$$\text{modified type 4 tally} = \left(\text{type 4 tally } \frac{\text{neutrons}}{\text{cm}^2\text{- fission neutron}}\right)(\text{GDCF barns})$$

$$\text{modified type 4 tally} = (\text{f4})(\text{GDCF})\ \frac{\text{DPA interactions-barns}}{\text{fission neutron-cm}^2} \tag{5}$$

The DPA values are calculated using the MCNP modified type 4 tally results, the DNF, a conversion factor, the ATR core power and the time step Effective Full Power Day (EFPD) in seconds. The DPA is calculated using Equation (6).

$$\text{DPA} = (\text{modified type 4 tally})(\text{DNF})\left(\frac{10^{-24}\text{cm}^2}{\text{barn}}\right)(\text{Core Power})(\text{EFPD}) \tag{6}$$

### 5.3 MCNP Prompt Heating Calculations

MCNP reports tally results normalized per source particle. The MCNP type 6 energy deposition tally results or type 7 fission energy deposition tally results can be used to calculate heat generation rates. For this calculation, type 6 energy deposition tally results were used. The MCNP tally type 6 has units of MeV/g per source particle (fission neutron for prompt neutron heating, gamma heating, and fission heating). The heating normalization factor (HNF) is defined by Equation (7).

$$\text{HNF} = \left(\frac{2.43\ \text{fission neutrons}}{\text{fission}}\right)\left(\frac{\text{fission}}{200\ \text{MeV}}\right)\left(\frac{6.24151\times10^{18}\ \text{MeV}}{\text{MW}_{\text{corepower}}\text{ - s}}\right)\left(\frac{1.60218\times10^{-13}\ \text{W - s}}{\text{MeV}}\right)$$

$$\text{HNF} = 1.215\times10^{4}\ \frac{\text{fission neutrons - W}}{\text{MW}_{\text{core power}}\text{ - MeV}} \tag{7}$$

The heat generation rate values are calculated using the MCNP tally type 6 results, the HNF, and the ATR core power. Prompt neutron and gamma heating rates (PHR) are calculated using Equation (8).

$$\text{PHR} = \left(\text{type 6 tally}\frac{\text{MeV}}{\text{g - fission neutron}}\right)\left(1.215\times10^{4}\ \frac{\text{fission neutrons - W}}{\text{MW}_{\text{core power}}\text{ - MeV}}\right)(\text{Core Power MW})$$

$$\text{PHR} = (\text{f6})(\text{HNF})(\text{Core Power}) = \frac{\text{W}}{\text{g}} \tag{8}$$

### 5.4 MCNP Delayed Fission Product Heating Calculations

MCNP reports tally results normalized per source particle. The heating tallies have units of MeV/g per fission neutron. The MCNP type 6 energy deposition tally results are used to calculate delayed gamma heat generation rates. The MCNP tally type 6 has units of MeV/g per source particle (per delayed fission

product gamma for delayed fission product gamma heating). The delayed gamma heating normalization factor (DNF) is defined by Equation (9) using 8.9603 delayed fission photons per fission [6].

$$\mathrm{DNF} = \left(\frac{8.9603\ \text{delayed photons}}{\text{fission}}\right)\left(\frac{\text{fission}}{200\ \text{MeV}}\right)\left(\frac{6.24151\times10^{18}\,\text{MeV}}{\text{MW}_{\text{corepower}}\text{ - s}}\right)\left(\frac{1.60218\times10^{-13}\,\text{W - s}}{\text{MeV}}\right)$$

$$\mathrm{DNF} = 4.480\times10^{4}\frac{\text{delayed photons - W}}{\text{MW}_{\text{corepower}}\text{ - MeV}} \tag{9}$$

The heat generation rate values are calculated using the MCNP tally type 6 or type 7 results, the DNF, and the ATR core power. Delayed fission product heating rate (DHR) is calculated using Equation (10).

$$\mathrm{DHR} = \left(\text{type 6 tally}\frac{\text{MeV}}{\text{g - delayed photons}}\right)\left(4.480\times10^{4}\frac{\text{delayed photons-W}}{\text{MW}_{\text{core power}}\text{-MeV}}\right)\left(\text{Core Power MW}\right)$$

$$\mathrm{DHR} = (\text{f6})(\text{DNF})(\text{Core Power}) = \frac{\text{W}}{\text{g}} \tag{10}$$

## 6.0 Software

Table 2 identifies the computer codes used to perform the calculations and analyses documented by this ECAR. These computer codes are listed in the INL Enterprise Architecture (EA) Repository and are accepted as qualified scientific and engineering analysis software.

**Table 2: INL Qualified Analysis Software Version and EA ID**

| Code Name | Version | EA ID |
|---|---|---|
| MCNP | 5 (Release 1.40) | 234166 |

MCNP has been validated for use at the INL to support irradiation experiments [7]. The computer configurations identified in Table 3 were used to perform the MCNP calculations reported by this ECAR.

**Table 3: Computer Configurations for INL Qualified MCNP5 installations.**

| Model of Computer | Processor | Operating System |
|---|---|---|
| Fission<br>Appro distributed memory system | 391 compute nodes<br>four 8x2.4 GHz AMD Opteron(tm) processor 6136<br>64 GB memory<br>QDR InfiniBand 3.5:1 | RedHat Linux Enterprise Server 5.7 |
| Icestorm<br>SGI Altix ICE 8200 distributed memory blade cluster | 256 compute blades with two quad core Intel Xeon processors each<br>2,048 compute cores total, 2.66 GHz clock speed<br>2 login nodes, each with 8 cores<br>2 GB memory per core, 4 TB memory total<br>DDR 4X InfiniBand interconnect network | SUSE Linux Enterprise Server 10 |

## 7.0 Results

The AGC-2 experiment was irradiated during ATR Cycle 149A, Cycle 149B, and Cycle 150B in the SFT. The experiment was then rotated 180º and further irradiated in the SFT during ATR Cycle 151A and 151B. The calculated as-run DPA, as-run fast neutron fluence, and representative as-run heat rates are reported herein. All tally results used for the reported results had acceptable statistics.

### 7.1 Representative As-Run Heat Rates

Representative as-run material heat rates were calculated using ATR Cycle 149B reactor conditions. The heat rates are reported for a South source power of 23.2 MW on June 22, 2011. This time was arbitrarily chosen to represent typical AGC-2 heat rates with the understanding that the heat rates could be scaled to reactor conditions at any point in time using a ratio of South source powers. The material heat rates for the pressure boundary, the heat shield, the graphite holder, the specimens, the outer TC positions, the inner TC positions, the primary coolant water, the tungsten and zirconia spacers, and the top Macor are presented in Table 4 through Table 12 respectively.

**Table 4: Heat Rates for the pressure boundary scaled to a South power of 23.2 MW.**

| Elevation (in. from mid-plane) | Pressure Boundary North (W/g) | Northeast (W/g) | Southeast (W/g) | South (W/g) | Southwest (W/g) | Northwest (W/g) |
|---|---|---|---|---|---|---|
| -24.12 | 2.36 | 2.29 | 2.03 | 1.84 | 2.03 | 2.26 |
| -23.125 | 2.83 | 2.79 | 2.45 | 2.24 | 2.46 | 2.74 |
| -22.125 | 3.29 | 3.27 | 2.86 | 2.62 | 2.84 | 3.23 |
| -21.125 | 3.74 | 3.62 | 3.25 | 2.95 | 3.24 | 3.66 |
| -20.125 | 4.25 | 4.11 | 3.62 | 3.31 | 3.62 | 4.06 |
| -19.125 | 4.69 | 4.53 | 3.98 | 3.63 | 3.99 | 4.49 |
| -18.125 | 5.09 | 4.90 | 4.41 | 3.99 | 4.43 | 4.94 |
| -17.125 | 5.58 | 5.43 | 4.77 | 4.30 | 4.75 | 5.37 |
| -16.125 | 5.98 | 5.72 | 5.11 | 4.63 | 5.11 | 5.77 |
| -15.125 | 6.37 | 6.17 | 5.46 | 4.93 | 5.47 | 6.17 |
| -14.125 | 6.69 | 6.53 | 5.76 | 5.27 | 5.77 | 6.44 |
| -13.125 | 7.09 | 6.90 | 6.09 | 5.52 | 6.04 | 6.88 |
| -12.125 | 7.43 | 7.22 | 6.34 | 5.76 | 6.31 | 7.22 |
| -11.125 | 7.77 | 7.49 | 6.68 | 6.00 | 6.61 | 7.48 |
| -10.125 | 8.04 | 7.83 | 6.82 | 6.26 | 6.89 | 7.80 |
| -9.125 | 8.33 | 8.03 | 7.09 | 6.40 | 7.09 | 8.00 |
| -8.125 | 8.52 | 8.18 | 7.30 | 6.58 | 7.31 | 8.18 |
| -7.125 | 8.70 | 8.44 | 7.46 | 6.83 | 7.41 | 8.34 |
| -6.125 | 8.90 | 8.70 | 7.64 | 6.94 | 7.56 | 8.54 |
| -5.125 | 8.98 | 8.77 | 7.79 | 7.09 | 7.74 | 8.79 |
| -4.125 | 9.11 | 8.89 | 7.76 | 7.07 | 7.77 | 8.86 |
| -3.125 | 9.27 | 8.96 | 7.90 | 7.14 | 7.85 | 8.95 |
| -2.125 | 9.27 | 9.06 | 8.01 | 7.19 | 7.94 | 9.01 |
| -1.125 | 9.26 | 9.02 | 7.97 | 7.18 | 7.95 | 8.97 |
| -0.125 | 9.29 | 9.04 | 7.92 | 7.21 | 8.04 | 8.99 |
| 0.125 | 9.31 | 9.07 | 8.03 | 7.28 | 7.99 | 8.98 |
| 1.125 | 9.29 | 9.01 | 7.89 | 7.21 | 7.90 | 8.96 |
| 2.125 | 9.25 | 8.93 | 7.85 | 7.16 | 7.88 | 8.91 |
| 3.125 | 9.12 | 8.78 | 7.83 | 7.06 | 7.79 | 8.86 |
| 4.125 | 8.94 | 8.76 | 7.69 | 7.03 | 7.72 | 8.72 |
| 5.125 | 8.88 | 8.63 | 7.59 | 6.89 | 7.53 | 8.61 |
| 6.125 | 8.74 | 8.36 | 7.45 | 6.67 | 7.40 | 8.42 |
| 7.125 | 8.45 | 8.17 | 7.20 | 6.52 | 7.25 | 8.17 |
| 8.125 | 8.18 | 8.01 | 7.06 | 6.29 | 7.05 | 7.90 |
| 9.125 | 8.02 | 7.65 | 6.75 | 6.14 | 6.77 | 7.63 |
| 10.125 | 7.65 | 7.40 | 6.45 | 5.86 | 6.49 | 7.37 |
| 11.125 | 7.27 | 7.10 | 6.28 | 5.67 | 6.21 | 7.07 |
| 12.125 | 7.00 | 6.75 | 5.89 | 5.36 | 5.94 | 6.73 |
| 13.125 | 6.56 | 6.31 | 5.55 | 5.08 | 5.59 | 6.31 |
| 14.125 | 6.14 | 5.96 | 5.26 | 4.82 | 5.23 | 5.92 |
| 15.125 | 5.71 | 5.53 | 4.92 | 4.42 | 4.89 | 5.55 |
| 16.125 | 5.34 | 5.13 | 4.51 | 4.09 | 4.51 | 5.12 |
| 17.125 | 4.87 | 4.62 | 4.10 | 3.68 | 4.12 | 4.69 |
| 18.125 | 4.33 | 4.17 | 3.63 | 3.33 | 3.73 | 4.14 |
| 19.125 | 3.78 | 3.65 | 3.20 | 2.91 | 3.17 | 3.65 |
| 20.125 | 3.26 | 3.15 | 2.79 | 2.46 | 2.74 | 3.12 |
| 21.125 | 2.65 | 2.62 | 2.29 | 2.15 | 2.28 | 2.59 |
| 22.125 | 2.07 | 2.04 | 1.81 | 1.70 | 1.83 | 2.01 |
| 23.125 | 1.60 | 1.58 | 1.44 | 1.31 | 1.43 | 1.54 |
| 24.125 | 1.27 | 1.21 | 1.12 | 1.05 | 1.11 | 1.24 |

**Table 5: Heat Rates for the heat shield scaled to a South power of 23.2 MW.**

| Elevation (in. from mid-plane) | Heat Shield North (W/g) | Northeast (W/g) | Southeast (W/g) | South (W/g) | Southwest (W/g) | Northwest (W/g) |
|---|---|---|---|---|---|---|
| -24.12 | 2.28 | 2.16 | 2.01 | 1.81 | 1.99 | 2.19 |
| -23.125 | 2.82 | 2.72 | 2.44 | 2.32 | 2.42 | 2.68 |
| -22.125 | 3.16 | 3.24 | 2.90 | 2.75 | 2.86 | 3.15 |
| -21.125 | 3.65 | 3.55 | 3.30 | 3.09 | 3.37 | 3.56 |
| -20.125 | 4.09 | 4.03 | 3.67 | 3.47 | 3.71 | 3.99 |
| -19.125 | 4.53 | 4.45 | 4.06 | 3.82 | 4.08 | 4.36 |
| -18.125 | 5.04 | 4.74 | 4.49 | 4.15 | 4.51 | 4.87 |
| -17.125 | 5.37 | 5.37 | 4.86 | 4.51 | 4.76 | 5.26 |
| -16.125 | 5.91 | 5.66 | 5.18 | 4.78 | 5.19 | 5.61 |
| -15.125 | 6.28 | 6.16 | 5.56 | 5.17 | 5.55 | 6.09 |
| -14.125 | 6.53 | 6.37 | 5.90 | 5.58 | 5.93 | 6.30 |
| -13.125 | 6.85 | 6.61 | 6.16 | 5.69 | 6.07 | 6.60 |
| -12.125 | 7.22 | 7.16 | 6.46 | 6.01 | 6.48 | 7.11 |
| -11.125 | 7.51 | 7.26 | 6.75 | 6.27 | 6.72 | 7.33 |
| -10.125 | 7.77 | 7.70 | 6.90 | 6.62 | 6.96 | 7.69 |
| -9.125 | 8.10 | 7.81 | 7.24 | 6.71 | 7.20 | 7.94 |
| -8.125 | 8.18 | 7.91 | 7.36 | 6.88 | 7.37 | 7.95 |
| -7.125 | 8.43 | 8.16 | 7.51 | 7.24 | 7.39 | 8.15 |
| -6.125 | 8.55 | 8.42 | 7.77 | 7.12 | 7.68 | 8.33 |
| -5.125 | 8.67 | 8.53 | 7.74 | 7.41 | 7.84 | 8.58 |
| -4.125 | 8.86 | 8.58 | 7.85 | 7.32 | 7.80 | 8.68 |
| -3.125 | 8.88 | 8.71 | 8.08 | 7.50 | 8.00 | 8.69 |
| -2.125 | 8.93 | 8.83 | 7.96 | 7.47 | 8.09 | 8.72 |
| -1.125 | 8.94 | 8.82 | 7.96 | 7.55 | 8.03 | 8.64 |
| -0.125 | 9.14 | 8.86 | 7.92 | 7.34 | 7.98 | 8.78 |
| 0.125 | 8.91 | 8.82 | 8.16 | 7.61 | 8.13 | 8.66 |
| 1.125 | 9.05 | 8.78 | 7.95 | 7.45 | 7.74 | 8.55 |
| 2.125 | 8.73 | 8.77 | 7.91 | 7.48 | 7.91 | 8.58 |
| 3.125 | 8.72 | 8.64 | 7.90 | 7.11 | 7.82 | 8.58 |
| 4.125 | 8.62 | 8.42 | 7.91 | 7.24 | 7.76 | 8.43 |
| 5.125 | 8.60 | 8.39 | 7.59 | 7.11 | 7.44 | 8.29 |
| 6.125 | 8.36 | 8.06 | 7.42 | 6.80 | 7.36 | 8.23 |
| 7.125 | 8.30 | 7.92 | 7.19 | 6.61 | 7.32 | 7.95 |
| 8.125 | 7.90 | 7.66 | 7.04 | 6.43 | 7.06 | 7.71 |
| 9.125 | 7.74 | 7.50 | 6.72 | 6.25 | 6.76 | 7.43 |
| 10.125 | 7.46 | 7.23 | 6.40 | 6.01 | 6.45 | 7.10 |
| 11.125 | 7.08 | 6.93 | 6.23 | 5.82 | 6.19 | 6.90 |
| 12.125 | 6.80 | 6.47 | 5.87 | 5.53 | 5.96 | 6.56 |
| 13.125 | 6.29 | 6.29 | 5.56 | 5.16 | 5.67 | 6.17 |
| 14.125 | 5.85 | 5.86 | 5.18 | 5.02 | 5.15 | 5.67 |
| 15.125 | 5.51 | 5.29 | 4.93 | 4.57 | 4.87 | 5.43 |
| 16.125 | 5.16 | 5.02 | 4.53 | 4.15 | 4.57 | 4.87 |
| 17.125 | 4.64 | 4.50 | 4.08 | 3.74 | 4.09 | 4.57 |
| 18.125 | 4.18 | 3.93 | 3.61 | 3.30 | 3.72 | 3.97 |
| 19.125 | 3.57 | 3.46 | 3.21 | 2.93 | 3.07 | 3.53 |
| 20.125 | 3.10 | 3.00 | 2.82 | 2.51 | 2.72 | 3.04 |
| 21.125 | 2.58 | 2.59 | 2.33 | 2.20 | 2.29 | 2.54 |
| 22.125 | 1.99 | 1.95 | 1.89 | 1.80 | 1.83 | 1.97 |
| 23.125 | 1.63 | 1.55 | 1.42 | 1.44 | 1.48 | 1.59 |
| 24.125 | 1.24 | 1.20 | 1.13 | 1.10 | 1.17 | 1.21 |

**Table 6: Heat Rates for the graphite holder scaled to a South power of 23.2 MW.**

| Elevation (in. from mid-plane) | Graphite Holder North (W/g) | Northeast (W/g) | Southeast (W/g) | South (W/g) | Southwest (W/g) | Northwest (W/g) |
|---|---|---|---|---|---|---|
| -24.12 | 1.95 | 1.86 | 1.74 | 1.67 | 1.76 | 1.87 |
| -23.125 | 2.34 | 2.30 | 2.10 | 2.03 | 2.13 | 2.29 |
| -22.125 | 2.70 | 2.65 | 2.47 | 2.35 | 2.48 | 2.67 |
| -21.125 | 3.07 | 3.03 | 2.80 | 2.67 | 2.80 | 2.99 |
| -20.125 | 3.46 | 3.36 | 3.15 | 3.00 | 3.13 | 3.39 |
| -19.125 | 3.82 | 3.70 | 3.47 | 3.30 | 3.41 | 3.69 |
| -18.125 | 4.19 | 4.06 | 3.78 | 3.60 | 3.75 | 4.04 |
| -17.125 | 4.55 | 4.44 | 4.04 | 3.92 | 4.08 | 4.39 |
| -16.125 | 4.82 | 4.71 | 4.37 | 4.17 | 4.38 | 4.70 |
| -15.125 | 5.17 | 5.03 | 4.70 | 4.49 | 4.69 | 5.04 |
| -14.125 | 5.46 | 5.28 | 4.91 | 4.70 | 4.99 | 5.31 |
| -13.125 | 5.77 | 5.63 | 5.19 | 5.00 | 5.18 | 5.57 |
| -12.125 | 6.06 | 5.87 | 5.45 | 5.17 | 5.44 | 5.89 |
| -11.125 | 6.32 | 6.10 | 5.69 | 5.39 | 5.69 | 6.09 |
| -10.125 | 6.55 | 6.36 | 5.89 | 5.59 | 5.91 | 6.40 |
| -9.125 | 6.75 | 6.55 | 6.10 | 5.83 | 6.14 | 6.58 |
| -8.125 | 6.89 | 6.68 | 6.25 | 5.95 | 6.28 | 6.72 |
| -7.125 | 7.04 | 6.93 | 6.39 | 6.13 | 6.44 | 6.92 |
| -6.125 | 7.23 | 7.04 | 6.57 | 6.26 | 6.55 | 7.03 |
| -5.125 | 7.35 | 7.10 | 6.70 | 6.38 | 6.71 | 7.20 |
| -4.125 | 7.37 | 7.22 | 6.71 | 6.42 | 6.72 | 7.22 |
| -3.125 | 7.45 | 7.32 | 6.88 | 6.53 | 6.75 | 7.33 |
| -2.125 | 7.59 | 7.36 | 6.85 | 6.50 | 6.82 | 7.34 |
| -1.125 | 7.64 | 7.42 | 6.83 | 6.54 | 6.94 | 7.41 |
| -0.125 | 7.61 | 7.40 | 6.87 | 6.53 | 6.92 | 7.41 |
| 0.125 | 7.58 | 7.37 | 6.87 | 6.59 | 6.91 | 7.42 |
| 1.125 | 7.57 | 7.37 | 6.82 | 6.55 | 6.89 | 7.34 |
| 2.125 | 7.48 | 7.35 | 6.76 | 6.50 | 6.85 | 7.28 |
| 3.125 | 7.45 | 7.27 | 6.73 | 6.37 | 6.76 | 7.29 |
| 4.125 | 7.36 | 7.12 | 6.66 | 6.29 | 6.67 | 7.22 |
| 5.125 | 7.24 | 7.05 | 6.50 | 6.22 | 6.55 | 7.00 |
| 6.125 | 7.04 | 6.90 | 6.43 | 6.10 | 6.42 | 6.90 |
| 7.125 | 6.92 | 6.72 | 6.25 | 6.01 | 6.24 | 6.75 |
| 8.125 | 6.71 | 6.53 | 6.08 | 5.78 | 6.04 | 6.48 |
| 9.125 | 6.51 | 6.35 | 5.85 | 5.57 | 5.81 | 6.28 |
| 10.125 | 6.29 | 6.07 | 5.62 | 5.35 | 5.68 | 6.09 |
| 11.125 | 5.95 | 5.81 | 5.41 | 5.13 | 5.41 | 5.80 |
| 12.125 | 5.68 | 5.53 | 5.15 | 4.94 | 5.15 | 5.57 |
| 13.125 | 5.34 | 5.27 | 4.87 | 4.64 | 4.86 | 5.24 |
| 14.125 | 5.05 | 4.95 | 4.62 | 4.34 | 4.61 | 4.93 |
| 15.125 | 4.69 | 4.61 | 4.27 | 4.06 | 4.27 | 4.57 |
| 16.125 | 4.37 | 4.26 | 3.93 | 3.75 | 3.91 | 4.23 |
| 17.125 | 4.00 | 3.89 | 3.62 | 3.42 | 3.59 | 3.86 |
| 18.125 | 3.60 | 3.51 | 3.21 | 3.10 | 3.23 | 3.45 |
| 19.125 | 3.21 | 3.11 | 2.83 | 2.65 | 2.78 | 3.08 |
| 20.125 | 2.80 | 2.70 | 2.48 | 2.38 | 2.49 | 2.71 |
| 21.125 | 2.41 | 2.35 | 2.17 | 2.07 | 2.18 | 2.30 |
| 22.125 | 1.97 | 1.92 | 1.81 | 1.76 | 1.81 | 1.92 |
| 23.125 | 1.59 | 1.57 | 1.48 | 1.44 | 1.47 | 1.54 |
| 24.125 | 1.24 | 1.24 | 1.18 | 1.13 | 1.18 | 1.23 |

**Table 7: Heat Rates for the specimens scaled to a South power of 23.2 MW.**

| Elevation (in. from mid-plane) | Specimens Center (W/g) | North (W/g) | Northeast (W/g) | Southeast (W/g) | South (W/g) | Southwest (W/g) | Northwest (W/g) |
|---|---|---|---|---|---|---|---|
| -24.12 | 1.73 | 1.83 | 1.79 | 1.66 | 1.58 | 1.67 | 1.81 |
| -23.125 | 2.15 | 2.32 | 2.25 | 2.05 | 1.99 | 2.09 | 2.26 |
| -22.125 | 2.45 | 2.68 | 2.62 | 2.44 | 2.25 | 2.38 | 2.69 |
| -21.125 | 2.85 | 3.06 | 2.98 | 2.77 | 2.60 | 2.74 | 2.98 |
| -20.125 | 3.16 | 3.42 | 3.36 | 3.08 | 2.94 | 3.07 | 3.37 |
| -19.125 | 3.43 | 3.77 | 3.62 | 3.41 | 3.24 | 3.38 | 3.65 |
| -18.125 | 3.78 | 4.11 | 4.00 | 3.73 | 3.53 | 3.68 | 3.97 |
| -17.125 | 4.12 | 4.52 | 4.36 | 4.04 | 3.81 | 4.06 | 4.36 |
| -16.125 | 4.44 | 4.78 | 4.65 | 4.29 | 4.12 | 4.30 | 4.68 |
| -15.125 | 4.75 | 5.16 | 5.00 | 4.59 | 4.43 | 4.55 | 4.97 |
| -14.125 | 4.98 | 5.45 | 5.23 | 4.89 | 4.62 | 4.87 | 5.31 |
| -13.125 | 5.25 | 5.78 | 5.57 | 5.12 | 4.89 | 5.11 | 5.59 |
| -12.125 | 5.50 | 5.99 | 5.82 | 5.38 | 5.08 | 5.32 | 5.82 |
| -11.125 | 5.72 | 6.27 | 6.05 | 5.64 | 5.28 | 5.54 | 6.03 |
| -10.125 | 5.93 | 6.58 | 6.38 | 5.81 | 5.45 | 5.81 | 6.37 |
| -9.125 | 6.21 | 6.68 | 6.47 | 6.10 | 5.66 | 6.02 | 6.58 |
| -8.125 | 6.36 | 6.89 | 6.64 | 6.20 | 5.82 | 6.19 | 6.70 |
| -7.125 | 6.46 | 7.02 | 6.84 | 6.34 | 6.01 | 6.35 | 6.89 |
| -6.125 | 6.65 | 7.24 | 6.97 | 6.49 | 6.14 | 6.37 | 7.01 |
| -5.125 | 6.71 | 7.25 | 7.10 | 6.59 | 6.15 | 6.54 | 7.17 |
| -4.125 | 6.77 | 7.44 | 7.17 | 6.60 | 6.27 | 6.62 | 7.12 |
| -3.125 | 6.85 | 7.45 | 7.24 | 6.68 | 6.33 | 6.66 | 7.38 |
| -2.125 | 6.85 | 7.59 | 7.31 | 6.80 | 6.34 | 6.79 | 7.30 |
| -1.125 | 6.95 | 7.54 | 7.35 | 6.69 | 6.39 | 6.80 | 7.27 |
| -0.125 | 6.97 | 7.55 | 7.32 | 6.78 | 6.41 | 6.80 | 7.36 |
| 0.125 | 6.94 | 7.54 | 7.38 | 6.77 | 6.39 | 6.70 | 7.39 |
| 1.125 | 6.97 | 7.54 | 7.22 | 6.65 | 6.32 | 6.74 | 7.32 |
| 2.125 | 6.87 | 7.48 | 7.31 | 6.68 | 6.31 | 6.74 | 7.18 |
| 3.125 | 6.80 | 7.46 | 7.24 | 6.61 | 6.27 | 6.62 | 7.19 |
| 4.125 | 6.70 | 7.35 | 7.07 | 6.55 | 6.15 | 6.52 | 7.11 |
| 5.125 | 6.57 | 7.19 | 7.04 | 6.42 | 6.04 | 6.37 | 6.91 |
| 6.125 | 6.47 | 7.04 | 6.82 | 6.35 | 6.01 | 6.33 | 6.84 |
| 7.125 | 6.32 | 6.84 | 6.67 | 6.20 | 5.83 | 6.13 | 6.67 |
| 8.125 | 6.08 | 6.67 | 6.49 | 6.00 | 5.68 | 5.93 | 6.51 |
| 9.125 | 5.92 | 6.46 | 6.37 | 5.80 | 5.48 | 5.78 | 6.28 |
| 10.125 | 5.73 | 6.26 | 6.02 | 5.54 | 5.22 | 5.59 | 6.06 |
| 11.125 | 5.43 | 5.90 | 5.75 | 5.33 | 5.02 | 5.31 | 5.79 |
| 12.125 | 5.24 | 5.66 | 5.50 | 5.02 | 4.81 | 5.09 | 5.52 |
| 13.125 | 4.91 | 5.31 | 5.20 | 4.72 | 4.49 | 4.78 | 5.17 |
| 14.125 | 4.65 | 5.04 | 4.88 | 4.53 | 4.24 | 4.47 | 4.91 |
| 15.125 | 4.30 | 4.69 | 4.53 | 4.22 | 3.95 | 4.25 | 4.57 |
| 16.125 | 3.99 | 4.37 | 4.21 | 3.94 | 3.70 | 3.86 | 4.25 |
| 17.125 | 3.63 | 3.94 | 3.84 | 3.56 | 3.34 | 3.53 | 3.88 |
| 18.125 | 3.31 | 3.57 | 3.44 | 3.15 | 3.02 | 3.21 | 3.47 |
| 19.125 | 4.00 | 3.22 | 3.10 | 2.77 | 2.63 | 2.79 | 3.04 |
| 20.125 | 2.43 | 2.79 | 2.67 | 2.44 | 2.34 | 2.45 | 2.71 |
| 21.125 | 2.19 | 2.39 | 2.34 | 2.19 | 2.04 | 2.12 | 2.31 |
| 22.125 | 1.84 | 1.99 | 1.91 | 1.80 | 1.74 | 1.80 | 1.90 |
| 23.125 | 1.52 | 1.59 | 1.57 | 1.48 | 1.39 | 1.44 | 1.56 |
| 24.125 | 1.20 | 1.26 | 1.25 | 1.16 | 1.14 | 1.16 | 1.20 |

**Table 8: Heat Rates for the outer TC positions scaled to a South power of 23.2 MW.**

| Elevation (in. from mid-plane) | Outer TCs TC-10 (W/gm) | TC-3 (W/gm) | TC-12 (W/gm) | TC-5 (W/gm) | TC-8 (W/gm) | TC-9 (W/gm) |
|---|---|---|---|---|---|---|
| -24.12 | 1.92 | 1.91 | 1.80 | 1.60 | 1.61 | 1.88 |
| -23.125 | 2.38 | 2.36 | 2.16 | 2.04 | 1.95 | 2.23 |
| -22.125 | 2.76 | 2.77 | 2.56 | 2.29 | 2.37 | 2.56 |
| -21.125 | 3.16 | 3.12 | 2.83 | 2.68 | 2.68 | 2.88 |
| -20.125 | 3.51 | 3.46 | 3.28 | 3.04 | 3.00 | 3.29 |
| -19.125 | 3.90 | 3.80 | 3.52 | 3.24 | 3.17 | 3.54 |
| -18.125 | 4.17 | 4.09 | 3.97 | 3.49 | 3.44 | 3.93 |
| -17.125 | 6.27 | 4.48 | 4.34 | 3.79 | 3.76 | 4.27 |
| -16.125 | 6.74 | 4.74 | 4.52 | 4.01 | 4.14 | 4.48 |
| -15.125 | 7.25 | 5.33 | 4.67 | 4.34 | 4.41 | 4.95 |
| -14.125 | 7.65 | 5.49 | 5.08 | 4.58 | 4.63 | 5.18 |
| -13.125 | 7.96 | 5.84 | 5.36 | 4.96 | 4.93 | 5.37 |
| -12.125 | 8.39 | 6.08 | 5.68 | 5.02 | 5.06 | 5.69 |
| -11.125 | 8.68 | 6.38 | 8.31 | 5.45 | 5.39 | 8.19 |
| -10.125 | 8.93 | 6.59 | 8.65 | 5.59 | 5.54 | 8.72 |
| -9.125 | 9.35 | 6.74 | 8.77 | 5.74 | 5.70 | 8.87 |
| -8.125 | 9.55 | 7.01 | 9.19 | 5.76 | 5.81 | 9.09 |
| -7.125 | 9.71 | 7.02 | 9.44 | 5.99 | 6.04 | 9.26 |
| -6.125 | 9.77 | 7.19 | 9.64 | 6.14 | 6.10 | 9.39 |
| -5.125 | 10.14 | 7.30 | 9.54 | 6.35 | 8.97 | 9.82 |
| -4.125 | 10.14 | 7.53 | 9.81 | 6.30 | 9.06 | 9.89 |
| -3.125 | 10.31 | 7.63 | 9.93 | 6.33 | 8.85 | 9.63 |
| -2.125 | 10.47 | 7.49 | 10.10 | 6.51 | 9.23 | 9.78 |
| -1.125 | 10.51 | 7.55 | 9.85 | 6.49 | 9.16 | 9.88 |
| -0.125 | 10.41 | 7.68 | 10.13 | 6.39 | 9.29 | 9.81 |
| 0.125 | 10.55 | 7.55 | 9.99 | 6.47 | 9.24 | 10.10 |
| 1.125 | 10.32 | 7.61 | 9.92 | 6.34 | 9.21 | 9.71 |
| 2.125 | 10.31 | 7.43 | 9.84 | 6.38 | 9.27 | 9.73 |
| 3.125 | 10.27 | 7.41 | 9.77 | 6.32 | 9.00 | 9.63 |
| 4.125 | 10.07 | 7.30 | 9.62 | 6.21 | 9.01 | 9.56 |
| 5.125 | 10.08 | 7.12 | 9.66 | 6.18 | 8.51 | 9.51 |
| 6.125 | 9.65 | 7.09 | 9.42 | 8.39 | 8.53 | 9.41 |
| 7.125 | 9.47 | 6.91 | 9.04 | 8.44 | 8.46 | 8.96 |
| 8.125 | 9.09 | 6.85 | 8.69 | 8.01 | 7.82 | 8.73 |
| 9.125 | 8.84 | 6.34 | 8.55 | 7.74 | 7.86 | 8.32 |
| 10.125 | 8.57 | 6.22 | 8.12 | 7.32 | 7.30 | 7.96 |
| 11.125 | 8.20 | 5.93 | 7.85 | 7.28 | 7.14 | 7.80 |
| 12.125 | 7.86 | 5.75 | 7.35 | 6.72 | 6.90 | 7.31 |
| 13.125 | 7.30 | 7.19 | 6.92 | 6.44 | 6.60 | 7.02 |
| 14.125 | 6.94 | 6.89 | 6.69 | 6.13 | 6.14 | 6.62 |
| 15.125 | 6.55 | 6.53 | 6.10 | 5.69 | 5.63 | 6.02 |
| 16.125 | 5.95 | 6.10 | 5.65 | 5.19 | 5.23 | 5.50 |
| 17.125 | 5.32 | 5.46 | 5.13 | 4.72 | 4.67 | 5.07 |
| 18.125 | 4.73 | 4.94 | 4.46 | 4.06 | 4.21 | 4.58 |
| 19.125 | 4.11 | 4.32 | 3.96 | 3.61 | 3.45 | 3.80 |
| 20.125 | 3.62 | 3.61 | 3.32 | 3.17 | 3.02 | 3.21 |
| 21.125 | 2.82 | 2.94 | 2.83 | 2.51 | 2.51 | 2.74 |
| 22.125 | 2.19 | 2.36 | 2.10 | 2.04 | 2.14 | 2.11 |
| 23.125 | 1.88 | 1.73 | 1.72 | 1.59 | 1.53 | 1.66 |
| 24.125 | 1.41 | 1.39 | 1.36 | 1.16 | 1.28 | 1.34 |

**Table 9: Heat Rates for the inner TC positions scaled to a South power of 23.2 MW.**

| Elevation (in. from mid-plane) | Inner TCs TC-11 (W/gm) | TC-2 (W/gm) | TC-6 (W/gm) | TC-4 (W/gm) | TC-7 (W/gm) | TC-1 (W/gm) |
|---|---|---|---|---|---|---|
| -24.12 | 1.88 | 1.83 | 1.83 | 1.72 | 1.74 | 1.77 |
| -23.125 | 2.30 | 2.20 | 2.13 | 2.05 | 2.14 | 2.16 |
| -22.125 | 2.64 | 2.54 | 2.43 | 2.45 | 2.38 | 2.51 |
| -21.125 | 2.89 | 3.01 | 2.88 | 2.70 | 2.71 | 2.78 |
| -20.125 | 3.28 | 3.31 | 3.20 | 3.13 | 2.97 | 3.25 |
| -19.125 | 3.52 | 3.67 | 3.47 | 3.32 | 3.40 | 3.56 |
| -18.125 | 3.94 | 4.06 | 3.76 | 3.73 | 3.66 | 3.82 |
| -17.125 | 6.17 | 4.23 | 4.13 | 3.99 | 3.94 | 4.21 |
| -16.125 | 6.57 | 4.59 | 4.47 | 4.27 | 4.27 | 4.44 |
| -15.125 | 7.09 | 5.01 | 4.87 | 4.49 | 4.50 | 4.80 |
| -14.125 | 7.31 | 5.27 | 4.99 | 4.67 | 4.86 | 4.86 |
| -13.125 | 8.01 | 5.70 | 5.27 | 5.00 | 5.19 | 5.30 |
| -12.125 | 8.30 | 5.84 | 5.58 | 5.39 | 5.19 | 5.48 |
| -11.125 | 8.41 | 5.86 | 5.78 | 5.37 | 5.56 | 5.69 |
| -10.125 | 9.01 | 6.14 | 5.93 | 5.66 | 5.77 | 6.11 |
| -9.125 | 9.00 | 6.58 | 6.22 | 5.93 | 5.79 | 6.33 |
| -8.125 | 9.22 | 6.46 | 6.35 | 6.01 | 6.02 | 6.42 |
| -7.125 | 9.65 | 6.63 | 6.50 | 6.17 | 6.24 | 6.55 |
| -6.125 | 9.94 | 6.99 | 6.68 | 6.42 | 6.52 | 6.74 |
| -5.125 | 10.08 | 6.81 | 6.83 | 6.62 | 9.38 | 6.76 |
| -4.125 | 9.94 | 6.93 | 6.81 | 6.55 | 9.52 | 6.87 |
| -3.125 | 10.23 | 7.23 | 6.92 | 6.58 | 9.47 | 6.98 |
| -2.125 | 10.11 | 7.30 | 6.96 | 6.65 | 9.78 | 6.93 |
| -1.125 | 10.44 | 7.40 | 6.90 | 6.63 | 9.62 | 6.96 |
| -0.125 | 10.38 | 7.15 | 7.00 | 6.70 | 9.59 | 7.05 |
| 0.125 | 10.22 | 7.19 | 7.03 | 6.74 | 9.58 | 6.93 |
| 1.125 | 10.20 | 7.16 | 6.83 | 6.62 | 9.68 | 6.94 |
| 2.125 | 9.97 | 7.25 | 10.07 | 6.48 | 9.71 | 6.84 |
| 3.125 | 10.02 | 6.99 | 9.82 | 6.55 | 9.29 | 6.93 |
| 4.125 | 9.93 | 7.08 | 9.64 | 6.62 | 9.34 | 6.76 |
| 5.125 | 9.48 | 6.96 | 9.37 | 6.44 | 9.13 | 6.70 |
| 6.125 | 9.62 | 6.63 | 9.21 | 8.94 | 8.99 | 6.61 |
| 7.125 | 9.19 | 6.61 | 9.03 | 8.90 | 8.67 | 6.35 |
| 8.125 | 9.02 | 6.16 | 8.92 | 8.31 | 8.38 | 6.11 |
| 9.125 | 8.59 | 6.10 | 8.46 | 8.19 | 8.11 | 5.98 |
| 10.125 | 8.54 | 6.00 | 8.00 | 7.65 | 7.81 | 5.70 |
| 11.125 | 7.94 | 5.76 | 7.78 | 7.56 | 7.56 | 5.43 |
| 12.125 | 7.40 | 5.50 | 7.14 | 7.13 | 7.30 | 5.25 |
| 13.125 | 7.19 | 7.24 | 6.86 | 6.72 | 6.69 | 4.98 |
| 14.125 | 6.73 | 6.80 | 6.62 | 6.21 | 6.38 | 4.58 |
| 15.125 | 6.28 | 6.41 | 5.96 | 5.96 | 5.83 | 4.24 |
| 16.125 | 5.79 | 5.78 | 5.69 | 5.42 | 5.46 | 3.97 |
| 17.125 | 5.28 | 5.26 | 5.19 | 4.97 | 4.86 | 3.67 |
| 18.125 | 4.54 | 4.74 | 4.36 | 4.26 | 4.38 | 4.30 |
| 19.125 | 3.86 | 3.89 | 3.69 | 3.34 | 3.45 | 3.59 |
| 20.125 | 3.39 | 3.44 | 3.28 | 3.06 | 3.24 | 3.29 |
| 21.125 | 2.90 | 2.82 | 2.77 | 2.65 | 2.68 | 2.89 |
| 22.125 | 2.21 | 2.26 | 2.13 | 2.18 | 2.11 | 2.24 |
| 23.125 | 1.82 | 1.69 | 1.70 | 1.76 | 1.75 | 1.73 |
| 24.125 | 1.33 | 1.33 | 1.39 | 1.32 | 1.34 | 1.39 |

**Table 10: Heat Rates for the primary coolant water scaled to a South power of 23.2 MW.**

| Elevation (in. from mid-plane) | PCS (W/gm) |
|---|---|
| -24.12 | 3.56 |
| -23.125 | 4.45 |
| -22.125 | 5.26 |
| -21.125 | 6.01 |
| -20.125 | 6.71 |
| -19.125 | 7.49 |
| -18.125 | 8.21 |
| -17.125 | 8.97 |
| -16.125 | 9.66 |
| -15.125 | 10.27 |
| -14.125 | 10.82 |
| -13.125 | 11.43 |
| -12.125 | 11.99 |
| -11.125 | 12.51 |
| -10.125 | 12.99 |
| -9.125 | 13.37 |
| -8.125 | 13.71 |
| -7.125 | 14.04 |
| -6.125 | 14.33 |
| -5.125 | 14.56 |
| -4.125 | 14.74 |
| -3.125 | 14.92 |
| -2.125 | 15.04 |
| -1.125 | 15.05 |
| -0.125 | 15.08 |
| 0.125 | 15.04 |
| 1.125 | 14.99 |
| 2.125 | 14.90 |
| 3.125 | 14.82 |
| 4.125 | 14.57 |
| 5.125 | 14.33 |
| 6.125 | 14.04 |
| 7.125 | 13.67 |
| 8.125 | 13.31 |
| 9.125 | 12.89 |
| 10.125 | 12.44 |
| 11.125 | 11.85 |
| 12.125 | 11.24 |
| 13.125 | 10.58 |
| 14.125 | 10.00 |
| 15.125 | 9.31 |
| 16.125 | 8.66 |
| 17.125 | 7.87 |
| 18.125 | 7.06 |
| 19.125 | 6.23 |
| 20.125 | 5.44 |
| 21.125 | 4.70 |
| 22.125 | 3.90 |
| 23.125 | 3.14 |
| 24.125 | 2.44 |

**Table 11: Heat Rates for the tungsten and zirconia spacers scaled to a South power of 23.2 MW.**

| Tungsten | Zirconia | | | | | |
|---|---|---|---|---|---|---|
| Center (W/gm) | North (W/g) | Northeast (W/g) | Southeast (W/g) | South (W/g) | Southwest (W/g) | Northwest (W/g) |
| 4.12 | 2.65 | 2.58 | 2.41 | 2.34 | 2.42 | 2.59 |

**Table 12: Heat Rates for the top Macor scaled to a South power of 23.2 MW.**

| Top Macor Elevation | Watts/g |
|---|---|
| below 50.0 inch | 1.51 |
| below 50.5 inch | 1.01 |
| below 51.0 inch | 0.85 |
| below 52.0 inch | 0.67 |
| below 53.0 inch | 0.48 |
| below 54.0 inch | 0.33 |
| below 55.0 inch | 0.23 |

### 7.2 As-Run Fast Neutron Fluence

The as-run fast neutron fluence (E > 0.1MeV) for the AGC-2 test specimens at the end of cycle (EOC) for Cycle 149A, Cycle 149B, and Cycle 150B are shown in Table 13, Table 14, and Table 15, respectively. The experiment was rotated 180 degrees after Cycle 150B. The as-run fast neutron fluence (E > 0.1MeV) for the AGC-2 test specimens at the end of cycle (EOC) for Cycle 151A and Cycle 151B are shown in Table 16 and Table 17, respectively. The specimen stack labels are shown in Figure 2. Specimen stack 1 (S1) is in the north position at the beginning of irradiation. After Cycle 150B, the experiment was rotated 180º which moved S1 to the south position.

**Table 13: AGC-2 specimen fast neutron fluence (E > 0.1 MeV) at the end of Cycle 149A.**

| Inches from Core Mid-Plane | S7 n/cm$^2$ | S1 n/cm$^2$ | S2 n/cm$^2$ | S3 n/cm$^2$ | S4 n/cm$^2$ | S5 n/cm$^2$ | S6 n/cm$^2$ |
|---|---|---|---|---|---|---|---|
| -23.9 | 2.49E+20 | 2.84E+20 | 2.72E+20 | 2.40E+20 | 2.22E+20 | 2.36E+20 | 2.72E+20 |
| -22.9 | 3.22E+20 | 3.62E+20 | 3.40E+20 | 3.00E+20 | 2.74E+20 | 2.97E+20 | 3.46E+20 |
| -21.9 | 3.81E+20 | 4.31E+20 | 4.06E+20 | 3.58E+20 | 3.28E+20 | 3.60E+20 | 4.12E+20 |
| -20.9 | 4.38E+20 | 4.94E+20 | 4.70E+20 | 4.17E+20 | 3.85E+20 | 4.15E+20 | 4.70E+20 |
| -19.9 | 4.93E+20 | 5.53E+20 | 5.24E+20 | 4.63E+20 | 4.25E+20 | 4.53E+20 | 5.37E+20 |
| -18.9 | 5.44E+20 | 6.10E+20 | 5.79E+20 | 5.12E+20 | 4.73E+20 | 5.17E+20 | 5.88E+20 |
| -17.9 | 6.03E+20 | 6.81E+20 | 6.40E+20 | 5.66E+20 | 5.18E+20 | 5.69E+20 | 6.38E+20 |
| -16.9 | 6.54E+20 | 7.28E+20 | 6.98E+20 | 6.20E+20 | 5.63E+20 | 6.13E+20 | 6.95E+20 |
| -15.9 | 6.93E+20 | 7.84E+20 | 7.41E+20 | 6.58E+20 | 6.06E+20 | 6.63E+20 | 7.54E+20 |
| -14.9 | 7.39E+20 | 8.19E+20 | 7.95E+20 | 6.89E+20 | 6.51E+20 | 6.98E+20 | 7.93E+20 |
| -13.9 | 7.79E+20 | 8.70E+20 | 8.28E+20 | 7.32E+20 | 6.76E+20 | 7.33E+20 | 8.35E+20 |
| -12.9 | 8.09E+20 | 9.00E+20 | 8.63E+20 | 7.65E+20 | 7.06E+20 | 7.67E+20 | 8.59E+20 |
| -11.9 | 8.55E+20 | 9.39E+20 | 8.92E+20 | 7.90E+20 | 7.36E+20 | 8.00E+20 | 9.07E+20 |
| -10.9 | 8.85E+20 | 9.74E+20 | 9.44E+20 | 8.31E+20 | 7.59E+20 | 8.33E+20 | 9.45E+20 |
| -9.9 | 9.06E+20 | 1.00E+21 | 9.60E+20 | 8.53E+20 | 8.02E+20 | 8.59E+20 | 9.72E+20 |
| -8.9 | 9.39E+20 | 1.03E+21 | 9.84E+20 | 8.76E+20 | 8.21E+20 | 8.75E+20 | 9.89E+20 |
| -7.9 | 9.52E+20 | 1.06E+21 | 1.01E+21 | 8.95E+20 | 8.30E+20 | 8.96E+20 | 1.02E+21 |
| -6.9 | 9.69E+20 | 1.07E+21 | 1.03E+21 | 9.10E+20 | 8.42E+20 | 9.22E+20 | 1.03E+21 |
| -5.9 | 9.86E+20 | 1.08E+21 | 1.05E+21 | 9.26E+20 | 8.56E+20 | 9.44E+20 | 1.05E+21 |
| -4.9 | 1.00E+21 | 1.10E+21 | 1.07E+21 | 9.42E+20 | 8.66E+20 | 9.45E+20 | 1.06E+21 |
| -3.9 | 1.02E+21 | 1.11E+21 | 1.06E+21 | 9.62E+20 | 8.80E+20 | 9.63E+20 | 1.08E+21 |
| -2.9 | 1.02E+21 | 1.12E+21 | 1.08E+21 | 9.53E+20 | 8.76E+20 | 9.68E+20 | 1.08E+21 |
| -1.9 | 1.02E+21 | 1.13E+21 | 1.08E+21 | 9.58E+20 | 8.96E+20 | 9.64E+20 | 1.08E+21 |
| -0.9 | 1.02E+21 | 1.13E+21 | 1.09E+21 | 9.65E+20 | 8.93E+20 | 9.64E+20 | 1.07E+21 |
| 0.1 | 1.02E+21 | 1.13E+21 | 1.09E+21 | 9.62E+20 | 8.99E+20 | 9.69E+20 | 1.08E+21 |
| 1.1 | 1.02E+21 | 1.13E+21 | 1.08E+21 | 9.64E+20 | 8.98E+20 | 9.63E+20 | 1.09E+21 |
| 2.1 | 1.02E+21 | 1.12E+21 | 1.08E+21 | 9.64E+20 | 8.90E+20 | 9.74E+20 | 1.08E+21 |
| 3.1 | 1.01E+21 | 1.11E+21 | 1.07E+21 | 9.56E+20 | 8.87E+20 | 9.52E+20 | 1.09E+21 |
| 4.1 | 9.97E+20 | 1.10E+21 | 1.05E+21 | 9.52E+20 | 8.68E+20 | 9.41E+20 | 1.06E+21 |
| 5.1 | 9.73E+20 | 1.08E+21 | 1.04E+21 | 9.31E+20 | 8.50E+20 | 9.31E+20 | 1.04E+21 |
| 6.1 | 9.54E+20 | 1.05E+21 | 1.02E+21 | 9.02E+20 | 8.39E+20 | 9.08E+20 | 1.02E+21 |
| 7.1 | 9.37E+20 | 1.04E+21 | 9.81E+20 | 8.81E+20 | 8.12E+20 | 8.92E+20 | 9.87E+20 |
| 8.1 | 9.09E+20 | 1.02E+21 | 9.73E+20 | 8.61E+20 | 8.00E+20 | 8.58E+20 | 9.67E+20 |
| 9.1 | 8.84E+20 | 9.85E+20 | 9.49E+20 | 8.37E+20 | 7.79E+20 | 8.28E+20 | 9.38E+20 |
| 10.1 | 8.47E+20 | 9.52E+20 | 9.12E+20 | 8.08E+20 | 7.46E+20 | 7.95E+20 | 9.11E+20 |
| 11.1 | 8.22E+20 | 9.13E+20 | 8.72E+20 | 7.70E+20 | 7.12E+20 | 7.69E+20 | 8.65E+20 |
| 12.1 | 7.81E+20 | 8.58E+20 | 8.28E+20 | 7.31E+20 | 6.76E+20 | 7.39E+20 | 8.29E+20 |
| 13.1 | 7.38E+20 | 8.25E+20 | 7.89E+20 | 6.96E+20 | 6.33E+20 | 6.99E+20 | 7.83E+20 |
| 14.1 | 6.97E+20 | 7.79E+20 | 7.45E+20 | 6.51E+20 | 6.03E+20 | 6.62E+20 | 7.43E+20 |
| 15.1 | 6.53E+20 | 7.25E+20 | 6.94E+20 | 6.12E+20 | 5.61E+20 | 6.14E+20 | 6.99E+20 |
| 16.1 | 5.99E+20 | 6.78E+20 | 6.47E+20 | 5.72E+20 | 5.19E+20 | 5.73E+20 | 6.47E+20 |
| 17.1 | 5.45E+20 | 6.15E+20 | 5.91E+20 | 5.20E+20 | 4.74E+20 | 5.24E+20 | 5.90E+20 |
| 18.1 | 4.95E+20 | 5.52E+20 | 5.28E+20 | 4.62E+20 | 4.27E+20 | 4.64E+20 | 5.23E+20 |
| 19.1 | 4.43E+20 | 4.83E+20 | 4.67E+20 | 4.09E+20 | 3.77E+20 | 4.05E+20 | 4.66E+20 |
| 20.1 | 3.82E+20 | 4.28E+20 | 4.02E+20 | 3.60E+20 | 3.34E+20 | 3.57E+20 | 4.02E+20 |
| 21.1 | 3.30E+20 | 3.64E+20 | 3.50E+20 | 3.11E+20 | 2.90E+20 | 3.09E+20 | 3.48E+20 |
| 22.1 | 2.78E+20 | 3.12E+20 | 2.96E+20 | 2.63E+20 | 2.37E+20 | 2.64E+20 | 2.98E+20 |
| 23.1 | 2.28E+20 | 2.54E+20 | 2.43E+20 | 2.15E+20 | 1.99E+20 | 2.15E+20 | 2.43E+20 |
| 24.1 | 1.76E+20 | 1.97E+20 | 1.85E+20 | 1.69E+20 | 1.55E+20 | 1.64E+20 | 1.88E+20 |

**Table 14: AGC-2 specimen fast neutron fluence (E > 0.1 MeV) at the end of Cycle 149B.**

| Inches from Core Mid-Plane | S7 n/cm$^2$ | S1 n/cm$^2$ | S2 n/cm$^2$ | S3 n/cm$^2$ | S4 n/cm$^2$ | S5 n/cm$^2$ | S6 n/cm$^2$ |
|---|---|---|---|---|---|---|---|
| -23.9 | 6.13E+20 | 6.95E+20 | 6.64E+20 | 5.80E+20 | 5.35E+20 | 5.78E+20 | 6.63E+20 |
| -22.9 | 7.80E+20 | 8.80E+20 | 8.30E+20 | 7.33E+20 | 6.70E+20 | 7.25E+20 | 8.35E+20 |
| -21.9 | 9.21E+20 | 1.05E+21 | 9.94E+20 | 8.68E+20 | 7.94E+20 | 8.71E+20 | 9.90E+20 |
| -20.9 | 1.06E+21 | 1.20E+21 | 1.14E+21 | 1.01E+21 | 9.29E+20 | 9.98E+20 | 1.13E+21 |
| -19.9 | 1.21E+21 | 1.35E+21 | 1.28E+21 | 1.13E+21 | 1.03E+21 | 1.11E+21 | 1.29E+21 |
| -18.9 | 1.32E+21 | 1.48E+21 | 1.42E+21 | 1.24E+21 | 1.14E+21 | 1.25E+21 | 1.43E+21 |
| -17.9 | 1.46E+21 | 1.64E+21 | 1.55E+21 | 1.37E+21 | 1.26E+21 | 1.38E+21 | 1.54E+21 |
| -16.9 | 1.59E+21 | 1.77E+21 | 1.68E+21 | 1.50E+21 | 1.37E+21 | 1.49E+21 | 1.69E+21 |
| -15.9 | 1.69E+21 | 1.90E+21 | 1.81E+21 | 1.59E+21 | 1.47E+21 | 1.60E+21 | 1.81E+21 |
| -14.9 | 1.78E+21 | 2.00E+21 | 1.92E+21 | 1.70E+21 | 1.56E+21 | 1.67E+21 | 1.91E+21 |
| -13.9 | 1.88E+21 | 2.10E+21 | 2.02E+21 | 1.78E+21 | 1.63E+21 | 1.77E+21 | 2.01E+21 |
| -12.9 | 1.97E+21 | 2.20E+21 | 2.10E+21 | 1.85E+21 | 1.71E+21 | 1.86E+21 | 2.09E+21 |
| -11.9 | 2.06E+21 | 2.29E+21 | 2.18E+21 | 1.92E+21 | 1.79E+21 | 1.93E+21 | 2.18E+21 |
| -10.9 | 2.15E+21 | 2.38E+21 | 2.29E+21 | 2.03E+21 | 1.84E+21 | 2.02E+21 | 2.28E+21 |
| -9.9 | 2.19E+21 | 2.46E+21 | 2.33E+21 | 2.08E+21 | 1.93E+21 | 2.09E+21 | 2.35E+21 |
| -8.9 | 2.27E+21 | 2.50E+21 | 2.39E+21 | 2.12E+21 | 1.99E+21 | 2.12E+21 | 2.41E+21 |
| -7.9 | 2.32E+21 | 2.56E+21 | 2.46E+21 | 2.18E+21 | 2.01E+21 | 2.19E+21 | 2.45E+21 |
| -6.9 | 2.35E+21 | 2.61E+21 | 2.52E+21 | 2.23E+21 | 2.05E+21 | 2.23E+21 | 2.50E+21 |
| -5.9 | 2.39E+21 | 2.64E+21 | 2.54E+21 | 2.25E+21 | 2.08E+21 | 2.29E+21 | 2.55E+21 |
| -4.9 | 2.42E+21 | 2.67E+21 | 2.59E+21 | 2.30E+21 | 2.11E+21 | 2.27E+21 | 2.57E+21 |
| -3.9 | 2.47E+21 | 2.70E+21 | 2.61E+21 | 2.33E+21 | 2.13E+21 | 2.32E+21 | 2.59E+21 |
| -2.9 | 2.47E+21 | 2.73E+21 | 2.63E+21 | 2.33E+21 | 2.15E+21 | 2.33E+21 | 2.61E+21 |
| -1.9 | 2.49E+21 | 2.72E+21 | 2.64E+21 | 2.35E+21 | 2.18E+21 | 2.37E+21 | 2.62E+21 |
| -0.9 | 2.48E+21 | 2.73E+21 | 2.65E+21 | 2.36E+21 | 2.16E+21 | 2.35E+21 | 2.62E+21 |
| 0.1 | 2.49E+21 | 2.74E+21 | 2.63E+21 | 2.35E+21 | 2.18E+21 | 2.36E+21 | 2.60E+21 |
| 1.1 | 2.49E+21 | 2.73E+21 | 2.62E+21 | 2.34E+21 | 2.17E+21 | 2.34E+21 | 2.63E+21 |
| 2.1 | 2.46E+21 | 2.72E+21 | 2.60E+21 | 2.34E+21 | 2.17E+21 | 2.35E+21 | 2.61E+21 |
| 3.1 | 2.45E+21 | 2.68E+21 | 2.60E+21 | 2.31E+21 | 2.14E+21 | 2.31E+21 | 2.62E+21 |
| 4.1 | 2.43E+21 | 2.67E+21 | 2.57E+21 | 2.30E+21 | 2.10E+21 | 2.29E+21 | 2.56E+21 |
| 5.1 | 2.38E+21 | 2.63E+21 | 2.54E+21 | 2.24E+21 | 2.07E+21 | 2.25E+21 | 2.53E+21 |
| 6.1 | 2.33E+21 | 2.57E+21 | 2.49E+21 | 2.20E+21 | 2.03E+21 | 2.20E+21 | 2.48E+21 |
| 7.1 | 2.28E+21 | 2.53E+21 | 2.41E+21 | 2.14E+21 | 1.97E+21 | 2.16E+21 | 2.41E+21 |
| 8.1 | 2.20E+21 | 2.47E+21 | 2.36E+21 | 2.09E+21 | 1.93E+21 | 2.10E+21 | 2.35E+21 |
| 9.1 | 2.15E+21 | 2.39E+21 | 2.30E+21 | 2.02E+21 | 1.88E+21 | 2.01E+21 | 2.28E+21 |
| 10.1 | 2.08E+21 | 2.32E+21 | 2.20E+21 | 1.96E+21 | 1.82E+21 | 1.95E+21 | 2.21E+21 |
| 11.1 | 1.99E+21 | 2.21E+21 | 2.12E+21 | 1.89E+21 | 1.75E+21 | 1.88E+21 | 2.11E+21 |
| 12.1 | 1.90E+21 | 2.10E+21 | 2.01E+21 | 1.77E+21 | 1.65E+21 | 1.79E+21 | 2.01E+21 |
| 13.1 | 1.81E+21 | 2.00E+21 | 1.91E+21 | 1.69E+21 | 1.55E+21 | 1.70E+21 | 1.91E+21 |
| 14.1 | 1.70E+21 | 1.89E+21 | 1.80E+21 | 1.59E+21 | 1.45E+21 | 1.60E+21 | 1.79E+21 |
| 15.1 | 1.59E+21 | 1.77E+21 | 1.70E+21 | 1.50E+21 | 1.37E+21 | 1.50E+21 | 1.70E+21 |
| 16.1 | 1.47E+21 | 1.65E+21 | 1.58E+21 | 1.39E+21 | 1.26E+21 | 1.39E+21 | 1.59E+21 |
| 17.1 | 1.33E+21 | 1.51E+21 | 1.44E+21 | 1.27E+21 | 1.16E+21 | 1.26E+21 | 1.43E+21 |
| 18.1 | 1.21E+21 | 1.34E+21 | 1.28E+21 | 1.13E+21 | 1.04E+21 | 1.13E+21 | 1.28E+21 |
| 19.1 | 1.08E+21 | 1.18E+21 | 1.13E+21 | 9.86E+20 | 9.25E+20 | 9.92E+20 | 1.14E+21 |
| 20.1 | 9.31E+20 | 1.04E+21 | 9.87E+20 | 8.75E+20 | 8.09E+20 | 8.75E+20 | 9.88E+20 |
| 21.1 | 8.05E+20 | 9.01E+20 | 8.60E+20 | 7.58E+20 | 7.03E+20 | 7.54E+20 | 8.52E+20 |
| 22.1 | 6.87E+20 | 7.61E+20 | 7.27E+20 | 6.45E+20 | 5.83E+20 | 6.41E+20 | 7.34E+20 |
| 23.1 | 5.55E+20 | 6.24E+20 | 5.92E+20 | 5.29E+20 | 4.83E+20 | 5.17E+20 | 5.94E+20 |
| 24.1 | 4.37E+20 | 4.71E+20 | 4.54E+20 | 4.16E+20 | 3.81E+20 | 4.04E+20 | 4.60E+20 |

**Table 15: AGC-2 specimen fast neutron fluence (E > 0.1 MeV) at the end of Cycle 150B.**

| Inches from Core Mid-Plane | S7 n/cm$^2$ | S1 n/cm$^2$ | S2 n/cm$^2$ | S3 n/cm$^2$ | S4 n/cm$^2$ | S5 n/cm$^2$ | S6 n/cm$^2$ |
|---|---|---|---|---|---|---|---|
| -23.9 | 9.09E+20 | 1.03E+21 | 9.81E+20 | 8.58E+20 | 7.87E+20 | 8.51E+20 | 9.82E+20 |
| -22.9 | 1.15E+21 | 1.30E+21 | 1.23E+21 | 1.08E+21 | 9.88E+20 | 1.08E+21 | 1.24E+21 |
| -21.9 | 1.36E+21 | 1.55E+21 | 1.47E+21 | 1.28E+21 | 1.17E+21 | 1.29E+21 | 1.46E+21 |
| -20.9 | 1.57E+21 | 1.77E+21 | 1.69E+21 | 1.48E+21 | 1.36E+21 | 1.47E+21 | 1.68E+21 |
| -19.9 | 1.78E+21 | 1.98E+21 | 1.88E+21 | 1.67E+21 | 1.51E+21 | 1.63E+21 | 1.89E+21 |
| -18.9 | 1.94E+21 | 2.19E+21 | 2.08E+21 | 1.83E+21 | 1.69E+21 | 1.84E+21 | 2.09E+21 |
| -17.9 | 2.14E+21 | 2.42E+21 | 2.28E+21 | 2.02E+21 | 1.85E+21 | 2.02E+21 | 2.27E+21 |
| -16.9 | 2.32E+21 | 2.62E+21 | 2.48E+21 | 2.20E+21 | 2.01E+21 | 2.20E+21 | 2.50E+21 |
| -15.9 | 2.48E+21 | 2.79E+21 | 2.67E+21 | 2.33E+21 | 2.15E+21 | 2.35E+21 | 2.66E+21 |
| -14.9 | 2.63E+21 | 2.95E+21 | 2.82E+21 | 2.48E+21 | 2.29E+21 | 2.46E+21 | 2.80E+21 |
| -13.9 | 2.76E+21 | 3.09E+21 | 2.96E+21 | 2.61E+21 | 2.40E+21 | 2.59E+21 | 2.95E+21 |
| -12.9 | 2.88E+21 | 3.22E+21 | 3.08E+21 | 2.71E+21 | 2.51E+21 | 2.73E+21 | 3.06E+21 |
| -11.9 | 3.02E+21 | 3.36E+21 | 3.21E+21 | 2.81E+21 | 2.63E+21 | 2.84E+21 | 3.20E+21 |
| -10.9 | 3.15E+21 | 3.49E+21 | 3.34E+21 | 2.97E+21 | 2.69E+21 | 2.95E+21 | 3.34E+21 |
| -9.9 | 3.21E+21 | 3.59E+21 | 3.41E+21 | 3.04E+21 | 2.81E+21 | 3.06E+21 | 3.44E+21 |
| -8.9 | 3.31E+21 | 3.67E+21 | 3.51E+21 | 3.11E+21 | 2.90E+21 | 3.10E+21 | 3.54E+21 |
| -7.9 | 3.39E+21 | 3.75E+21 | 3.59E+21 | 3.17E+21 | 2.93E+21 | 3.20E+21 | 3.60E+21 |
| -6.9 | 3.43E+21 | 3.79E+21 | 3.67E+21 | 3.25E+21 | 2.99E+21 | 3.26E+21 | 3.65E+21 |
| -5.9 | 3.49E+21 | 3.85E+21 | 3.71E+21 | 3.29E+21 | 3.04E+21 | 3.32E+21 | 3.72E+21 |
| -4.9 | 3.54E+21 | 3.90E+21 | 3.77E+21 | 3.36E+21 | 3.09E+21 | 3.33E+21 | 3.75E+21 |
| -3.9 | 3.60E+21 | 3.94E+21 | 3.79E+21 | 3.39E+21 | 3.11E+21 | 3.38E+21 | 3.78E+21 |
| -2.9 | 3.61E+21 | 3.99E+21 | 3.83E+21 | 3.39E+21 | 3.13E+21 | 3.41E+21 | 3.82E+21 |
| -1.9 | 3.62E+21 | 3.97E+21 | 3.85E+21 | 3.41E+21 | 3.16E+21 | 3.43E+21 | 3.82E+21 |
| -0.9 | 3.61E+21 | 3.99E+21 | 3.85E+21 | 3.43E+21 | 3.15E+21 | 3.42E+21 | 3.81E+21 |
| 0.1 | 3.64E+21 | 4.00E+21 | 3.85E+21 | 3.42E+21 | 3.18E+21 | 3.43E+21 | 3.80E+21 |
| 1.1 | 3.63E+21 | 3.99E+21 | 3.82E+21 | 3.41E+21 | 3.16E+21 | 3.41E+21 | 3.83E+21 |
| 2.1 | 3.59E+21 | 3.96E+21 | 3.80E+21 | 3.42E+21 | 3.16E+21 | 3.42E+21 | 3.81E+21 |
| 3.1 | 3.58E+21 | 3.92E+21 | 3.79E+21 | 3.37E+21 | 3.11E+21 | 3.37E+21 | 3.83E+21 |
| 4.1 | 3.54E+21 | 3.91E+21 | 3.75E+21 | 3.34E+21 | 3.06E+21 | 3.33E+21 | 3.74E+21 |
| 5.1 | 3.47E+21 | 3.84E+21 | 3.70E+21 | 3.28E+21 | 3.02E+21 | 3.29E+21 | 3.69E+21 |
| 6.1 | 3.40E+21 | 3.76E+21 | 3.61E+21 | 3.21E+21 | 2.98E+21 | 3.22E+21 | 3.63E+21 |
| 7.1 | 3.31E+21 | 3.70E+21 | 3.53E+21 | 3.13E+21 | 2.88E+21 | 3.16E+21 | 3.51E+21 |
| 8.1 | 3.23E+21 | 3.61E+21 | 3.45E+21 | 3.04E+21 | 2.81E+21 | 3.06E+21 | 3.43E+21 |
| 9.1 | 3.14E+21 | 3.50E+21 | 3.36E+21 | 2.97E+21 | 2.75E+21 | 2.94E+21 | 3.32E+21 |
| 10.1 | 3.06E+21 | 3.39E+21 | 3.22E+21 | 2.87E+21 | 2.65E+21 | 2.85E+21 | 3.24E+21 |
| 11.1 | 2.91E+21 | 3.24E+21 | 3.10E+21 | 2.75E+21 | 2.55E+21 | 2.75E+21 | 3.09E+21 |
| 12.1 | 2.79E+21 | 3.09E+21 | 2.95E+21 | 2.60E+21 | 2.42E+21 | 2.63E+21 | 2.95E+21 |
| 13.1 | 2.64E+21 | 2.94E+21 | 2.80E+21 | 2.49E+21 | 2.28E+21 | 2.50E+21 | 2.80E+21 |
| 14.1 | 2.50E+21 | 2.77E+21 | 2.65E+21 | 2.32E+21 | 2.13E+21 | 2.34E+21 | 2.63E+21 |
| 15.1 | 2.32E+21 | 2.60E+21 | 2.50E+21 | 2.20E+21 | 2.02E+21 | 2.19E+21 | 2.49E+21 |
| 16.1 | 2.16E+21 | 2.44E+21 | 2.32E+21 | 2.05E+21 | 1.87E+21 | 2.04E+21 | 2.32E+21 |
| 17.1 | 1.97E+21 | 2.22E+21 | 2.12E+21 | 1.86E+21 | 1.70E+21 | 1.85E+21 | 2.11E+21 |
| 18.1 | 1.78E+21 | 1.98E+21 | 1.88E+21 | 1.66E+21 | 1.53E+21 | 1.67E+21 | 1.89E+21 |
| 19.1 | 1.58E+21 | 1.75E+21 | 1.67E+21 | 1.46E+21 | 1.36E+21 | 1.46E+21 | 1.67E+21 |
| 20.1 | 1.37E+21 | 1.54E+21 | 1.46E+21 | 1.29E+21 | 1.19E+21 | 1.28E+21 | 1.46E+21 |
| 21.1 | 1.18E+21 | 1.34E+21 | 1.27E+21 | 1.12E+21 | 1.04E+21 | 1.11E+21 | 1.26E+21 |
| 22.1 | 1.01E+21 | 1.13E+21 | 1.07E+21 | 9.53E+20 | 8.62E+20 | 9.43E+20 | 1.09E+21 |
| 23.1 | 8.23E+20 | 9.23E+20 | 8.72E+20 | 7.82E+20 | 7.12E+20 | 7.64E+20 | 8.82E+20 |
| 24.1 | 6.43E+20 | 6.96E+20 | 6.79E+20 | 6.08E+20 | 5.59E+20 | 5.97E+20 | 6.75E+20 |

**Table 16: AGC-2 specimen fast neutron fluence (E > 0.1 MeV) at the end of Cycle 151A.**

| Inches from Core Mid-Plane | S7 n/cm$^2$ | S4 n/cm$^2$ | S5 n/cm$^2$ | S6 n/cm$^2$ | S1 n/cm$^2$ | S2 n/cm$^2$ | S3 n/cm$^2$ |
|---|---|---|---|---|---|---|---|
| -23.9 | 1.30E+21 | 1.23E+21 | 1.27E+21 | 1.34E+21 | 1.37E+21 | 1.34E+21 | 1.28E+21 |
| -22.9 | 1.65E+21 | 1.55E+21 | 1.61E+21 | 1.70E+21 | 1.72E+21 | 1.69E+21 | 1.61E+21 |
| -21.9 | 1.95E+21 | 1.84E+21 | 1.91E+21 | 2.00E+21 | 2.06E+21 | 2.01E+21 | 1.91E+21 |
| -20.9 | 2.25E+21 | 2.12E+21 | 2.19E+21 | 2.31E+21 | 2.35E+21 | 2.32E+21 | 2.19E+21 |
| -19.9 | 2.53E+21 | 2.35E+21 | 2.44E+21 | 2.60E+21 | 2.62E+21 | 2.58E+21 | 2.47E+21 |
| -18.9 | 2.77E+21 | 2.62E+21 | 2.72E+21 | 2.87E+21 | 2.90E+21 | 2.86E+21 | 2.71E+21 |
| -17.9 | 3.04E+21 | 2.87E+21 | 2.99E+21 | 3.12E+21 | 3.20E+21 | 3.13E+21 | 2.99E+21 |
| -16.9 | 3.31E+21 | 3.11E+21 | 3.25E+21 | 3.41E+21 | 3.47E+21 | 3.40E+21 | 3.25E+21 |
| -15.9 | 3.53E+21 | 3.31E+21 | 3.46E+21 | 3.66E+21 | 3.70E+21 | 3.64E+21 | 3.44E+21 |
| -14.9 | 3.74E+21 | 3.52E+21 | 3.63E+21 | 3.84E+21 | 3.91E+21 | 3.86E+21 | 3.65E+21 |
| -13.9 | 3.92E+21 | 3.69E+21 | 3.82E+21 | 4.03E+21 | 4.10E+21 | 4.06E+21 | 3.84E+21 |
| -12.9 | 4.10E+21 | 3.86E+21 | 4.01E+21 | 4.20E+21 | 4.28E+21 | 4.23E+21 | 4.00E+21 |
| -11.9 | 4.28E+21 | 4.02E+21 | 4.17E+21 | 4.39E+21 | 4.47E+21 | 4.39E+21 | 4.14E+21 |
| -10.9 | 4.45E+21 | 4.13E+21 | 4.33E+21 | 4.56E+21 | 4.61E+21 | 4.57E+21 | 4.34E+21 |
| -9.9 | 4.55E+21 | 4.30E+21 | 4.48E+21 | 4.70E+21 | 4.75E+21 | 4.68E+21 | 4.46E+21 |
| -8.9 | 4.68E+21 | 4.42E+21 | 4.54E+21 | 4.83E+21 | 4.87E+21 | 4.80E+21 | 4.58E+21 |
| -7.9 | 4.79E+21 | 4.47E+21 | 4.67E+21 | 4.92E+21 | 4.96E+21 | 4.90E+21 | 4.66E+21 |
| -6.9 | 4.84E+21 | 4.55E+21 | 4.76E+21 | 5.00E+21 | 5.02E+21 | 5.01E+21 | 4.75E+21 |
| -5.9 | 4.95E+21 | 4.61E+21 | 4.82E+21 | 5.07E+21 | 5.10E+21 | 5.07E+21 | 4.81E+21 |
| -4.9 | 4.99E+21 | 4.69E+21 | 4.87E+21 | 5.11E+21 | 5.18E+21 | 5.15E+21 | 4.90E+21 |
| -3.9 | 5.07E+21 | 4.71E+21 | 4.92E+21 | 5.17E+21 | 5.24E+21 | 5.17E+21 | 4.93E+21 |
| -2.9 | 5.09E+21 | 4.75E+21 | 4.97E+21 | 5.22E+21 | 5.28E+21 | 5.23E+21 | 4.95E+21 |
| -1.9 | 5.10E+21 | 4.78E+21 | 5.00E+21 | 5.22E+21 | 5.27E+21 | 5.25E+21 | 4.98E+21 |
| -0.9 | 5.10E+21 | 4.78E+21 | 4.98E+21 | 5.21E+21 | 5.29E+21 | 5.24E+21 | 5.00E+21 |
| 0.1 | 5.12E+21 | 4.80E+21 | 5.00E+21 | 5.20E+21 | 5.29E+21 | 5.25E+21 | 4.99E+21 |
| 1.1 | 5.11E+21 | 4.79E+21 | 4.98E+21 | 5.24E+21 | 5.30E+21 | 5.23E+21 | 4.98E+21 |
| 2.1 | 5.06E+21 | 4.79E+21 | 4.97E+21 | 5.19E+21 | 5.26E+21 | 5.20E+21 | 4.96E+21 |
| 3.1 | 5.04E+21 | 4.73E+21 | 4.92E+21 | 5.22E+21 | 5.19E+21 | 5.18E+21 | 4.91E+21 |
| 4.1 | 4.99E+21 | 4.66E+21 | 4.87E+21 | 5.11E+21 | 5.18E+21 | 5.12E+21 | 4.89E+21 |
| 5.1 | 4.89E+21 | 4.61E+21 | 4.81E+21 | 5.05E+21 | 5.08E+21 | 5.05E+21 | 4.80E+21 |
| 6.1 | 4.80E+21 | 4.53E+21 | 4.69E+21 | 4.95E+21 | 4.97E+21 | 4.93E+21 | 4.69E+21 |
| 7.1 | 4.68E+21 | 4.39E+21 | 4.60E+21 | 4.80E+21 | 4.89E+21 | 4.83E+21 | 4.59E+21 |
| 8.1 | 4.56E+21 | 4.29E+21 | 4.48E+21 | 4.68E+21 | 4.78E+21 | 4.72E+21 | 4.46E+21 |
| 9.1 | 4.45E+21 | 4.19E+21 | 4.33E+21 | 4.55E+21 | 4.64E+21 | 4.61E+21 | 4.35E+21 |
| 10.1 | 4.33E+21 | 4.05E+21 | 4.20E+21 | 4.43E+21 | 4.50E+21 | 4.41E+21 | 4.21E+21 |
| 11.1 | 4.13E+21 | 3.90E+21 | 4.05E+21 | 4.24E+21 | 4.30E+21 | 4.24E+21 | 4.04E+21 |
| 12.1 | 3.95E+21 | 3.70E+21 | 3.86E+21 | 4.04E+21 | 4.10E+21 | 4.05E+21 | 3.83E+21 |
| 13.1 | 3.75E+21 | 3.50E+21 | 3.68E+21 | 3.84E+21 | 3.90E+21 | 3.84E+21 | 3.66E+21 |
| 14.1 | 3.53E+21 | 3.30E+21 | 3.46E+21 | 3.61E+21 | 3.68E+21 | 3.62E+21 | 3.43E+21 |
| 15.1 | 3.30E+21 | 3.12E+21 | 3.25E+21 | 3.40E+21 | 3.45E+21 | 3.41E+21 | 3.24E+21 |
| 16.1 | 3.07E+21 | 2.89E+21 | 3.01E+21 | 3.18E+21 | 3.23E+21 | 3.17E+21 | 3.01E+21 |
| 17.1 | 2.81E+21 | 2.64E+21 | 2.74E+21 | 2.90E+21 | 2.94E+21 | 2.89E+21 | 2.75E+21 |
| 18.1 | 2.53E+21 | 2.37E+21 | 2.46E+21 | 2.60E+21 | 2.63E+21 | 2.60E+21 | 2.47E+21 |
| 19.1 | 2.25E+21 | 2.11E+21 | 2.18E+21 | 2.30E+21 | 2.32E+21 | 2.31E+21 | 2.17E+21 |
| 20.1 | 1.97E+21 | 1.84E+21 | 1.90E+21 | 2.00E+21 | 2.04E+21 | 2.01E+21 | 1.92E+21 |
| 21.1 | 1.69E+21 | 1.62E+21 | 1.65E+21 | 1.74E+21 | 1.78E+21 | 1.75E+21 | 1.67E+21 |
| 22.1 | 1.44E+21 | 1.34E+21 | 1.41E+21 | 1.49E+21 | 1.50E+21 | 1.47E+21 | 1.41E+21 |
| 23.1 | 1.19E+21 | 1.12E+21 | 1.14E+21 | 1.21E+21 | 1.22E+21 | 1.20E+21 | 1.16E+21 |
| 24.1 | 9.16E+20 | 8.63E+20 | 8.83E+20 | 9.33E+20 | 9.37E+20 | 9.35E+20 | 8.96E+20 |

**Table 17: AGC-2 specimen fast neutron fluence (E > 0.1 MeV) at the end of Cycle 151B.**

| Inches from Core Mid-Plane | S7 n/cm$^2$ | S4 n/cm$^2$ | S5 n/cm$^2$ | S6 n/cm$^2$ | S1 n/cm$^2$ | S2 n/cm$^2$ | S3 n/cm$^2$ |
|---|---|---|---|---|---|---|---|
| -23.9 | 1.64E+21 | 1.62E+21 | 1.63E+21 | 1.66E+21 | 1.66E+21 | 1.66E+21 | 1.66E+21 |
| -22.9 | 2.09E+21 | 2.05E+21 | 2.08E+21 | 2.11E+21 | 2.10E+21 | 2.11E+21 | 2.07E+21 |
| -21.9 | 2.47E+21 | 2.43E+21 | 2.47E+21 | 2.49E+21 | 2.52E+21 | 2.50E+21 | 2.47E+21 |
| -20.9 | 2.84E+21 | 2.78E+21 | 2.84E+21 | 2.87E+21 | 2.86E+21 | 2.87E+21 | 2.82E+21 |
| -19.9 | 3.20E+21 | 3.10E+21 | 3.16E+21 | 3.22E+21 | 3.20E+21 | 3.20E+21 | 3.17E+21 |
| -18.9 | 3.52E+21 | 3.44E+21 | 3.51E+21 | 3.58E+21 | 3.54E+21 | 3.55E+21 | 3.49E+21 |
| -17.9 | 3.86E+21 | 3.78E+21 | 3.86E+21 | 3.89E+21 | 3.89E+21 | 3.88E+21 | 3.84E+21 |
| -16.9 | 4.20E+21 | 4.07E+21 | 4.19E+21 | 4.25E+21 | 4.22E+21 | 4.20E+21 | 4.18E+21 |
| -15.9 | 4.47E+21 | 4.34E+21 | 4.46E+21 | 4.53E+21 | 4.51E+21 | 4.52E+21 | 4.43E+21 |
| -14.9 | 4.73E+21 | 4.63E+21 | 4.68E+21 | 4.78E+21 | 4.77E+21 | 4.80E+21 | 4.69E+21 |
| -13.9 | 4.96E+21 | 4.84E+21 | 4.94E+21 | 5.01E+21 | 5.00E+21 | 5.01E+21 | 4.93E+21 |
| -12.9 | 5.19E+21 | 5.06E+21 | 5.15E+21 | 5.24E+21 | 5.22E+21 | 5.25E+21 | 5.15E+21 |
| -11.9 | 5.41E+21 | 5.27E+21 | 5.39E+21 | 5.46E+21 | 5.45E+21 | 5.46E+21 | 5.32E+21 |
| -10.9 | 5.62E+21 | 5.44E+21 | 5.58E+21 | 5.67E+21 | 5.63E+21 | 5.69E+21 | 5.58E+21 |
| -9.9 | 5.75E+21 | 5.62E+21 | 5.78E+21 | 5.85E+21 | 5.80E+21 | 5.81E+21 | 5.71E+21 |
| -8.9 | 5.91E+21 | 5.78E+21 | 5.85E+21 | 6.01E+21 | 5.94E+21 | 5.97E+21 | 5.87E+21 |
| -7.9 | 6.05E+21 | 5.83E+21 | 5.99E+21 | 6.11E+21 | 6.07E+21 | 6.09E+21 | 5.99E+21 |
| -6.9 | 6.12E+21 | 5.96E+21 | 6.12E+21 | 6.21E+21 | 6.13E+21 | 6.21E+21 | 6.08E+21 |
| -5.9 | 6.26E+21 | 6.03E+21 | 6.20E+21 | 6.31E+21 | 6.23E+21 | 6.29E+21 | 6.16E+21 |
| -4.9 | 6.29E+21 | 6.14E+21 | 6.26E+21 | 6.36E+21 | 6.32E+21 | 6.39E+21 | 6.27E+21 |
| -3.9 | 6.42E+21 | 6.16E+21 | 6.34E+21 | 6.42E+21 | 6.37E+21 | 6.41E+21 | 6.32E+21 |
| -2.9 | 6.42E+21 | 6.19E+21 | 6.40E+21 | 6.49E+21 | 6.46E+21 | 6.49E+21 | 6.37E+21 |
| -1.9 | 6.44E+21 | 6.24E+21 | 6.41E+21 | 6.49E+21 | 6.44E+21 | 6.52E+21 | 6.38E+21 |
| -0.9 | 6.43E+21 | 6.23E+21 | 6.40E+21 | 6.48E+21 | 6.48E+21 | 6.52E+21 | 6.42E+21 |
| 0.1 | 6.45E+21 | 6.27E+21 | 6.43E+21 | 6.47E+21 | 6.46E+21 | 6.52E+21 | 6.39E+21 |
| 1.1 | 6.44E+21 | 6.24E+21 | 6.40E+21 | 6.50E+21 | 6.47E+21 | 6.50E+21 | 6.37E+21 |
| 2.1 | 6.38E+21 | 6.24E+21 | 6.38E+21 | 6.46E+21 | 6.43E+21 | 6.45E+21 | 6.35E+21 |
| 3.1 | 6.35E+21 | 6.19E+21 | 6.33E+21 | 6.47E+21 | 6.35E+21 | 6.42E+21 | 6.28E+21 |
| 4.1 | 6.32E+21 | 6.09E+21 | 6.26E+21 | 6.36E+21 | 6.34E+21 | 6.36E+21 | 6.25E+21 |
| 5.1 | 6.17E+21 | 6.02E+21 | 6.18E+21 | 6.27E+21 | 6.20E+21 | 6.26E+21 | 6.14E+21 |
| 6.1 | 6.06E+21 | 5.91E+21 | 6.03E+21 | 6.15E+21 | 6.08E+21 | 6.11E+21 | 6.02E+21 |
| 7.1 | 5.92E+21 | 5.74E+21 | 5.93E+21 | 5.98E+21 | 5.97E+21 | 5.97E+21 | 5.88E+21 |
| 8.1 | 5.75E+21 | 5.63E+21 | 5.75E+21 | 5.82E+21 | 5.83E+21 | 5.86E+21 | 5.72E+21 |
| 9.1 | 5.61E+21 | 5.48E+21 | 5.58E+21 | 5.66E+21 | 5.67E+21 | 5.72E+21 | 5.61E+21 |
| 10.1 | 5.46E+21 | 5.30E+21 | 5.40E+21 | 5.51E+21 | 5.49E+21 | 5.48E+21 | 5.42E+21 |
| 11.1 | 5.21E+21 | 5.12E+21 | 5.21E+21 | 5.29E+21 | 5.25E+21 | 5.26E+21 | 5.20E+21 |
| 12.1 | 4.98E+21 | 4.84E+21 | 4.97E+21 | 5.02E+21 | 5.00E+21 | 5.04E+21 | 4.92E+21 |
| 13.1 | 4.73E+21 | 4.58E+21 | 4.74E+21 | 4.79E+21 | 4.75E+21 | 4.77E+21 | 4.68E+21 |
| 14.1 | 4.45E+21 | 4.33E+21 | 4.47E+21 | 4.48E+21 | 4.48E+21 | 4.49E+21 | 4.42E+21 |
| 15.1 | 4.17E+21 | 4.11E+21 | 4.19E+21 | 4.23E+21 | 4.21E+21 | 4.24E+21 | 4.16E+21 |
| 16.1 | 3.90E+21 | 3.81E+21 | 3.90E+21 | 3.96E+21 | 3.93E+21 | 3.92E+21 | 3.87E+21 |
| 17.1 | 3.55E+21 | 3.47E+21 | 3.55E+21 | 3.60E+21 | 3.58E+21 | 3.60E+21 | 3.55E+21 |
| 18.1 | 3.20E+21 | 3.12E+21 | 3.18E+21 | 3.24E+21 | 3.20E+21 | 3.23E+21 | 3.19E+21 |
| 19.1 | 2.85E+21 | 2.78E+21 | 2.81E+21 | 2.85E+21 | 2.83E+21 | 2.85E+21 | 2.79E+21 |
| 20.1 | 2.50E+21 | 2.43E+21 | 2.46E+21 | 2.48E+21 | 2.50E+21 | 2.48E+21 | 2.47E+21 |
| 21.1 | 2.15E+21 | 2.13E+21 | 2.14E+21 | 2.17E+21 | 2.17E+21 | 2.17E+21 | 2.15E+21 |
| 22.1 | 1.84E+21 | 1.77E+21 | 1.81E+21 | 1.85E+21 | 1.82E+21 | 1.83E+21 | 1.82E+21 |
| 23.1 | 1.51E+21 | 1.46E+21 | 1.47E+21 | 1.50E+21 | 1.50E+21 | 1.49E+21 | 1.49E+21 |
| 24.1 | 1.15E+21 | 1.12E+21 | 1.14E+21 | 1.17E+21 | 1.15E+21 | 1.16E+21 | 1.16E+21 |

### 7.3 As-Run DPA

The as-run graphite DPA for the AGC-2 test specimens at the end of cycle (EOC) for Cycle 149A, Cycle 149B, and Cycle 150B are shown in Table 18, Table 19, and Table 20, respectively. The experiment was rotated 180 degrees after Cycle 150B. The as-run graphite DPA for the AGC-2 test specimens at the end of cycle (EOC) for Cycle 151A and Cycle 151B are shown in Table 21 and Table 22, respectively. Table 23 presents the peak DPA for the specimens. Table 24 presents the peak DPA for the graphite holder segments. The specimen stack labels are shown in Figure 2. Specimen stack 1 (S1) is in the north position at the beginning of irradiation. After Cycle 150B, the experiment was rotated 180º which moved

S1 to the south position. The graphite holder azimuthal section labeling matches the specimen stack labeling with graphite holder section S1 being the graphite holder section surrounding specimen stack S1.

**Table 18: AGC-2 Specimen DPA at the end of Cycle 149A.**

| Inches from Core Mid-Plane | S7 DPA | S1 DPA | S2 DPA | S3 DPA | S4 DPA | S5 DPA | S6 DPA |
|---|---|---|---|---|---|---|---|
| -23.9 | 0.18 | 0.20 | 0.19 | 0.17 | 0.16 | 0.17 | 0.19 |
| -22.9 | 0.23 | 0.26 | 0.24 | 0.21 | 0.20 | 0.21 | 0.25 |
| -21.9 | 0.27 | 0.31 | 0.29 | 0.26 | 0.24 | 0.26 | 0.30 |
| -20.9 | 0.31 | 0.35 | 0.34 | 0.30 | 0.28 | 0.30 | 0.34 |
| -19.9 | 0.35 | 0.40 | 0.38 | 0.33 | 0.31 | 0.32 | 0.38 |
| -18.9 | 0.39 | 0.44 | 0.41 | 0.37 | 0.34 | 0.37 | 0.42 |
| -17.9 | 0.43 | 0.49 | 0.46 | 0.40 | 0.37 | 0.41 | 0.46 |
| -16.9 | 0.47 | 0.52 | 0.50 | 0.44 | 0.40 | 0.44 | 0.50 |
| -15.9 | 0.50 | 0.56 | 0.53 | 0.47 | 0.43 | 0.47 | 0.54 |
| -14.9 | 0.53 | 0.59 | 0.57 | 0.49 | 0.47 | 0.50 | 0.57 |
| -13.9 | 0.56 | 0.62 | 0.59 | 0.52 | 0.48 | 0.52 | 0.59 |
| -12.9 | 0.58 | 0.64 | 0.62 | 0.55 | 0.51 | 0.55 | 0.61 |
| -11.9 | 0.61 | 0.67 | 0.64 | 0.57 | 0.53 | 0.57 | 0.65 |
| -10.9 | 0.63 | 0.70 | 0.68 | 0.60 | 0.55 | 0.60 | 0.67 |
| -9.9 | 0.65 | 0.72 | 0.69 | 0.61 | 0.57 | 0.61 | 0.69 |
| -8.9 | 0.67 | 0.73 | 0.70 | 0.63 | 0.59 | 0.63 | 0.71 |
| -7.9 | 0.68 | 0.76 | 0.72 | 0.64 | 0.60 | 0.64 | 0.73 |
| -6.9 | 0.70 | 0.77 | 0.74 | 0.65 | 0.61 | 0.66 | 0.74 |
| -5.9 | 0.71 | 0.77 | 0.75 | 0.66 | 0.61 | 0.68 | 0.75 |
| -4.9 | 0.72 | 0.79 | 0.77 | 0.68 | 0.62 | 0.68 | 0.76 |
| -3.9 | 0.73 | 0.80 | 0.76 | 0.69 | 0.63 | 0.69 | 0.77 |
| -2.9 | 0.73 | 0.80 | 0.77 | 0.68 | 0.63 | 0.69 | 0.77 |
| -1.9 | 0.73 | 0.81 | 0.77 | 0.69 | 0.64 | 0.69 | 0.77 |
| -0.9 | 0.73 | 0.80 | 0.78 | 0.69 | 0.64 | 0.69 | 0.77 |
| 0.1 | 0.73 | 0.80 | 0.78 | 0.69 | 0.65 | 0.70 | 0.77 |
| 1.1 | 0.73 | 0.81 | 0.77 | 0.69 | 0.64 | 0.69 | 0.78 |
| 2.1 | 0.73 | 0.80 | 0.77 | 0.69 | 0.64 | 0.70 | 0.77 |
| 3.1 | 0.72 | 0.79 | 0.77 | 0.69 | 0.64 | 0.68 | 0.78 |
| 4.1 | 0.71 | 0.79 | 0.75 | 0.68 | 0.62 | 0.67 | 0.76 |
| 5.1 | 0.70 | 0.77 | 0.74 | 0.67 | 0.61 | 0.67 | 0.74 |
| 6.1 | 0.68 | 0.75 | 0.73 | 0.64 | 0.60 | 0.65 | 0.73 |
| 7.1 | 0.67 | 0.74 | 0.70 | 0.63 | 0.58 | 0.64 | 0.71 |
| 8.1 | 0.65 | 0.72 | 0.70 | 0.62 | 0.57 | 0.62 | 0.69 |
| 9.1 | 0.63 | 0.70 | 0.68 | 0.60 | 0.56 | 0.59 | 0.67 |
| 10.1 | 0.61 | 0.68 | 0.65 | 0.58 | 0.53 | 0.57 | 0.65 |
| 11.1 | 0.59 | 0.65 | 0.62 | 0.55 | 0.51 | 0.55 | 0.62 |
| 12.1 | 0.56 | 0.61 | 0.59 | 0.52 | 0.48 | 0.53 | 0.59 |
| 13.1 | 0.53 | 0.59 | 0.56 | 0.50 | 0.45 | 0.50 | 0.56 |
| 14.1 | 0.50 | 0.56 | 0.53 | 0.47 | 0.43 | 0.47 | 0.53 |
| 15.1 | 0.47 | 0.52 | 0.50 | 0.44 | 0.40 | 0.44 | 0.50 |
| 16.1 | 0.43 | 0.48 | 0.46 | 0.41 | 0.37 | 0.41 | 0.46 |
| 17.1 | 0.39 | 0.44 | 0.42 | 0.37 | 0.34 | 0.37 | 0.42 |
| 18.1 | 0.35 | 0.39 | 0.38 | 0.33 | 0.31 | 0.33 | 0.37 |
| 19.1 | 0.32 | 0.35 | 0.33 | 0.29 | 0.27 | 0.29 | 0.33 |
| 20.1 | 0.27 | 0.31 | 0.29 | 0.26 | 0.24 | 0.26 | 0.29 |
| 21.1 | 0.24 | 0.26 | 0.25 | 0.22 | 0.21 | 0.22 | 0.25 |
| 22.1 | 0.20 | 0.22 | 0.21 | 0.19 | 0.17 | 0.19 | 0.21 |
| 23.1 | 0.16 | 0.18 | 0.17 | 0.15 | 0.14 | 0.15 | 0.17 |
| 24.1 | 0.13 | 0.14 | 0.13 | 0.12 | 0.11 | 0.12 | 0.13 |

**Table 19: AGC-2 Specimen DPA at the end of Cycle 149B.**

| Inches from Core Mid-Plane | S7 DPA | S1 DPA | S2 DPA | S3 DPA | S4 DPA | S5 DPA | S6 DPA |
|---|---|---|---|---|---|---|---|
| -23.9 | 0.44 | 0.50 | 0.47 | 0.41 | 0.38 | 0.41 | 0.47 |
| -22.9 | 0.56 | 0.63 | 0.59 | 0.52 | 0.48 | 0.52 | 0.60 |
| -21.9 | 0.66 | 0.75 | 0.71 | 0.62 | 0.57 | 0.62 | 0.71 |
| -20.9 | 0.76 | 0.86 | 0.82 | 0.72 | 0.66 | 0.71 | 0.81 |
| -19.9 | 0.86 | 0.96 | 0.92 | 0.81 | 0.74 | 0.80 | 0.92 |
| -18.9 | 0.95 | 1.06 | 1.01 | 0.89 | 0.82 | 0.89 | 1.02 |
| -17.9 | 1.04 | 1.17 | 1.11 | 0.98 | 0.90 | 0.98 | 1.11 |
| -16.9 | 1.14 | 1.27 | 1.20 | 1.07 | 0.98 | 1.07 | 1.21 |
| -15.9 | 1.21 | 1.35 | 1.29 | 1.14 | 1.05 | 1.14 | 1.30 |
| -14.9 | 1.28 | 1.43 | 1.38 | 1.21 | 1.12 | 1.20 | 1.36 |
| -13.9 | 1.35 | 1.50 | 1.44 | 1.27 | 1.17 | 1.26 | 1.44 |
| -12.9 | 1.41 | 1.57 | 1.50 | 1.33 | 1.23 | 1.33 | 1.50 |
| -11.9 | 1.47 | 1.64 | 1.56 | 1.38 | 1.28 | 1.38 | 1.56 |
| -10.9 | 1.54 | 1.70 | 1.64 | 1.45 | 1.32 | 1.45 | 1.63 |
| -9.9 | 1.57 | 1.76 | 1.67 | 1.49 | 1.38 | 1.49 | 1.68 |
| -8.9 | 1.62 | 1.79 | 1.71 | 1.52 | 1.42 | 1.52 | 1.72 |
| -7.9 | 1.66 | 1.83 | 1.76 | 1.56 | 1.44 | 1.57 | 1.75 |
| -6.9 | 1.69 | 1.86 | 1.80 | 1.59 | 1.47 | 1.60 | 1.79 |
| -5.9 | 1.71 | 1.89 | 1.82 | 1.61 | 1.49 | 1.64 | 1.82 |
| -4.9 | 1.73 | 1.90 | 1.85 | 1.64 | 1.51 | 1.63 | 1.84 |
| -3.9 | 1.76 | 1.93 | 1.86 | 1.67 | 1.53 | 1.66 | 1.86 |
| -2.9 | 1.77 | 1.95 | 1.88 | 1.67 | 1.54 | 1.67 | 1.87 |
| -1.9 | 1.78 | 1.95 | 1.89 | 1.68 | 1.56 | 1.69 | 1.87 |
| -0.9 | 1.77 | 1.95 | 1.89 | 1.69 | 1.55 | 1.68 | 1.87 |
| 0.1 | 1.78 | 1.96 | 1.88 | 1.69 | 1.56 | 1.69 | 1.86 |
| 1.1 | 1.78 | 1.95 | 1.88 | 1.67 | 1.56 | 1.68 | 1.88 |
| 2.1 | 1.76 | 1.94 | 1.86 | 1.68 | 1.55 | 1.68 | 1.87 |
| 3.1 | 1.75 | 1.92 | 1.86 | 1.65 | 1.54 | 1.66 | 1.87 |
| 4.1 | 1.74 | 1.90 | 1.84 | 1.64 | 1.50 | 1.64 | 1.83 |
| 5.1 | 1.70 | 1.88 | 1.81 | 1.61 | 1.48 | 1.61 | 1.80 |
| 6.1 | 1.67 | 1.83 | 1.78 | 1.57 | 1.46 | 1.57 | 1.77 |
| 7.1 | 1.63 | 1.81 | 1.73 | 1.53 | 1.41 | 1.55 | 1.72 |
| 8.1 | 1.58 | 1.76 | 1.69 | 1.50 | 1.38 | 1.50 | 1.68 |
| 9.1 | 1.54 | 1.71 | 1.64 | 1.45 | 1.35 | 1.44 | 1.63 |
| 10.1 | 1.49 | 1.66 | 1.57 | 1.40 | 1.30 | 1.40 | 1.58 |
| 11.1 | 1.42 | 1.58 | 1.52 | 1.35 | 1.25 | 1.35 | 1.50 |
| 12.1 | 1.36 | 1.50 | 1.44 | 1.27 | 1.18 | 1.28 | 1.44 |
| 13.1 | 1.29 | 1.43 | 1.36 | 1.21 | 1.11 | 1.22 | 1.36 |
| 14.1 | 1.21 | 1.35 | 1.29 | 1.14 | 1.04 | 1.14 | 1.28 |
| 15.1 | 1.14 | 1.26 | 1.21 | 1.07 | 0.98 | 1.07 | 1.21 |
| 16.1 | 1.05 | 1.18 | 1.13 | 0.99 | 0.91 | 1.00 | 1.13 |
| 17.1 | 0.95 | 1.08 | 1.03 | 0.91 | 0.83 | 0.90 | 1.03 |
| 18.1 | 0.86 | 0.95 | 0.92 | 0.81 | 0.75 | 0.81 | 0.91 |
| 19.1 | 0.77 | 0.84 | 0.81 | 0.71 | 0.66 | 0.71 | 0.81 |
| 20.1 | 0.67 | 0.75 | 0.71 | 0.63 | 0.58 | 0.62 | 0.70 |
| 21.1 | 0.58 | 0.65 | 0.61 | 0.54 | 0.50 | 0.54 | 0.61 |
| 22.1 | 0.49 | 0.54 | 0.52 | 0.46 | 0.42 | 0.46 | 0.52 |
| 23.1 | 0.40 | 0.45 | 0.42 | 0.38 | 0.35 | 0.37 | 0.42 |
| 24.1 | 0.31 | 0.34 | 0.32 | 0.30 | 0.27 | 0.29 | 0.33 |

**Table 20: AGC-2 Specimen DPA at the end of Cycle 150B.**

| Inches from Core Mid-Plane | S7 DPA | S1 DPA | S2 DPA | S3 DPA | S4 DPA | S5 DPA | S6 DPA |
|---|---|---|---|---|---|---|---|
| -23.9 | 0.65 | 0.73 | 0.70 | 0.61 | 0.56 | 0.61 | 0.70 |
| -22.9 | 0.82 | 0.93 | 0.88 | 0.77 | 0.71 | 0.77 | 0.88 |
| -21.9 | 0.97 | 1.11 | 1.05 | 0.92 | 0.84 | 0.92 | 1.05 |
| -20.9 | 1.12 | 1.26 | 1.20 | 1.06 | 0.97 | 1.05 | 1.20 |
| -19.9 | 1.27 | 1.41 | 1.35 | 1.19 | 1.09 | 1.17 | 1.35 |
| -18.9 | 1.39 | 1.56 | 1.49 | 1.31 | 1.21 | 1.32 | 1.50 |
| -17.9 | 1.54 | 1.72 | 1.63 | 1.45 | 1.33 | 1.45 | 1.63 |
| -16.9 | 1.66 | 1.87 | 1.77 | 1.58 | 1.44 | 1.57 | 1.78 |
| -15.9 | 1.78 | 1.99 | 1.90 | 1.67 | 1.54 | 1.68 | 1.91 |
| -14.9 | 1.88 | 2.11 | 2.02 | 1.77 | 1.64 | 1.77 | 2.00 |
| -13.9 | 1.98 | 2.21 | 2.12 | 1.87 | 1.72 | 1.85 | 2.11 |
| -12.9 | 2.06 | 2.30 | 2.20 | 1.94 | 1.80 | 1.95 | 2.19 |
| -11.9 | 2.16 | 2.40 | 2.29 | 2.02 | 1.88 | 2.03 | 2.29 |
| -10.9 | 2.25 | 2.49 | 2.39 | 2.12 | 1.93 | 2.11 | 2.38 |
| -9.9 | 2.30 | 2.57 | 2.44 | 2.18 | 2.02 | 2.19 | 2.46 |
| -8.9 | 2.37 | 2.62 | 2.51 | 2.23 | 2.08 | 2.22 | 2.52 |
| -7.9 | 2.43 | 2.67 | 2.56 | 2.27 | 2.11 | 2.29 | 2.57 |
| -6.9 | 2.46 | 2.71 | 2.62 | 2.33 | 2.15 | 2.34 | 2.61 |
| -5.9 | 2.50 | 2.76 | 2.65 | 2.35 | 2.18 | 2.37 | 2.65 |
| -4.9 | 2.54 | 2.78 | 2.70 | 2.40 | 2.21 | 2.38 | 2.68 |
| -3.9 | 2.58 | 2.82 | 2.71 | 2.43 | 2.23 | 2.42 | 2.71 |
| -2.9 | 2.58 | 2.85 | 2.74 | 2.43 | 2.25 | 2.44 | 2.73 |
| -1.9 | 2.59 | 2.84 | 2.76 | 2.44 | 2.26 | 2.45 | 2.73 |
| -0.9 | 2.59 | 2.85 | 2.75 | 2.46 | 2.26 | 2.44 | 2.73 |
| 0.1 | 2.60 | 2.85 | 2.75 | 2.45 | 2.28 | 2.46 | 2.72 |
| 1.1 | 2.60 | 2.85 | 2.73 | 2.44 | 2.27 | 2.44 | 2.74 |
| 2.1 | 2.57 | 2.83 | 2.71 | 2.45 | 2.27 | 2.45 | 2.72 |
| 3.1 | 2.56 | 2.80 | 2.71 | 2.41 | 2.23 | 2.41 | 2.74 |
| 4.1 | 2.53 | 2.79 | 2.68 | 2.39 | 2.20 | 2.39 | 2.67 |
| 5.1 | 2.48 | 2.74 | 2.64 | 2.35 | 2.16 | 2.36 | 2.63 |
| 6.1 | 2.43 | 2.68 | 2.58 | 2.30 | 2.13 | 2.30 | 2.59 |
| 7.1 | 2.37 | 2.64 | 2.52 | 2.24 | 2.06 | 2.26 | 2.51 |
| 8.1 | 2.31 | 2.58 | 2.46 | 2.18 | 2.02 | 2.19 | 2.45 |
| 9.1 | 2.25 | 2.50 | 2.40 | 2.12 | 1.97 | 2.11 | 2.38 |
| 10.1 | 2.19 | 2.42 | 2.30 | 2.05 | 1.90 | 2.04 | 2.31 |
| 11.1 | 2.08 | 2.32 | 2.22 | 1.97 | 1.83 | 1.97 | 2.21 |
| 12.1 | 2.00 | 2.21 | 2.11 | 1.86 | 1.73 | 1.88 | 2.11 |
| 13.1 | 1.89 | 2.10 | 2.00 | 1.78 | 1.63 | 1.79 | 2.00 |
| 14.1 | 1.79 | 1.98 | 1.89 | 1.67 | 1.53 | 1.68 | 1.88 |
| 15.1 | 1.66 | 1.86 | 1.78 | 1.58 | 1.44 | 1.57 | 1.77 |
| 16.1 | 1.55 | 1.74 | 1.66 | 1.46 | 1.34 | 1.46 | 1.66 |
| 17.1 | 1.41 | 1.59 | 1.51 | 1.33 | 1.22 | 1.32 | 1.51 |
| 18.1 | 1.27 | 1.41 | 1.35 | 1.19 | 1.10 | 1.19 | 1.35 |
| 19.1 | 1.13 | 1.25 | 1.20 | 1.04 | 0.97 | 1.05 | 1.19 |
| 20.1 | 0.98 | 1.10 | 1.04 | 0.92 | 0.85 | 0.92 | 1.04 |
| 21.1 | 0.85 | 0.96 | 0.91 | 0.80 | 0.74 | 0.80 | 0.90 |
| 22.1 | 0.72 | 0.81 | 0.77 | 0.68 | 0.62 | 0.68 | 0.78 |
| 23.1 | 0.59 | 0.66 | 0.62 | 0.56 | 0.51 | 0.55 | 0.63 |
| 24.1 | 0.46 | 0.50 | 0.48 | 0.43 | 0.40 | 0.43 | 0.48 |

**Table 21: AGC-2 Specimen DPA at the end of Cycle 151A.**

| Inches from Core Mid-Plane | S7 DPA | S4 DPA | S5 DPA | S6 DPA | S1 DPA | S2 DPA | S3 DPA |
|---|---|---|---|---|---|---|---|
| -23.9 | 0.93 | 0.88 | 0.91 | 0.96 | 0.98 | 0.96 | 0.91 |
| -22.9 | 1.18 | 1.11 | 1.15 | 1.21 | 1.23 | 1.21 | 1.15 |
| -21.9 | 1.39 | 1.32 | 1.37 | 1.43 | 1.47 | 1.44 | 1.36 |
| -20.9 | 1.61 | 1.51 | 1.57 | 1.65 | 1.68 | 1.65 | 1.57 |
| -19.9 | 1.81 | 1.69 | 1.75 | 1.86 | 1.87 | 1.85 | 1.76 |
| -18.9 | 1.99 | 1.88 | 1.95 | 2.05 | 2.08 | 2.05 | 1.94 |
| -17.9 | 2.18 | 2.05 | 2.14 | 2.24 | 2.29 | 2.24 | 2.14 |
| -16.9 | 2.37 | 2.22 | 2.32 | 2.44 | 2.48 | 2.43 | 2.33 |
| -15.9 | 2.53 | 2.37 | 2.47 | 2.61 | 2.64 | 2.61 | 2.46 |
| -14.9 | 2.68 | 2.52 | 2.60 | 2.74 | 2.80 | 2.76 | 2.61 |
| -13.9 | 2.81 | 2.64 | 2.74 | 2.88 | 2.93 | 2.90 | 2.75 |
| -12.9 | 2.93 | 2.76 | 2.87 | 3.00 | 3.06 | 3.02 | 2.86 |
| -11.9 | 3.06 | 2.87 | 2.99 | 3.14 | 3.19 | 3.14 | 2.96 |
| -10.9 | 3.18 | 2.96 | 3.10 | 3.26 | 3.30 | 3.27 | 3.11 |
| -9.9 | 3.25 | 3.08 | 3.21 | 3.36 | 3.40 | 3.35 | 3.19 |
| -8.9 | 3.35 | 3.16 | 3.25 | 3.45 | 3.48 | 3.44 | 3.28 |
| -7.9 | 3.43 | 3.20 | 3.34 | 3.52 | 3.55 | 3.50 | 3.33 |
| -6.9 | 3.47 | 3.26 | 3.41 | 3.57 | 3.59 | 3.58 | 3.40 |
| -5.9 | 3.54 | 3.30 | 3.45 | 3.62 | 3.65 | 3.62 | 3.44 |
| -4.9 | 3.57 | 3.36 | 3.48 | 3.65 | 3.70 | 3.69 | 3.50 |
| -3.9 | 3.63 | 3.38 | 3.53 | 3.70 | 3.75 | 3.70 | 3.53 |
| -2.9 | 3.64 | 3.40 | 3.56 | 3.73 | 3.77 | 3.74 | 3.54 |
| -1.9 | 3.65 | 3.42 | 3.57 | 3.73 | 3.77 | 3.76 | 3.56 |
| -0.9 | 3.65 | 3.42 | 3.56 | 3.73 | 3.78 | 3.75 | 3.58 |
| 0.1 | 3.66 | 3.44 | 3.58 | 3.72 | 3.78 | 3.75 | 3.57 |
| 1.1 | 3.66 | 3.43 | 3.56 | 3.75 | 3.79 | 3.74 | 3.56 |
| 2.1 | 3.62 | 3.43 | 3.56 | 3.72 | 3.76 | 3.72 | 3.55 |
| 3.1 | 3.61 | 3.39 | 3.52 | 3.73 | 3.71 | 3.70 | 3.52 |
| 4.1 | 3.57 | 3.34 | 3.48 | 3.65 | 3.70 | 3.67 | 3.50 |
| 5.1 | 3.50 | 3.30 | 3.44 | 3.60 | 3.63 | 3.61 | 3.43 |
| 6.1 | 3.44 | 3.24 | 3.35 | 3.53 | 3.55 | 3.53 | 3.36 |
| 7.1 | 3.35 | 3.14 | 3.29 | 3.44 | 3.50 | 3.45 | 3.28 |
| 8.1 | 3.26 | 3.08 | 3.21 | 3.35 | 3.42 | 3.37 | 3.20 |
| 9.1 | 3.18 | 3.00 | 3.10 | 3.25 | 3.32 | 3.30 | 3.11 |
| 10.1 | 3.10 | 2.90 | 3.01 | 3.17 | 3.21 | 3.15 | 3.01 |
| 11.1 | 2.95 | 2.79 | 2.90 | 3.03 | 3.08 | 3.04 | 2.89 |
| 12.1 | 2.83 | 2.65 | 2.77 | 2.89 | 2.93 | 2.90 | 2.74 |
| 13.1 | 2.68 | 2.51 | 2.63 | 2.74 | 2.79 | 2.74 | 2.62 |
| 14.1 | 2.53 | 2.36 | 2.47 | 2.58 | 2.63 | 2.59 | 2.46 |
| 15.1 | 2.36 | 2.23 | 2.33 | 2.43 | 2.47 | 2.44 | 2.32 |
| 16.1 | 2.20 | 2.07 | 2.15 | 2.27 | 2.31 | 2.26 | 2.15 |
| 17.1 | 2.01 | 1.89 | 1.96 | 2.07 | 2.10 | 2.07 | 1.97 |
| 18.1 | 1.81 | 1.70 | 1.76 | 1.86 | 1.88 | 1.86 | 1.77 |
| 19.1 | 1.61 | 1.51 | 1.56 | 1.64 | 1.66 | 1.65 | 1.55 |
| 20.1 | 1.40 | 1.32 | 1.36 | 1.43 | 1.46 | 1.44 | 1.37 |
| 21.1 | 1.21 | 1.16 | 1.18 | 1.24 | 1.27 | 1.25 | 1.19 |
| 22.1 | 1.03 | 0.96 | 1.01 | 1.07 | 1.07 | 1.05 | 1.01 |
| 23.1 | 0.85 | 0.80 | 0.81 | 0.86 | 0.87 | 0.86 | 0.83 |
| 24.1 | 0.65 | 0.62 | 0.63 | 0.67 | 0.67 | 0.67 | 0.64 |

**Table 22: AGC-2 Specimen DPA at the end of Cycle 151B.**

| Inches from Core Mid-Plane | S7 DPA | S4 DPA | S5 DPA | S6 DPA | S1 DPA | S2 DPA | S3 DPA |
|---|---|---|---|---|---|---|---|
| -23.9 | 1.18 | 1.16 | 1.17 | 1.19 | 1.19 | 1.19 | 1.18 |
| -22.9 | 1.50 | 1.47 | 1.49 | 1.50 | 1.50 | 1.51 | 1.48 |
| -21.9 | 1.76 | 1.74 | 1.77 | 1.78 | 1.80 | 1.79 | 1.76 |
| -20.9 | 2.04 | 1.99 | 2.03 | 2.05 | 2.04 | 2.05 | 2.02 |
| -19.9 | 2.29 | 2.22 | 2.26 | 2.31 | 2.29 | 2.29 | 2.26 |
| -18.9 | 2.52 | 2.47 | 2.51 | 2.55 | 2.53 | 2.54 | 2.50 |
| -17.9 | 2.76 | 2.71 | 2.76 | 2.79 | 2.79 | 2.78 | 2.75 |
| -16.9 | 3.00 | 2.91 | 3.00 | 3.04 | 3.02 | 3.01 | 2.99 |
| -15.9 | 3.20 | 3.11 | 3.19 | 3.24 | 3.22 | 3.23 | 3.17 |
| -14.9 | 3.39 | 3.31 | 3.35 | 3.42 | 3.41 | 3.44 | 3.36 |
| -13.9 | 3.55 | 3.46 | 3.54 | 3.58 | 3.58 | 3.59 | 3.53 |
| -12.9 | 3.71 | 3.62 | 3.68 | 3.75 | 3.74 | 3.75 | 3.69 |
| -11.9 | 3.87 | 3.77 | 3.85 | 3.90 | 3.90 | 3.90 | 3.81 |
| -10.9 | 4.01 | 3.89 | 3.99 | 4.05 | 4.03 | 4.07 | 3.99 |
| -9.9 | 4.11 | 4.02 | 4.13 | 4.18 | 4.15 | 4.16 | 4.09 |
| -8.9 | 4.23 | 4.13 | 4.19 | 4.30 | 4.25 | 4.27 | 4.20 |
| -7.9 | 4.33 | 4.18 | 4.29 | 4.37 | 4.34 | 4.36 | 4.28 |
| -6.9 | 4.38 | 4.27 | 4.38 | 4.44 | 4.38 | 4.44 | 4.35 |
| -5.9 | 4.48 | 4.32 | 4.44 | 4.51 | 4.47 | 4.50 | 4.40 |
| -4.9 | 4.50 | 4.40 | 4.48 | 4.55 | 4.52 | 4.57 | 4.49 |
| -3.9 | 4.59 | 4.41 | 4.54 | 4.60 | 4.56 | 4.59 | 4.52 |
| -2.9 | 4.59 | 4.43 | 4.58 | 4.64 | 4.62 | 4.64 | 4.55 |
| -1.9 | 4.61 | 4.46 | 4.58 | 4.64 | 4.61 | 4.67 | 4.56 |
| -0.9 | 4.60 | 4.46 | 4.58 | 4.63 | 4.63 | 4.66 | 4.59 |
| 0.1 | 4.62 | 4.49 | 4.60 | 4.63 | 4.62 | 4.66 | 4.58 |
| 1.1 | 4.61 | 4.47 | 4.57 | 4.66 | 4.63 | 4.65 | 4.56 |
| 2.1 | 4.57 | 4.47 | 4.57 | 4.62 | 4.60 | 4.62 | 4.54 |
| 3.1 | 4.55 | 4.43 | 4.53 | 4.62 | 4.55 | 4.59 | 4.50 |
| 4.1 | 4.52 | 4.36 | 4.48 | 4.55 | 4.53 | 4.55 | 4.47 |
| 5.1 | 4.42 | 4.30 | 4.42 | 4.48 | 4.43 | 4.47 | 4.40 |
| 6.1 | 4.34 | 4.23 | 4.31 | 4.39 | 4.35 | 4.37 | 4.31 |
| 7.1 | 4.24 | 4.11 | 4.24 | 4.28 | 4.27 | 4.28 | 4.21 |
| 8.1 | 4.12 | 4.03 | 4.12 | 4.16 | 4.17 | 4.19 | 4.10 |
| 9.1 | 4.01 | 3.92 | 4.00 | 4.05 | 4.06 | 4.09 | 4.01 |
| 10.1 | 3.91 | 3.79 | 3.86 | 3.93 | 3.93 | 3.92 | 3.87 |
| 11.1 | 3.73 | 3.66 | 3.72 | 3.78 | 3.76 | 3.76 | 3.72 |
| 12.1 | 3.57 | 3.46 | 3.56 | 3.59 | 3.58 | 3.60 | 3.52 |
| 13.1 | 3.38 | 3.28 | 3.38 | 3.42 | 3.40 | 3.41 | 3.35 |
| 14.1 | 3.18 | 3.10 | 3.19 | 3.21 | 3.21 | 3.21 | 3.16 |
| 15.1 | 2.99 | 2.94 | 3.00 | 3.03 | 3.01 | 3.03 | 2.97 |
| 16.1 | 2.79 | 2.72 | 2.78 | 2.83 | 2.81 | 2.80 | 2.76 |
| 17.1 | 2.54 | 2.48 | 2.54 | 2.58 | 2.56 | 2.57 | 2.54 |
| 18.1 | 2.30 | 2.23 | 2.28 | 2.31 | 2.29 | 2.31 | 2.28 |
| 19.1 | 2.03 | 1.99 | 2.01 | 2.04 | 2.02 | 2.04 | 2.00 |
| 20.1 | 1.78 | 1.74 | 1.75 | 1.77 | 1.79 | 1.78 | 1.76 |
| 21.1 | 1.54 | 1.53 | 1.53 | 1.55 | 1.55 | 1.55 | 1.53 |
| 22.1 | 1.31 | 1.27 | 1.30 | 1.32 | 1.31 | 1.31 | 1.30 |
| 23.1 | 1.08 | 1.05 | 1.05 | 1.07 | 1.07 | 1.07 | 1.06 |
| 24.1 | 0.82 | 0.80 | 0.81 | 0.83 | 0.82 | 0.83 | 0.83 |

**Table 23: AGC-2 specimen peak DPA for each step of each cycle.**

| Cycle | Date | S7 DPA | S1 DPA | S2 DPA | S3 DPA | S4 DPA | S5 DPA | S6 DPA |
|---|---|---|---|---|---|---|---|---|
| 149A | 4/29/11 | 0.30 | 0.33 | 0.32 | 0.29 | 0.27 | 0.29 | 0.32 |
| | 5/14/11 | 0.60 | 0.66 | 0.63 | 0.56 | 0.53 | 0.57 | 0.63 |
| | 5/21/11 | 0.73 | 0.81 | 0.78 | 0.69 | 0.65 | 0.70 | 0.78 |
| 149B | 6/22/11 | 1.03 | 1.13 | 1.09 | 0.97 | 0.90 | 0.98 | 1.09 |
| | 7/7/11 | 1.34 | 1.47 | 1.42 | 1.27 | 1.17 | 1.27 | 1.41 |
| | 7/29/11 | 1.78 | 1.96 | 1.89 | 1.69 | 1.56 | 1.69 | 1.88 |
| 150B | 11/2/11 | 2.14 | 2.35 | 2.27 | 2.02 | 1.87 | 2.03 | 2.25 |
| | 11/14/11 | 2.39 | 2.63 | 2.53 | 2.26 | 2.09 | 2.26 | 2.52 |
| | 11/23/11 | 2.60 | 2.85 | 2.76 | 2.45 | 2.28 | 2.46 | 2.74 |
| | | | | | | | | |
| Cycle | Date | S7 DPA | S4 DPA | S5 DPA | S6 DPA | S1 DPA | S2 DPA | S3 DPA |
| 151A | 12/23/11 | 2.89 | 2.59 | 2.77 | 3.02 | 3.11 | 3.03 | 2.76 |
| | 1/11/12 | 3.25 | 2.99 | 3.15 | 3.36 | 3.43 | 3.37 | 3.15 |
| | 2/7/12 | 3.66 | 3.44 | 3.58 | 3.75 | 3.79 | 3.76 | 3.58 |
| 151B | 3/20/12 | 4.09 | 3.91 | 4.04 | 4.16 | 4.17 | 4.17 | 4.03 |
| | 4/18/12 | 4.39 | 4.24 | 4.36 | 4.44 | 4.43 | 4.45 | 4.35 |
| | 5/3/12 | 4.62 | 4.49 | 4.60 | 4.66 | 4.63 | 4.67 | 4.59 |

**Table 24: AGC-2 graphite holder peak DPA for each step of each cycle.**

| Cycle | Date | S1 DPA | S2 DPA | S3 DPA | S4 DPA | S5 DPA | S6 DPA |
|---|---|---|---|---|---|---|---|
| 149A | 4/29/11 | 0.33 | 0.32 | 0.29 | 0.27 | 0.29 | 0.32 |
| | 5/14/11 | 0.65 | 0.63 | 0.57 | 0.53 | 0.57 | 0.63 |
| | 5/21/11 | 0.80 | 0.77 | 0.70 | 0.65 | 0.70 | 0.77 |
| 149B | 6/22/11 | 1.13 | 1.09 | 0.98 | 0.92 | 0.98 | 1.08 |
| | 7/7/11 | 1.46 | 1.41 | 1.27 | 1.19 | 1.27 | 1.40 |
| | 7/29/11 | 1.95 | 1.88 | 1.70 | 1.59 | 1.70 | 1.87 |
| 150B | 11/2/11 | 2.34 | 2.26 | 2.03 | 1.90 | 2.03 | 2.24 |
| | 11/14/11 | 2.61 | 2.52 | 2.27 | 2.12 | 2.27 | 2.50 |
| | 11/23/11 | 2.84 | 2.74 | 2.46 | 2.31 | 2.47 | 2.72 |
| | | | | | | | |
| Cycle | Date | S4 DPA | S5 DPA | S6 DPA | S1 DPA | S2 DPA | S3 DPA |
| 151A | 12/23/11 | 2.63 | 2.77 | 3.00 | 3.10 | 3.01 | 2.77 |
| | 1/11/12 | 3.02 | 3.15 | 3.34 | 3.42 | 3.36 | 3.15 |
| | 2/7/12 | 3.46 | 3.58 | 3.73 | 3.79 | 3.74 | 3.58 |
| 151B | 3/20/12 | 3.93 | 4.03 | 4.14 | 4.17 | 4.15 | 4.03 |
| | 4/18/12 | 4.26 | 4.35 | 4.43 | 4.44 | 4.43 | 4.34 |
| | 5/3/12 | 4.51 | 4.59 | 4.64 | 4.64 | 4.65 | 4.58 |

## 8.0 References

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