TOPIC: 192006
KNOWLEDGE: K1.01 [2.5/2.6]
QID: P58

Fission products that have large microscopic cross sections for capture of thermal neutrons are called...

A. breeder fuels.

B. burnable poisons.

C. fissionable fuels.

D. reactor poisons.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.01 [2.5/2.6]
QID: P858 (B1858)

Fission product poisons can be differentiated from other fission products in that fission product poisons...

A. have a longer half-life.

B. are stronger absorbers of thermal neutrons.

C. are produced in a larger percentage of fissions.

D. have a higher fission cross section for thermal neutrons.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.01 [2.5/2.6]
QID: P2058 (B2061)

A fission product poison can be differentiated from all other fission products in that a fission product poison will...

A. be produced in direct proportion to the fission rate in the core.

B. remain radioactive for thousands of years after the final reactor criticality.

C. depress the power production in some core locations and cause peaking in others.

D. migrate out of the fuel pellets and into the reactor coolant via pinhole defects in the clad.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.01 [2.5/2.6]
QID: P2158

A fission product poison can be differentiated from all other fission products in that a fission product poison...

A. will be radioactive for thousands of years.

B. is produced in a relatively large percentage of thermal fissions.

C. has a relatively high probability of absorbing a fission neutron.

D. is formed as a gas and is contained within the fuel pellets and fuel rods.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.01 [2.5/2.6]
QID: P2858 (B1558)

A fission product poison can be differentiated from all other fission products because a fission product poison...

A. has a higher microscopic cross section for thermal neutron capture.

B. has a longer half-life.

C. is produced in a greater percentage of thermal fissions.

D. is formed as a gas and is contained in the fuel pellets.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.02 [3.0/1.1]
QID: P658

Xenon-135 is considered a major fission product poison because it has a large...

A. fission cross section.

B. absorption cross section.

C. elastic scatter cross section.

D. inelastic scatter cross section.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.02 [3.0/1.1]
QID: P1858 (B1058)

Which one of the following is a characteristic of xenon-135?

A. Thermal neutron flux level affects both the production and removal of xenon-135.

B. Thermal neutrons interact with xenon-135 primarily through scattering reactions.

C. Xenon-135 is primarily a resonance absorber of epithermal neutrons.

D. Xenon-135 is produced from the radioactive decay of barium-135.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.02 [3.0/1.1]
QID: P2458 (B1658)

Which one of the following has the greatest microscopic cross section for absorption of a thermal neutron?

A. Uranium-235

B. Boron-10

C. Samarium-149

D. Xenon-135

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.02 [3.0/1.1]
QID: P2658 (B256)

Compared to other reactor poisons, the two characteristics that make xenon-135 a major reactor poison are its relatively __________ thermal neutron absorption cross section and its relatively __________ variation in concentration for large reactor power changes.

A. small; large

B. small; small

C. large; small

D. large; large

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P59

Immediately after a reactor trip from sustained high power operation, xenon-135 concentration in the reactor will...

A. increase, due to the decay of iodine-135.

B. decrease, because xenon-135 production from fission has stopped.

C. remain the same, because the decay of iodine-135 and xenon-135 balance each other out.

D. decrease initially, and then slowly increase due to the differences in the half-lives of iodine-135 and xenon-135.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P358 (B362)

Xenon-135 is produced in a reactor by two primary methods. One is directly from fission; the other is from the decay of...

A. cesium-135.

B. iodine-135.

C. xenon-136.

D. iodine-136.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P1359 (B458)

A reactor has been operating at full power for several weeks. Xenon-135 is being directly produced as a fission product in approximately __________ percent of all fissions.

A. 100

B. 30

C. 3

D. 0.3

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P1559 (B859)

Which one of the following describes the production mechanisms of xenon-135 in a reactor that is operating at steady-state 100 percent power?

A. Primarily from fission, secondarily from iodine decay

B. Primarily from fission, secondarily from promethium decay

C. Primarily from iodine decay, secondarily from fission

D. Primarily from promethium decay, secondarily from fission

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.03 [2.7/2.8]
QID: P1859 (B257)

What is the major contributor to the production of xenon-135 in a reactor that has been operating at full power for two weeks?

A. Radioactive decay of I-135.

B. Radioactive decay of Cs-135.

C. Direct production from fission of U-235.

D. Direct production from fission of U-238.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.04 [2.8/2.8]
QID: P60

One hour after a reactor trip from sustained 100 percent power operation, the xenon-135 removal process consists primarily of...

A. beta decay.

B. gamma decay.

C. neutron capture.

D. gamma capture.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.04 [2.8/2.8]
QID: P460 (B462)

Reactor power is increased from 50 percent to 60 percent in one hour. What is the most significant contributor to the initial change in xenon-135 reactivity?

A. Production of xenon-135 directly from fission.

B. Production of xenon-135 from iodine-135 decay.

C. Loss of xenon-135 due to absorption of neutrons.

D. Loss of xenon-135 due to decay to cesium-135.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.04 [2.8/2.8]
QID: P859

In a shutdown reactor, which decay chain describes the primary means of removing xenon-135?

A. $^{135}Xe \xrightarrow{\beta^-} {}^{135}Cs$

B. $^{135}Xe \xrightarrow{n} {}^{134}Xe$

C. $^{135}Xe \xrightarrow{\alpha} {}^{131}Te$

D. $^{135}Xe \xrightarrow{\beta^+} {}^{131}I$

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.04 [2.8/2.8]
QID: P1059 (B359)

Xenon-135 undergoes radioactive decay to...

A. iodine-135.

B. cesium-135.

C. tellurium-135.

D. lanthanum-135.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.04 [2.8/2.8]
QID: P2659 (B3358)

A nuclear power plant has been operating at 100 percent power for several months. Which one of the following describes the relative contributions of beta decay and neutron capture to xenon-135 removal from the reactor?

A. Primary is neutron capture; secondary is beta decay.

B. Primary is beta decay; secondary is neutron capture.

C. Beta decay and neutron capture contribute equally.

D. Not enough information is given to make a comparison.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.05 [3.1/3.1]
QID: P61 (B58)

A reactor was operating at 50 percent power for one week when power was ramped to 100 percent. Which one of the following describes the equilibrium xenon-135 concentration at 100 percent power?

A. Twice the 50 percent power concentration.

B. Less than twice the 50 percent power concentration.

C. More than twice the 50 percent power concentration.

D. Remains the same, because it is independent of power.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.05 [3.1/3.1]
QID: P660 (B658)

A reactor was operating at 100 percent power for one week when power was decreased to 50 percent. Which one of the following describes the equilibrium xenon-135 concentration at 50 percent power?

A. The same as the 100 percent power equilibrium concentration.

B. More than one-half the 100 percent power equilibrium concentration.

C. One-half the 100 percent power equilibrium concentration.

D. Less than one-half the 100 percent power equilibrium concentration.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.05 [3.1/3.1]
QID: P1158 (B1160)

A reactor has been operating at 25 percent power for 24 hours following a two-hour power reduction from steady-state 100 percent power. Which one of the following describes the current status of the xenon-135 concentration?

A. At equilibrium.

B. Decreasing toward an upturn.

C. Decreasing toward equilibrium.

D. Increasing toward a peak.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.05 [3.1/3.1]
QID: P1459 (B259)

Following a two-week shutdown, a reactor is taken critical and ramped to 100 percent power in 6 hours. How long will it take to achieve an equilibrium xenon-135 condition after the reactor reaches 100 percent power?

A. 70 to 80 hours

B. 40 to 50 hours

C. 8 to 10 hours

D. 1 to 2 hours

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.05 [3.1/3.1]
QID: P2159 (B2659)

Which one of the following indicates that core xenon-135 concentration is in equilibrium?

A. Xenon-135 production and removal rates are momentarily equal five hours after a power increase.

B. A reactor has been operated at 80 percent power for five days.

C. Xenon-135 is being produced equally by fission and I-135 decay.

D. A reactor is currently operating at 100 percent power.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.05 [2.8/2.8]
QID: P2558 (B2558)

Reactors A and B are operating at steady-state 100 percent power with equilibrium xenon-135. The reactors are identical except that reactor A is operating near the end of a fuel cycle (EOC) and reactor B is operating near the beginning of a fuel cycle (BOC).

Which reactor has the greater concentration of xenon-135, and why?

A. Reactor A (EOC), due to the smaller 100 percent power thermal neutron flux.

B. Reactor A (EOC), due to the larger 100 percent power thermal neutron flux.

C. Reactor B (BOC), due to the smaller 100 percent power thermal neutron flux.

D. Reactor B (BOC), due to the larger 100 percent power thermal neutron flux.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.05 [3.1/3.1]
QID: P2859 (B2760)

Reactors A and B are operating at steady-state 100 percent power with equilibrium xenon-135. The reactors are identical except that reactor A is operating near the end of a fuel cycle (EOC) and reactor B is operating near the beginning of a fuel cycle (BOC).

Which reactor is experiencing the most negative reactivity from equilibrium xenon-135?

A. Reactor A (EOC), due to a greater equilibrium concentration of xenon-135.

B. Reactor A (EOC), due to lower competition from the fuel for thermal neutrons.

C. Reactor B (BOC), due to a greater thermal neutron flux in the core.

D. Reactor B (BOC), due to a smaller accumulation of fission product poisons.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P259

A reactor has been operating at 50 percent power for one week when power is ramped to 100 percent over a four-hour period. How will the xenon-135 concentration respond after power reaches 100 percent?

A. Decrease initially, and then build to a new equilibrium concentration in 8 to 10 hours.

B. Decrease initially, and then build to a new equilibrium concentration in 40 to 50 hours.

C. Increase steadily to a new equilibrium concentration in 20 to 30 hours.

D. Increase steadily to a new equilibrium concentration in 70 to 80 hours.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P659

A reactor has been operating at a 50 percent power for 15 hours following a one-hour power reduction from 100 percent. Which one of the following describes the current xenon-135 concentration?

A. Increasing

B. Decreasing

C. At equilibrium

D. Oscillating

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P959

A reactor was operating for 42 weeks at a steady-state power level below 100 percent when a reactor trip occurred. The reactor was returned to critical after 12 hours and then ramped to 60 percent power in 6 hours.

How much time at steady-state 60 percent power will be required to reach an equilibrium xenon-135 concentration?

A. 20 to 30 hours

B. 40 to 50 hours

C. 70 to 80 hours

D. Unable to determine without knowledge of previous power history

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P1258

A reactor has been operating at 100 percent power for one week when power is ramped in 4 hours to 25 percent power. The new equilibrium xenon-135 concentration will be __________ the initial 100 percent equilibrium concentration.

A. the same as

B. about 80 percent of

C. about 50 percent of

D. less than 25 percent of

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P1360 (B1960)

A reactor has been operating at a constant 50 percent power level for 15 hours following a one-hour power reduction from steady-state 100 percent power. Which one of the following describes the current xenon-135 concentration?

A. Increasing toward a peak.

B. Decreasing toward an upturn.

C. Increasing toward equilibrium.

D. Decreasing toward equilibrium.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P1659

A reactor was operating for 24 weeks at a steady-state power level below 100 percent when a reactor trip occurred. The reactor was returned to critical after 12 hours, and then ramped to 80 percent power in 6 hours.

Approximately how much time at steady-state 80 percent power will be required to reach an equilibrium xenon-135 concentration?

A. 10 to 20 hours

B. 40 to 50 hours

C. 70 to 80 hours

D. Cannot determine without knowledge of previous power history

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P1960 (B1262)

A reactor was operating at 100 percent power for two weeks when power was decreased to 10 percent in one hour. Immediately following the power decrease, xenon-135 concentration will __________ for a period of __________.

A. decrease; 4 to 6 hours

B. increase; 4 to 6 hours

C. decrease; 8 to 11 hours

D. increase; 8 to 11 hours

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P2060

A reactor is initially operating at 50 percent of rated power with equilibrium xenon-135. Power is then increased to 100 percent over a one-hour period and average reactor coolant temperature is adjusted to 588°F using manual rod control. Rod control is left in Manual and no subsequent operator actions are taken.

Considering only the reactivity effects of xenon-135 changes, which one of the following describes the average reactor coolant temperature 8 hours after the power change is completed?

A. Greater than 588°F and decreasing slowly

B. Greater than 588°F and increasing slowly

C. Less than 588°F and decreasing slowly

D. Less than 588°F and increasing slowly

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P2061 (B2158)

A reactor had been operating at 100 percent power for two weeks when power was reduced to 50 percent over a one-hour period. To maintain reactor power stable during the next 24 hours, which one of the following incremental control rod manipulations will be required?

A. Withdraw rods slowly during the entire period.

B. Withdraw rods slowly at first, and then insert rods slowly.

C. Insert rods slowly during the entire period.

D. Insert rods slowly at first, and then withdraw rods slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P2160

A reactor had been operating at 50 percent power for two weeks when power was increased to 100 percent over a three-hour period. To maintain reactor power stable during the next 24 hours, which one of the following incremental control rod manipulations will be required?

A. Withdraw rods slowly during the entire period.

B. Withdraw rods slowly at first, and then insert rods slowly.

C. Insert rods slowly during the entire period.

D. Insert rods slowly at first, and then withdraw rods slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P2359 (B2660)

Which one of the following explains why xenon-135 oscillations are a concern in a reactor?

A. They can adversely affect core power distribution, and they can require operation below full rated power.

B. They can adversely affect core power distribution, and they can prevent reactor criticality during a reactor startup.

C. They can cause excessively short reactor periods during power operation, and they can require operation below full rated power.

D. They can cause excessively short reactor periods during power operation, and they can prevent reactor criticality during a reactor startup.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P2360 (B2361)

A reactor had been operating at 70 percent power for two weeks when power was increased to 100 percent over a two-hour period. To offset xenon-135 reactivity changes during the next 12 hours, which one of the following incremental control rod manipulations will be required?

A. Withdraw rods slowly during the entire period.

B. Withdraw rods slowly at first, and then insert rods slowly.

C. Insert rods slowly during the entire period.

D. Insert rods slowly at first, and then withdraw rods slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P2559

A reactor is initially operating at 100 percent power with equilibrium xenon-135. Power is decreased to 50 percent over a one-hour period and average reactor coolant temperature is adjusted to 572°F using manual rod control. Rod control is left in Manual and no subsequent operator actions are taken.

Considering only the reactivity effects of xenon-135 changes, which one of the following describes the average reactor coolant temperature 10 hours after the power change is completed?

A. Less than 572°F and increasing slowly.

B. Less than 572°F and decreasing slowly.

C. Greater than 572°F and increasing slowly.

D. Greater than 572°F and decreasing slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P2760

A reactor is initially operating at 80 percent power with equilibrium xenon-135. Power is increased to 100 percent over a two-hour period and average reactor coolant temperature is adjusted to 585°F using manual rod control. Rod control is left in Manual and no subsequent operator actions are taken.

Considering only the reactivity effects of xenon-135 changes, which one of the following describes the average reactor coolant temperature 24 hours after the power change is completed?

A. Less than 585°F and decreasing slowly.

B. Less than 585°F and increasing slowly.

C. Greater than 585°F and decreasing slowly.

D. Greater than 585°F and increasing slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.06 [3.2/3.4]
QID: P3460

A reactor is initially operating at 100 percent power with equilibrium xenon-135. Power is decreased to 40 percent over a two-hour period and average reactor coolant temperature is adjusted to 562°F using manual rod control. Rod control is left in Manual and no subsequent operator actions are taken.

Considering only the reactivity effects of xenon-135 changes, which one of the following describes the status of the average reactor coolant temperature two hours after the power change is completed?

A. Greater than 562°F and decreasing slowly.

B. Greater than 562°F and increasing slowly.

C. Less than 562°F and decreasing slowly.

D. Less than 562°F and increasing slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.07 [3.4/3.4]
QID: P260 (B459)

Two identical reactors have been operating at a constant power level for one week. Reactor A is at 50 percent power and reactor B is at 100 percent power. If both reactors trip at the same time, xenon-135 negative reactivity will peak first in reactor _____; and the highest xenon-135 reactivity peak will occur in reactor _____.

A. B; B

B. B; A

C. A; B

D. A; A

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.07 [3.4/3.4]
QID: P1159 (B1761)

Two identical reactors have been operating at a constant power level for one week. Reactor A is at 100 percent power and reactor B is at 50 percent power. If both reactors trip at the same time, xenon-135 concentration will peak first in reactor _____; and the highest peak xenon-135 concentration will occur in reactor _____.

A. B; B

B. B; A

C. A; B

D. A; A

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.07 [3.4/3.4]
QID: P1358 (B1361)

A reactor has been operating at 75 percent power for two months. A manual reactor trip is required for a test. The trip will be followed immediately by a reactor startup with criticality scheduled to occur 12 hours after the trip.

The greatest assurance that fission product poison reactivity will permit criticality during the startup will exist if the reactor is operated at __________ power for 48 hours prior to the trip; and if criticality is rescheduled for __________ hours after the trip.

A. 100 percent; 8

B. 100 percent; 16

C. 50 percent; 8

D. 50 percent; 16

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.07 [3.4/3.4]
QID: P1561

The amount of negative reactivity associated with peak xenon-135 is smallest after a reactor trip from equilibrium __________ reactor power at the __________ of a fuel cycle.

A. 20 percent; beginning

B. 20 percent; end

C. 100 percent; beginning

D. 100 percent; end

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.07 [3.4/3.4]
QID: P1660

The amount of negative reactivity associated with peak xenon-135 is greatest after a reactor trip from equilibrium __________ reactor power at the __________ of a fuel cycle.

A. 20 percent; beginning

B. 20 percent; end

C. 100 percent; beginning

D. 100 percent; end

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.07 [3.4/3.4]
QID: P3860 (B3861)

A reactor has been operating at 80 percent power for two months. A manual reactor trip is required for a test. The trip will be followed by a reactor startup with criticality scheduled to occur 24 hours after the trip.

The greatest assurance that xenon-135 reactivity will permit criticality during the reactor startup will exist if the reactor is operated at __________ power for 48 hours prior to the trip; and if criticality is rescheduled for __________ hours after the trip.

A. 60 percent; 18

B. 60 percent; 30

C. 100 percent; 18

D. 100 percent; 30

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.07 [3.4/3.4]
QID: P6031

A reactor trip occurred one hour ago following several months of operation at 100 percent power. Reactor coolant temperature is being maintained at 550°F and the source range count rate is currently 400 cps. If no additional operator action is taken, how will the source range count rate respond during the next 24 hours? (Assume a constant source neutron flux.)

A. The count rate will remain about the same.

B. The count rate will decrease for the entire period.

C. The count rate will initially decrease and then increase.

D. The count rate will initially increase and then decrease.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P62

Slow changes in axial power distribution in a reactor that has operated at a steady-state power level for a long time can be caused by xenon-135...

A. peaking.

B. override.

C. burnup.

D. oscillations.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P261

Xenon-135 oscillations that tend to <u>dampen</u> themselves over time are ___________ oscillations.

A. converging

B. diverging

C. diffusing

D. equalizing

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P372

Which one of the following occurrences can cause reactor power production to fluctuate between the top and bottom of the core when steam demand is constant?

A. Steam generator level transients

B. Iodine-135 spiking

C. Xenon-135 oscillations

D. Inadvertent boron dilution

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P463

A reactor has been operating at 100 percent power for several weeks with a symmetrical axial power distribution peaked at the core midplane. Reactor power is reduced to 50 percent using boration to control reactor coolant temperature while maintaining control rods fully withdrawn.

During the power reduction, the axial power distribution will...

A. shift toward the top of the core.

B. shift toward the bottom of the core.

C. peak at the top and the bottom of the core.

D. remain symmetrical and peaked at the core midplane.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P563

A reactor was initially operating at 100 percent power at the beginning of core life with equilibrium xenon-135. Then, reactor power was reduced to 50 percent over a two-hour period.

The following information is given:

	Prior to Power Change	After Power Change
Reactor power:	100 percent	50 percent
Reactor coolant boron concentration:	740 ppm	820 ppm
Control rod position:	Fully withdrawn	Fully withdrawn

What is the effect on power distribution in the core during the first 4 hours following the power reduction?

A. Power production in the top of the core increases relative to the bottom of the core.

B. Power production in the top of the core decreases relative to the bottom of the core.

C. There is no relative change in power distribution in the core.

D. It is impossible to determine without additional information.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P761

When a reactor experiences xenon-135 oscillations, the most significant shifts in power generation occur between the ___________ of the core.

A. top and bottom

B. adjacent quadrants

C. center and periphery

D. opposite quadrants

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P763

A reactor has been operating at 80 percent power for several weeks with power production equally distributed axially above and below the core midplane. Reactor power is increased to 100 percent using boron dilution to control reactor coolant temperature while maintaining control rods fully withdrawn.

During the power increase, axial power distribution will...

A. shift toward the top of the core.

B. shift toward the bottom of the core.

C. remain evenly distributed above and below the core midplane.

D. peak at the top and the bottom of the core.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P961

Which one of the following will cause reactor power production to fluctuate slowly between the top and bottom of the core with steady-state steam demand?

A. Feedwater variations

B. Dropped center control rod

C. Xenon-135 oscillations

D. Samarium-149 oscillations

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P1160

Xenon-135 oscillations take about __________ hours to get from maximum xenon-135 negative reactivity to minimum xenon-135 negative reactivity.

A. 40 to 50

B. 24 to 28

C. 12 to 14

D. 6 to 7

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P2764

A reactor was initially operating at 80 percent power near the beginning of a fuel cycle with equilibrium xenon-135. Then, reactor power was increased to 100 percent over a 2 hour period.

The following information is provided:

	Prior to Power Change	After Power Change
Reactor power:	80 percent	100 percent
Reactor coolant boron concentration:	780 ppm	760 ppm
Control rod position:	Fully Withdrawn	Fully Withdrawn

What is the effect on power distribution in the core during the first 4 hours following the power increase?

A. Power production in the top of the core increases relative to the bottom of the core.

B. Power production in the top of the core decreases relative to the bottom of the core.

C. There is no relative change in power distribution in the core.

D. It is impossible to determine without additional information.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.08 [3.3/3.4]
QID: P3060 (B3061)

A reactor has been operating at 100 percent power for one month following a refueling outage with axial neutron flux distribution peaked in the bottom half of the core. An inadvertent reactor trip occurs. The reactor is restarted, with criticality occurring 6 hours after the trip. Reactor power is increased to 60 percent over the next 4 hours and then stabilized.

During the one-hour period immediately after power level is stabilized at 60 percent, the core axial neutron flux peak will be located __________ in the core than the pre-scram peak location; and the core axial neutron flux peak will be moving __________.

A. higher; upward

B. higher; downward

C. lower; upward

D. lower; downward

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.09 [3.0/3.1]
QID: P353 (B355)

A nuclear power plant is being returned to operation following a refueling outage. Fuel preconditioning procedures require reactor power to be increased from 10 percent to 100 percent gradually over a one-week period.

During this slow power increase, most of the positive reactivity added by the operator is required to overcome the negative reactivity from...

A. uranium-235 burnup.

B. xenon-135 buildup.

C. fuel temperature increase.

D. moderator temperature increase.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.09 [3.0/3.1]
QID: P1263

A reactor has been shut down for 7 days to perform maintenance. A reactor startup is performed, and power level is increased to 50 percent over a 5 hour period.

When power reaches 50 percent, the magnitude of xenon-135 negative reactivity will be...

A. increasing toward a peak value.

B. increasing toward an equilibrium value.

C. decreasing toward an equilibrium value.

D. decreasing toward an upturn.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.09 [3.0/3.1]
QID: P1661

A reactor has been shut down for 5 days to perform maintenance. A reactor startup is performed, and power is ramped to 75 percent over a 16-hour period.

When power reaches 75 percent, the concentration of xenon-135 will be...

A. decreasing toward an upturn.

B. increasing toward a peak value.

C. decreasing toward an equilibrium value.

D. increasing toward an equilibrium value.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.09 [3.0/3.1]
QID: P5631 (B5631)

A reactor was shut down for 7 days to perform maintenance. Then, a reactor startup was performed, and reactor power level was increased from 1 percent to 50 percent over a 2 hour period. Reactor power is currently stable at 50 percent.

Ten hours after reactor power reaches 50 percent, the xenon-135 concentration will be…

A. increasing toward a downturn.

B. increasing toward an equilibrium value.

C. decreasing toward an equilibrium value.

D. decreasing toward an upturn.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.10 [3.1/3.2]
QID: P128

A reactor startup is being performed 5 hours after a reactor trip from 100 percent power with equilibrium xenon-135. The reactor is currently at 10 percent power, and is being returned to 100 percent power at 2.0 percent per minute instead of the normal rate of 0.5 percent per minute.

At the faster rate of power increase, the minimum amount of xenon-135 will occur __________ than normal; and the amount of equilibrium xenon-135 at 100 percent power will be __________.

A. sooner; the same

B. sooner; smaller

C. later; the same

D. later; smaller

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.10 [3.1/3.2]
QID: P1062

A reactor was operating at 100 percent power for 8 weeks when a reactor trip occurred. The reactor was critical 6 hours later and power was increased to 100 percent over the next 6 hours.

What was the status of xenon-135 concentration when power reached 100 percent?

A. Increasing toward an equilibrium value.

B. Burning out faster than it is being produced.

C. Increasing toward a peak value.

D. At equilibrium.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.10 [3.1/3.2]
QID: P1262

Xenon-135 poisoning in a reactor is most likely to prevent a reactor startup following a reactor shutdown from __________ power at the __________ of core life.

A. high; beginning

B. low; beginning

C. high; end

D. low; end

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.10 [3.1/3.2]
QID: P4631

A reactor startup is in progress 5 hours after a reactor trip from 100 percent power with equilibrium xenon-135. The reactor is currently at 10 percent power, and is being returned to 100 percent power at 0.25 percent per minute instead of the normal rate of 0.5 percent per minute.

At the slower rate of power increase, the maximum amount of xenon-135 will occur __________ than normal; and the amount of equilibrium xenon-135 at 100 percent power will be __________.

A. sooner; the same

B. sooner; smaller

C. later; the same

D. later; smaller

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.10 [3.1/3.2]
QID: P6931

A nuclear power plant was operating at 100 percent power for 3 months near the beginning of a fuel cycle when a reactor trip occurred. Eighteen hours after the reactor trip, the reactor was critical at the point of adding heat. Then, reactor power was increased to 100 percent over a three-hour period.

During the three-hour reactor power increase to 100 percent, most of the positive reactivity added by the operator was required to overcome the negative reactivity from...

A. fuel burnup.

B. xenon-135 buildup.

C. fuel temperature increase.

D. moderator temperature increase.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P63

A reactor was operating at 100 percent power for two weeks when power was quickly reduced to 50 percent. Core xenon-135 will reach a new equilibrium concentration in __________ hours.

A. 8 to 10

B. 20 to 25

C. 40 to 50

D. 70 to 80

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P263

A reactor that has been operating at 100 percent power for two weeks is reduced in power to 50 percent. What happens to the xenon-135 concentration in the core?

A. There will be no change, because iodine-135 concentration is constant.

B. Xenon-135 concentration will initially build up, and then decrease to a new equilibrium value.

C. Xenon-135 concentration will initially decrease, and then build up to a new equilibrium value.

D. Xenon-135 concentration will steadily decrease to a new equilibrium value.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P1860 (B2259)

Which one of the following describes the initial change in xenon-135 concentration immediately following a power increase from steady-state power operation?

A. Decreases, due to the increased rate of xenon-135 radioactive decay.

B. Decreases, due to the increased rate of neutron absorption by xenon-135.

C. Increases, due to the increased xenon-135 production rate from fission.

D. Initially increases, due to the increased iodine-135 production rate from fission.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P2261 (B2761)

A reactor has been operating at 50 percent power for 12 hours following a one-hour power reduction from steady-state 100 percent power. Which one of the following describes the current xenon-135 concentration?

A. Increasing toward a peak.

B. Decreasing toward an upturn.

C. Increasing toward equilibrium.

D. Decreasing toward equilibrium.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P2762 (B2763)

A reactor that had been operating at 100 percent power for about two months was shut down over a two-hour period. Following the shutdown, xenon-135 will reach a steady-state concentration in __________ hours.

A. 8 to 10

B. 20 to 25

C. 40 to 50

D. 70 to 80

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P2961 (B2960)

A reactor has been operating at 30 percent power for three hours following a one-hour power reduction from steady-state 100 percent power. Which one of the following describes the current xenon-135 concentration?

A. Increasing toward a peak.

B. Increasing toward equilibrium.

C. Decreasing toward an upturn.

D. Decreasing toward equilibrium.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P3261

A nuclear power plant is initially operating at steady-state 100 percent power in the middle of a fuel cycle. The operators decrease main generator load while adding boric acid to the reactor coolant system over a period of 30 minutes. At the end of this time period, reactor power is 70 percent and average reactor coolant temperature is 575°F. All control rods remain fully withdrawn and in manual control.

Considering only the reactivity effects of xenon-135 changes, which one of the following describes the status of the average reactor coolant temperature 60 minutes after the power change is completed?

A. 575°F and stable.

B. Less than 575°F and increasing.

C. Less than 575°F and decreasing.

D. Less than 575°F and stable.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.11 [3.1/3.1]
QID: P3362 (B2559)

A reactor has been operating at 70 percent power for 20 hours following a one-hour power reduction from steady-state 100 percent power. Which one of the following describes the current xenon-135 concentration?

A. Increasing toward a peak.

B. Decreasing toward an upturn.

C. Decreasing toward equilibrium.

D. At equilibrium.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P360

A reactor had operated at 100 percent power for several days when a reactor trip occurred. If the reactor had operated at 50 percent power prior to the trip, the xenon-135 concentration would peak __________; and the peak xenon-135 concentration would be __________.

A. earlier; the same

B. at the same time; the same

C. earlier; less negative

D. at the same time; less negative

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P663

Following a reactor trip, negative reactivity from xenon-135 initially increases due to...

A. xenon-135 production from the decay of iodine-135.

B. xenon-135 production from the spontaneous fission of uranium-235.

C. the reduction of xenon-135 removal by decay.

D. the reduction of xenon-135 removal by recombination.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P863 (B2262)

Twenty-four hours after a reactor trip from 100 percent power with equilibrium xenon-135, the xenon-135 concentration will be approximately...

A. the same as the concentration at the time of the trip and decreasing.

B. the same as the concentration at the time of the trip and increasing.

C. 50 percent lower than the concentration at the time of the trip and decreasing.

D. 50 percent higher than the concentration at the time of the trip and increasing.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
KNOWLEDGE: K1.13 [2.9/3.0]
QID: P963

A reactor had been operating at 100 percent power for several days when it was shut down over a two-hour period for maintenance. How will the xenon-135 concentration change after the shutdown?

A. Peak in 2 to 4 hours and then decay to near zero in about 1 day.

B. Peak in 2 to 4 hours and then decay to near zero in 3 to 4 days.

C. Peak in 6 to 10 hours and then decay to near zero in about 1 day.

D. Peak in 6 to 10 hours and then decay to near zero in 3 to 4 days.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P1063 (B2159)

A reactor had operated at 100 percent power for three weeks when a reactor trip occurred. Which one of the following describes the concentration of xenon-135 in the core 24 hours after the trip?

A. At least twice the concentration at the time of the trip and decreasing.

B. Less than one-half the concentration at the time of the trip and decreasing.

C. At or approaching a peak concentration.

D. Approximately the same as the concentration at the time of the trip.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P2262 (B2461)

Fourteen hours after a reactor trip from 100 percent power with equilibrium xenon-135, the concentration of xenon-135 will be __________ than the 100 percent power equilibrium xenon-135 concentration; and xenon-135 will have added a net __________ reactivity since the trip.

A. less; positive

B. less; negative

C. greater; positive

D. greater; negative

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P2363

How does the amount of xenon-135 change immediately following a reactor trip from 100 percent power with equilibrium xenon-135?

A. Decreases, due to xenon-135 removal by decay.

B. Decreases, due to the reduction in xenon-135 production directly from fission.

C. Increases, due to xenon-135 production from the decay of iodine-135.

D. Increases, due to xenon-135 production from the spontaneous fission of uranium.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P2662

Given:

- A reactor was operating at 100 percent power for six weeks when a reactor trip occurred.
- A reactor startup was performed, and criticality was reached 16 hours after the trip.
- Two hours later, the reactor is currently at 30 percent power with control rods in Manual.

If <u>no</u> operator actions are taken over the next hour, average reactor coolant temperature will ___________ because xenon-135 concentration is ___________.

A. increase; decreasing

B. increase; increasing

C. decrease; decreasing

D. decrease; increasing

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P2862

A reactor was operating at 100 percent power for 2 months when a reactor trip occurred. Four hours later, the reactor is critical and stable at 10 percent power.

Which one of the following operator actions is required to maintain reactor coolant temperature stable over the next 18 hours?

A. Add positive reactivity during the entire period.

B. Add negative reactivity during the entire period.

C. Add positive reactivity at first, and then negative reactivity.

D. Add negative reactivity at first, and then positive reactivity.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.12 [3.1/3.1]
QID: P7717

Nuclear reactors A and B are identical and are operating near the middle of a fuel cycle. Reactor A is operating at steady-state 100 percent power, while reactor B is operating at steady-state 50 percent power. The integral control rod worth is the same for both reactors.

Which one of the following describes which reactor will have the greater K_{eff} at three minutes and at three days following a reactor trip? (Assume that all control rods fully insert and that no subsequent operator actions affecting reactivity are taken.)

	Three Minutes	Three Days
A.	Reactor A	Reactor A
B.	Reactor A	Reactor B
C.	Reactor B	Reactor A
D.	Reactor B	Reactor B

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.13 [2.9/3.0]
QID: P562

After a reactor shutdown from equilibrium xenon-135 conditions, the peak xenon-135 negative reactivity is ___________ the pre-shutdown power level.

A. independent of

B. directly proportional to

C. inversely proportional to

D. dependent on, but not directly proportional to

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.13 [2.9/3.0]
QID: P1760

A reactor was shut down following three months of operation at full power. The shutdown occurred over a three-hour period with a constant rate of power decrease.

Which one of the following describes the reactivity added by xenon-135 during the shutdown?

A. Xenon-135 buildup added negative reactivity.

B. Xenon-135 buildup added positive reactivity.

C. Xenon-135 burnout added negative reactivity.

D. Xenon-135 burnout added positive reactivity.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P262

Four hours after a reactor trip from 100 percent power operation with equilibrium xenon-135, a reactor is taken critical and power is immediately stabilized for critical data. To maintain a constant reactor power, the operator must add __________ reactivity because xenon-135 concentration is __________.

A. positive; increasing

B. positive; decreasing

C. negative; increasing

D. negative; decreasing

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P361 (B1862)

A nuclear power plant has been operating at 100 percent power for two months when a reactor trip occurs. Shortly after the reactor trip, a reactor startup is commenced. Four hours after the trip, reactor power is at 5 percent. To maintain reactor power at 5 percent over the next hour, the operator must add...

A. positive reactivity, because the xenon-135 concentration is increasing.

B. negative reactivity, because the xenon-135 concentration is increasing.

C. positive reactivity, because the xenon-135 concentration is decreasing.

D. negative reactivity, because the xenon-135 concentration is decreasing.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P561 (B562)

Following a 7 day shutdown, a reactor startup is performed and the reactor is taken to 100 percent power over a 16-hour period. After reaching 100 percent power, what type of reactivity addition will be needed to compensate for xenon-135 changes over the next 24 hours?

A. Negative only

B. Negative, then positive

C. Positive only

D. Positive, then negative

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P1462

A reactor has been operating at 100 percent power for two weeks. Power is then decreased over a one hour period to 10 percent.

Assuming manual rod control, which one of the following operator actions is required to maintain a constant reactor coolant temperature at 10 percent power during the next 24 hours?

A. Add negative reactivity during the entire period.

B. Add positive reactivity during the entire period.

C. Add positive reactivity at first, and then negative reactivity

D. Add negative reactivity at first, and then positive reactivity

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P1762 (B1763)

A reactor had been operating for two months at 100 percent power when a trip occurred. Fifteen hours later, during a reactor startup, the reactor has achieved criticality and reactor power is currently 1.0 x 10^{-4} percent.

Which one of the following describes the response of reactor power over the next 2 hours without any further operator actions?

A. Power increases toward the point of adding heat, due to the decay of Xe-135.

B. Power increases toward the point of adding heat, due to the decay of Sm-149.

C. Power decreases toward a stable shutdown neutron level, due to the buildup of Xe-135.

D. Power decreases toward a stable shutdown neutron level, due to the buildup of Sm-149.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P2260 (B2861)

A reactor is initially shut down with no xenon-135 in the core. Over the next 4 hours, the reactor is made critical and power level is increased to10 percent. The shift supervisor has directed that power level and reactor coolant temperature be maintained constant for 12 hours.

To accomplish this objective, control rods will have to be...

A. inserted periodically for the duration of the 12 hours.

B. withdrawn periodically for the duration of the 12 hours.

C. inserted periodically for 4 to 6 hours, and then withdrawn periodically.

D. withdrawn periodically for 4 to 6 hours, and then inserted periodically.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P2561

A reactor is initially shut down with no xenon in the core. Over the next 4 hours, the reactor is made critical and power level is increased to 25 percent. The shift supervisor has directed that power level and reactor coolant temperature be maintained constant for 12 hours.

To accomplish this objective, control rods will have to be...

A. withdrawn periodically for the duration of the 12 hours.

B. inserted periodically for the duration of the 12 hours.

C. withdrawn periodically for 4 to 6 hours, and then inserted periodically.

D. inserted periodically for 4 to 6 hours, and then withdrawn periodically.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P2863

Initially, a reactor was operating at steady-state 70 percent power. Then, reactor power was increased to 100 percent over a 1 hour period. To keep reactor coolant system temperature stable during the next 2 hours, the operator must gradually __________ the control rods or __________ the reactor coolant boron concentration.

A. insert; increase

B. insert; decrease

C. withdraw; increase

D. withdraw; decrease

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P2963

A reactor is operating at 60 percent power immediately after a one-hour power increase from steady-state 40 percent power. To keep reactor coolant temperature stable over the next two hours, the operator must __________ control rods or __________ reactor coolant boron concentration.

A. insert; increase

B. insert; decrease

C. withdraw; increase

D. withdraw; decrease

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P3063

Initially, a nuclear power plant was operating at 100 percent power with equilibrium xenon-135. Then, power was decreased to 75 percent over a one-hour period. The operator is currently adjusting control rod position as necessary to maintain average reactor coolant temperature constant.

What will the control rod position and directional trend be 30 hours after power reached 75 percent?

A. Above the initial 75 percent power position and inserting slowly.

B. Above the initial 75 percent power position and withdrawing slowly.

C. Below the initial 75 percent power position and inserting slowly.

D. Below the initial 75 percent power position and withdrawing slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P3563 (B3563)

A nuclear power plant had been operating at 100 percent power for two months when a reactor trip occurred. Soon afterward, a reactor startup was performed. Twelve hours after the trip, the startup has been paused with reactor power at 5 percent.

To maintain reactor power and reactor coolant temperatures stable over the next hour, the operator must add __________ reactivity because the xenon-135 concentration will be __________.

A. positive; increasing

B. negative; increasing

C. positive; decreasing

D. negative; decreasing

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P3863

Initially, a nuclear power plant is operating at steady-state 100 percent reactor power in the middle of a fuel cycle. Then, the operators decrease main generator load to 90 percent over a one-hour period while adding boric acid to the reactor coolant system. After the required amount of boric acid is added, reactor power is 90 percent and average reactor coolant temperature is 582°F. All control rods remain fully withdrawn and in manual control.

If no other operator actions are taken, which one of the following describes the average reactor coolant temperature after an additional hour?

A. Higher than 582°F and increasing slowly.

B. Higher than 582°F and decreasing slowly.

C. Lower than 582°F and increasing slowly.

D. Lower than 582°F and decreasing slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P6831 (B6831)

A reactor has been shut down for 7 days following 2 months of steady-state 100 percent power operation. A reactor startup is then performed and the reactor is taken to 100 percent power over a 12-hour period. After 100 percent power is reached, what incremental control rod positioning will be needed to compensate for xenon-135 changes over the next 24 hours?

A. Withdraw rods slowly during the entire period.

B. Withdraw rods slowly at first, and then insert rods slowly.

C. Insert rods slowly during the entire period.

D. Insert rods slowly at first, and then withdraw rods slowly.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P7431 (B7431)

A nuclear power plant was initially operating at steady-state 100 percent power at the end of a fuel cycle (EOC) when the plant was shut down for refueling. After refueling, the reactor was restarted and the plant is currently operating at steady-state 100 percent power at the beginning of a fuel cycle (BOC). Assume the average energy released by each fission did not change.

Compared to the equilibrium xenon-135 concentration at 100 percent power just prior to the refueling, the current equilibrium xenon-135 concentration is…

A. greater, because the higher fission rate at BOC produces xenon-135 at a faster rate.

B. greater, because the lower thermal neutron flux at BOC removes xenon-135 at a slower rate.

C. smaller, because the lower fission rate at BOC produces xenon-135 at a slower rate.

D. smaller, because the higher thermal neutron flux at BOC removes xenon-135 at a faster rate.

[redacted]

TOPIC: 192006
KNOWLEDGE: K1.14 [3.2/3.3]
QID: P7657 (B7657)

With xenon-135 initially at equilibrium, which one of the following power changes will produce the greater change in equilibrium xenon-135 negative reactivity?

A. 0 percent to 10 percent

B. 30 percent to 40 percent

C. 60 percent to 70 percent

D. 90 percent to 100 percent

[redacted]