TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P254

A reactor is initially critical well below the point of adding heat (POAH) during a reactor startup. Control rods are withdrawn for 20 seconds to establish a 0.5 DPM startup rate.

In response to the control rod withdrawal, reactor power will initially increase, and then...

A. continue increasing until the control rods are reinserted.

B. stabilize at a value slightly below the POAH.

C. stabilize at the POAH.

D. stabilize at a value slightly above the POAH.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P354

A reactor is initially critical below the point of adding heat during a reactor startup. If control rods are manually inserted for 5 seconds, reactor power will decrease...

A. to a lower power level determined by subcritical multiplication.

B. temporarily, then return to the original power level due to subcritical multiplication.

C. temporarily, then return to the original power level due to a decrease in moderator temperature.

D. until inherent positive reactivity feedback causes the reactor to become critical at a lower power level.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P754 (B755)

A reactor is initially critical below the point of adding heat (POAH) during a reactor startup. If control rods are manually withdrawn for 5 seconds, reactor power will...

A. increase to a stable critical power level below the POAH.

B. increase temporarily, then decrease and stabilize at the original value.

C. increase to a stable critical power level at the POAH.

D. increase temporarily, then decrease and stabilize below the original value.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P1054

A reactor is operating at steady-state 50 percent power near the end of a fuel cycle when the operator withdraws a group of control rods for 5 seconds. (Assume main turbine load remains constant and the reactor does <u>not</u> trip.)

In response to the control rod withdrawal, actual reactor power will stabilize __________ the initial power level and reactor coolant temperature will stabilize __________ the initial temperature.

A. at; at

B. at; above

C. above; at

D. above; above

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P1254

A reactor is operating at steady-state 50 percent power when control rods are inserted a short distance. Assume that main turbine-generator load remains constant and the reactor does <u>not</u> trip.

In response to the control rod insertion, reactor power will initially decrease, and then…

A. stabilize in the source range.

B. stabilize at a lower value in the power range.

C. increase and stabilize above the original value.

D. increase and stabilize at the original value.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P1654

A reactor is operating at steady-state 50 percent power near the end of a fuel cycle when the operator inserts a group of control rods for 5 seconds. Assume that turbine load remains constant and the reactor does <u>not</u> trip.

In response to the control rod insertion, reactor power will stabilize __________ the initial power level and reactor coolant temperature will stabilize __________ the initial temperature.

A. at; at

B. at; below

C. below; at

D. below; below

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P1854 (B2155)

A reactor has been shut down for three weeks with all control rods fully inserted. If a single control rod is fully withdrawn from the core, neutron flux level will… (Assume the reactor remains subcritical.)

A. increase and stabilize above the original level.

B. increase, then decrease and stabilize at the original level.

C. increase, then decrease and stabilize above the original level.

D. remain the same during and after the withdrawal.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P1955 (B954)

A reactor has been shut down for three weeks with all control rods fully inserted. If a center control rod is fully withdrawn from the core, neutron flux level will… (Assume the reactor remains subcritical.)

A. remain the same.

B. increase and stabilize at a new higher level.

C. increase temporarily then return to the original level.

D. increase exponentially until the operator reinserts the center control rod.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.03 [3.5/3.6]
QID: P3854

Criticality has been achieved during a xenon-free reactor startup. The core neutron flux level is low in the intermediate range with a stable 0.5 DPM startup rate (SUR). The operator begins inserting control rods in an effort to stabilize the core neutron flux level near its current value. The operator stops inserting control rods when the SUR indicates exactly 0.0 DPM.

Immediately after the operator stops inserting the control rods, the SUR will become __________; and the core neutron flux level will __________.

A. positive; increase exponentially

B. positive; increase linearly

C. negative; decrease exponentially

D. negative; decrease linearly

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P555 (B856)

The total amount of reactivity added by a control rod position change from a reference height to any other rod height is called...

A. differential rod worth.

B. excess reactivity.

C. integral rod worth.

D. reference reactivity.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P654

Integral control rod worth can be described as the change in __________ for a __________ change in rod position.

A. reactor power; total

B. reactivity; unit

C. reactor power; unit

D. reactivity; total

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P755 (B756)

A control rod is positioned in a reactor with the following neutron flux parameters:

Core average thermal neutron flux = 1×10^{12} neutrons/cm^2-sec
Control rod tip thermal neutron flux = 5×10^{12} neutrons/cm^2-sec

If the control rod is slightly withdrawn such that the tip of the control rod is located in a thermal neutron flux of 1×10^{13} neutrons/cm^2-sec, the differential control rod worth will increase by a factor of __________. (Assume the core average thermal neutron flux is constant.)

A. 0.5

B. 1.4

C. 2.0

D. 4.0

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P1354

Integral rod worth is the...

A. change in reactivity per unit change in control rod position.

B. rod worth associated with the most reactive control rod.

C. change in worth of a control rod per unit change in reactor power.

D. reactivity added by moving a control rod from one position to another position.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P1471

Reactor power was ramped from 80 percent power to 100 percent power over 4 hours. The 80 percent conditions were as follows:

Reactor coolant system (RCS) boron concentration	=	600 ppm
Control rod position	=	110 inches
RCS average temperature	=	575°F

The 100 percent conditions are as follows:

RCS boron concentration	=	580 ppm
Control rod position	=	130 inches
RCS average temperature	=	580°F

Given the following reactivity coefficient/worth values, and ignoring fission product poison reactivity changes, what was the average differential control rod worth during the power change?

Power coefficient	=	-0.03 %ΔK/K/percent
Moderator temperature coefficient	=	-0.02 %ΔK/K/°F
Differential boron worth	=	-0.01 %ΔK/K/ppm

A. -0.02 %ΔK/K/inch

B. -0.025 %ΔK/K/inch

C. -0.04 %ΔK/K/inch

D. -0.05 %ΔK/K/inch

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P1554 (B1057)

A control rod is positioned in a reactor with the following neutron flux parameters:

Core average thermal neutron flux = 1.0×10^{12} n/cm^2-sec
Control rod tip thermal neutron flux = 5.0×10^{12} n/cm^2-sec

If the control rod is slightly inserted such that the control rod tip is located in a thermal neutron flux of 1.0×10^{13} n/cm^2-sec, the differential control rod worth will increase by a factor of __________. (Assume the core average thermal neutron flux is constant.)

A. 2

B. 4

C. 10

D. 100

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P1755 (B1855)

A control rod is positioned in a reactor with the following neutron flux parameters:

Core average thermal neutron flux = 1.0×10^{12} n/cm^2-sec
Control rod tip thermal neutron flux = 4.0×10^{12} n/cm^2-sec

If the control rod is slightly inserted such that the control rod tip is located in a thermal neutron flux of 1.2×10^{13} n/cm^2-sec, the differential control rod worth will increase by a factor of __________. (Assume the core average thermal neutron flux is constant.)

A. 1/3

B. 3

C. 9

D. 27

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P2255

A reactor is initially operating at steady state 70 percent power with the following conditions:

Reactor coolant system (RCS) boron concentration	=	600 ppm
Control rod position	=	110 inches
RCS average temperature	=	575°F

Reactor power is increased to 100 percent. The 100 percent reactor power conditions are as follows:

RCS boron concentration	=	590 ppm
Control rod position	=	130 inches
RCS average temperature	=	580°F

Given the following reactivity coefficient/worth values, and ignoring fission product poison reactivity changes, what was the average differential control rod worth during the power change?

Power coefficient	=	-0.03 %ΔK/K/percent
Moderator temperature coefficient	=	-0.02 %ΔK/K/°F
Differential boron worth	=	-0.01 %ΔK/K/ppm

A. -0.02 %ΔK/K/inch

B. -0.025 %ΔK/K/inch

C. -0.04 %ΔK/K/inch

D. -0.05 %ΔK/K/inch

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.05 [2.8/3.1]
QID: P2554 (B2655)

A control rod is positioned in a reactor with the following neutron flux parameters:

Core average thermal neutron flux = 1.0×10^{12} n/cm^2-sec
Control rod tip thermal neutron flux = 4.0×10^{12} n/cm^2-sec

If the control rod is slightly inserted such that the control rod tip is located in a thermal neutron flux of 1.6×10^{13} n/cm^2-sec, the differential control rod worth will increase by a factor of __________. (Assume the core average thermal neutron flux is constant.)

A. 2

B. 4

C. 8

D. 16

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.06 [2.6/2.9]
QID: P134 (B1755)

Which one of the following expresses the relationship between differential rod worth (DRW) and integral rod worth (IRW)?

A. DRW is the area under the IRW curve at a given rod position.

B. DRW is the slope of the IRW curve at a given rod position.

C. DRW is the IRW at a given rod position.

D. DRW is the square root of the IRW at a given rod position.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.06 [2.6/2.9]
QID: P655 (B2255)

Which one of the following parameters typically has the <u>greatest</u> influence on the shape of a differential rod worth curve?

A. Core radial neutron flux distribution

B. Core axial neutron flux distribution

C. Core xenon distribution

D. Burnable poison distribution

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.06 [2.6/2.9]
QID: P856

During normal full power operation, the differential control rod worth is less negative at the top and bottom of the core compared to the center regions due to the effects of...

A. reactor coolant boron concentration.

B. neutron flux distribution.

C. xenon concentration.

D. fuel temperature distribution.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.06 [2.6/2.9]
QID: P1555 (B1657)

Which one of the following expresses the relationship between differential rod worth (DRW) and integral rod worth (IRW)?

A. IRW is the slope of the DRW curve.

B. IRW is the inverse of the DRW curve.

C. IRW is the sum of the DRWs between the initial and final control rod positions.

D. IRW is the sum of the DRWs of all control rods at a specific control rod position.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.07 [2.5/2.8]
QID: P54

As moderator temperature increases, the differential rod worth becomes more negative because...

A. moderator density decreases, which causes more neutron leakage out of the core.

B. the moderator temperature coefficient decreases, which causes decreased competition for neutrons.

C. fuel temperature also increases, which decreases the rate of neutron absorption in the fuel.

D. moderator density decreases, which increases the neutron migration length.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.07 [2.5/2.8]
QID: P454

Differential rod worth will become most negative if reactor coolant temperature is __________ and reactor coolant boron concentration is __________.

A. increased; decreased

B. decreased; decreased

C. increased; increased

D. decreased; increased

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.07 [2.5/2.8]
QID: P955

With a nuclear power plant operating normally at full power, a 5°F decrease in moderator temperature will cause the differential control rod worth to become...

A. more negative due to better moderation of neutrons.

B. less negative due to shorter neutron migration length.

C. more negative due to increased neutron absorption in the moderator.

D. less negative due to increased resonance absorption of neutrons.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.07 [2.5/2.8]
QID: P1556 (B2656)

As moderator temperature increases, the differential rod worth becomes...

A. more negative due to longer neutron diffusion lengths.

B. more negative due to decreased resonance absorption of neutrons.

C. less negative due to reduced moderation of neutrons.

D. less negative due to decreased moderator absorption of neutrons.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.07 [2.5/2.8]
QID: P2156

A reactor is operating at 60 percent power near the end of a fuel cycle with the controlling group of control rods inserted 5 percent into the core. Which one of the following will cause the group differential rod worth to become <u>less</u> negative? (Consider only the direct effect of the indicated change.)

A. Burnable poison rods become increasingly depleted.

B. Core Xe-135 concentration decreases toward an equilibrium value.

C. Reactor coolant temperature is allowed to decrease from 575°F to 570°F.

D. The group of control rods is inserted an additional 0.5 percent.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.07 [2.5/2.8]
QID: P2356

A reactor startup is in progress from a cold shutdown condition. During the reactor coolant heatup phase of the startup, the differential control rod worth will become __________ negative; and during the complete withdrawal of the initial bank of control rods, the differential control rod worth will become __________.

A. more; more negative initially and then less negative

B. more; less negative initially and then more negative

C. less; more negative during the entire withdrawal

D. less; less negative during the entire withdrawal

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.07 [2.5/2.8]
QID: P2655

Which one of the following will cause the differential rod worth for a group of control rods to become less negative? (Consider only the direct effect of the initiated change.)

A. During long-term full power operation, fuel temperature decreases as the fuel pellets come into contact with the fuel clad.

B. The reactor coolant system is cooled from 170°F to 120°F in preparation for refueling.

C. Core xenon-135 builds up in the lower half of the core.

D. During the fuel cycle, the quantity of burnable poisons decreases.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.08 [2.7/2.9]
QID: P857 (B3356)

The main reason for designing and operating a reactor with a flattened neutron flux distribution is to...

A. provide even burnup of control rods.

B. reduce neutron leakage from the core.

C. achieve a higher average power density.

D. provide more accurate nuclear power indication.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.08 [2.7/2.9]
QID: P2456 (B2457)

Which one of the following is a reason for neutron flux shaping in a reactor core?

A. To minimize local power peaking by more evenly distributing the core thermal neutron flux.

B. To reduce thermal neutron leakage by decreasing the neutron flux at the periphery of the reactor core.

C. To reduce the size and number of control rods needed to shut down the reactor during a reactor trip.

D. To increase differential control rod worth by peaking the thermal neutron flux at the top of the reactor core.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.09 [2.8/3.0]
QID: P55

Which one of the following includes two reasons for control rod bank/group overlap?

A. Provides a more uniform differential rod worth, and minimizes axial neutron flux peaking.

B. Provides a more uniform differential rod worth, and allows dampening of xenon-induced neutron flux oscillations.

C. Ensures that all rods remain within the allowable tolerance between their individual position indicators and their group counters, and ensures rod insertion limits are not exceeded.

D. Ensures that all rods remain within their allowable tolerance between individual position indicators and their group counters, and provides a more uniform axial flux distribution.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.09 [2.8/3.0]
QID: P656

Which one of the following includes two reasons for control rod bank/group overlap?

A. Provide a more uniform axial power distribution and provide a more uniform differential rod worth.

B. Provide a more uniform differential rod worth and provide a more uniform radial power distribution.

C. Provide a more uniform radial power distribution and maintain individual and group rod position indicators within allowable tolerances.

D. Maintain individual and group rod position indicators within allowable tolerances and provide a more uniform axial power distribution.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.09 [2.8/3.0]
QID: P1156

One purpose of using control rod bank/group overlap is to...

A. ensure adequate shutdown margin.

B. provide a more uniform differential rod worth.

C. allow dampening of xenon-induced neutron flux oscillations.

D. ensure control rod insertion limits are not exceeded.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.10 [3.0/3.3]
QID: P455

A reactor has been operating at 100 percent power for several weeks near the middle of a fuel cycle with all control rods fully withdrawn. Which one of the following describes why most of the power is being produced in the lower half of the reactor core?

A. Xenon-135 concentration is lower in the lower half of the core.

B. The moderator to fuel ratio is lower in the lower half of the core.

C. The fuel loading in the lower half of the core contains a higher uranium-235 enrichment.

D. The moderator temperature coefficient of reactivity is adding less negative reactivity in the lower half of the core.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.10 [3.0/3.3]
QID: P1357

A reactor is operating at steady-state 75 percent power in the middle of a fuel cycle. Which one of the following actions will cause the greatest shift in reactor power distribution toward the top of the core? (Assume control rods remain fully withdrawn.)

A. Decrease reactor power by 25 percent.

B. Decrease reactor coolant boron concentration by 10 ppm.

C. Decrease average reactor coolant temperature by 5°F.

D. Decrease reactor coolant system operating pressure by 15 psia.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.10 [3.0/3.3]
QID: P2656

A reactor has been operating at 100 percent power for three weeks shortly after a refueling outage. All control rods are fully withdrawn. Which one of the following describes why most of the power is being produced in the lower half of the core?

A. The fuel loading in the lower half of the core contains a higher U-235 enrichment.

B. Reactor coolant boron is adding more negative reactivity in the upper half of the core.

C. There is a greater concentration of Xe-135 in the upper half of the core.

D. The moderator temperature coefficient of reactivity is adding more negative reactivity in the upper half of the core.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.11 [2.8/3.2]
QID: P1157

If core quadrant power distribution (sometimes called quadrant power tilt or azimuthal tilt) is maintained within design limits, which one of the following conditions is most likely?

A. Axial power distribution is within design limits.

B. Radial power distribution is within design limits.

C. Nuclear instrumentation is indicating within design accuracy.

D. Departure from nucleate boiling ratio is within design limits.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.12 [2.9/3.1]
QID: P256

A reactor was restarted following a refueling outage and is currently at the point of adding heat. Which one of the following describes the change in axial power distribution as reactor power is increased to 5 percent by control rod withdrawal?

A. Shifts toward the bottom of the core.

B. Shifts toward the top of the core.

C. Shifts from the center of the core toward the top and bottom of the core.

D. Shifts from the top and bottom of the core toward the center of the core.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.12 [2.9/3.1]
QID: P355

By maintaining the radial and axial core power distributions within their prescribed limits, the operator is assured that ___________ will remain within acceptable limits.

A. power density (kW/foot) and departure from nucleate boiling ratio (DNBR)

B. DNBR and shutdown margin

C. core delta-T and power density (kW/foot)

D. shutdown margin and core delta-T

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.13 [2.8/3.2]
QID: P3156

Consider a reactor core with four quadrants: A, B, C, and D. The reactor is operating at steady-state 90 percent power when a fully withdrawn control rod in quadrant C drops to the bottom of the core. Assume that no operator actions are taken and reactor power stabilizes at 88 percent.

How are the maximum upper and lower core power tilt values (sometimes called quadrant power tilt ratio or azimuthal power tilt) affected by the dropped rod?

A. Upper core value decreases while lower core value increases.

B. Upper core value increases while lower core value decreases.

C. Both upper and lower core values decrease.

D. Both upper and lower core values increase.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.14 [3.2/3.5]
QID: P356 (B358)

A reactor is operating at steady-state 100 percent power when a single control rod fully inserts from the fully withdrawn position. After the initial transient, the operator returns the reactor to 100 percent power with the control rod still fully inserted.

Compared to the initial core axial neutron flux shape, the current core axial neutron flux shape will have a...

A. minor distortion, because the fully inserted control rod has nearly zero reactivity worth.

B. minor distortion, because the fully inserted control rod is an axially uniform poison.

C. major distortion, because the upper and lower core halves are tightly coupled in the vicinity of the control rod.

D. major distortion, because the power production will be drastically reduced in the vicinity of the control rod.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.14 [3.2/3.5]
QID: P956

After a control rod is fully inserted (from the fully withdrawn position), the effect on the axial flux shape is minimal. This is because...

A. the differential rod worth is constant along the length of the control rod.

B. the fully inserted control rod is an axially uniform poison.

C. a control rod only has reactivity worth if it is moving.

D. a variable poison distribution exists throughout the length of the control rod.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.15 [3.4/3.9]
QID: P57

The control rod insertion limits generally rise as reactor power increases because…

A. the power defect becomes more negative as power increases.

B. the control rod worth becomes more negative as power increases.

C. the fuel temperature coefficient becomes more negative as power increases.

D. the equilibrium xenon-135 reactivity becomes more negative as power increases.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.15 [3.4/3.9]
QID: P1055

Control rod insertion limits are established for power operation because excessive rod insertion will...

A. adversely affect core power distribution.

B. generate excessive liquid waste due to dilution.

C. cause reduced control rod lifetime.

D. cause unacceptable fast and thermal neutron leakage.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.15 [3.4/3.9]
QID: P1456

Control rod insertion limits ensure that control rods will be more withdrawn as reactor power __________ to compensate for the change in __________.

A. increases; xenon reactivity

B. decreases; xenon reactivity

C. increases; power defect

D. decreases; power defect

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.15 [3.4/3.9]
QID: P1757

Why are control rod insertion limits established for power operation?

A. To minimize the worth of a dropped control rod.

B. To maintain a negative moderator temperature coefficient.

C. To provide adequate shutdown margin after a reactor trip.

D. To ensure sufficient positive reactivity is available to compensate for the existing power defect.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P557

A reactor has been operating at 80 percent power for four weeks with the controlling rod bank/group inserted 10 percent from the fully withdrawn position.

Which one of the following will be most affected by inserting the controlling bank/group an additional 5 percent? (Assume steady-state reactor power does not change.)

A. Total xenon-135 reactivity

B. Radial power distribution

C. Quadrant (azimuthal) power distribution

D. Axial power distribution

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P1457

A reactor is operating at steady-state 75 percent power with all control rods fully withdrawn. Assuming the reactor does not trip, which one of the following compares the effects of dropping (full insertion) a center control rod to the effects of partially inserting (50 percent) the same control rod?

A. A dropped rod causes a greater change in shutdown margin.

B. A dropped rod causes a smaller change in shutdown margin.

C. A dropped rod causes a greater change in axial power distribution.

D. A dropped rod causes a greater change in radial power distribution.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P1657

A reactor is operating at steady-state 75 percent power with all control rods fully withdrawn. Assuming the reactor does not trip, which one of the following compares the effects of dropping (full insertion) a center control rod to the effects of partially inserting (50 percent) the same control rod?

A. A partially inserted rod causes a greater change in axial power distribution.

B. A partially inserted rod causes a greater change in radial power distribution.

C. A partially inserted rod causes a greater change in shutdown margin.

D. A partially inserted rod causes a smaller change in shutdown margin.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P2157

A reactor is operating at steady-state 75 percent power with all control rods fully withdrawn. Assuming the reactor power does not trip, which one of the following compares the effects of dropping (full insertion) a center control rod to the effects of partially inserting (50 percent) the same control rod?

A. A dropped rod causes a smaller change in axial power distribution.

B. A dropped rod causes a smaller change in radial power distribution.

C. A dropped rod causes a smaller change in shutdown margin.

D. A dropped rod causes a greater change in shutdown margin.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P2257

A reactor is operating at steady-state 85 percent power with all control rods fully withdrawn. Assuming the reactor does not trip, which one of the following compares the effects of partially inserting (50 percent) a center control rod to the effects of dropping (full insertion) the same control rod?

A. A partially inserted rod causes a smaller change in axial power distribution.

B. A partially inserted rod causes a smaller change in radial power distribution.

C. A partially inserted rod causes a greater change in shutdown margin.

D. A partially inserted rod causes a smaller change in shutdown margin.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P2457

A reactor is operating at steady-state 100 percent power at the beginning of a fuel cycle with all control rods fully withdrawn. Assuming the reactor does not trip, which one of the following compares the effects of dropping a control rod in the center of the core to dropping an identical control rod at the periphery of the core?

A. Dropping a center control rod causes a greater change in shutdown margin.

B. Dropping a center control rod causes a smaller change in shutdown margin.

C. Dropping a center control rod causes a greater change in axial power distribution.

D. Dropping a center control rod causes a greater change in radial power distribution.

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P2556

A reactor has been operating at 80 percent power for four weeks with the controlling rod group inserted 15 percent from the fully withdrawn position.

Which one of the following will be significantly affected by withdrawing the controlling rod group an additional 5 percent? (Assume steady-state reactor power does not change.)

A. Total xenon-135 reactivity

B. Axial power distribution

C. Radial power distribution

D. Quadrant (azimuthal) power distribution

[redacted]

TOPIC: 192005
KNOWLEDGE: K1.16 [2.8/3.1]
QID: P2857

A reactor is operating at steady-state 100 percent power with all control rods fully withdrawn when one control rod at the core periphery falls completely into the core. Assuming no reactor trip and no operator action, which one of the following will change significantly as a result of the dropped rod?

A. Axial power distribution only.

B. Axial power distribution and shutdown margin.

C. Radial power distribution only.

D. Radial power distribution and shutdown margin.

[redacted]