科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P935 (B737)

A demineralizer is being used in a water purification system. How will accumulation of suspended solids in the demineralizer affect performance of the demineralizer?

A. The rate of resin depletion will increase.

B. The flow rate of water through the demineralizer will increase.

C. The differential pressure across the demineralizer will decrease.

D. The rate of unwanted ion removal from the system will decrease.

ANSWER: D.

一部除礦器用於一淨水系統。此除礦器中懸浮固體之累積，對除礦器性能有何影響？

A. 樹脂耗竭率會增加。

B. 通過除礦器的流量將增加。

C. 除礦器兩端差壓將減小。

D. 由系統中移除不必要離子的速率將減小。

答案：D.

科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P1035

A sudden increase in conductivity of water at the outlet of a demineralizer will result from...

A. increased demineralizer flow rate

B. reduced demineralizer inlet temperature

C. reduced demineralizer inlet conductivity

D. increased demineralizer effluent pressure

ANSWER: A.

下列何者將導致除礦器出口的水導電度驟增？

A. 除礦器流量增加。

B. 除礦器進口溫度降低。

C. 除礦器進口導電度降低。

D. 除礦器出口水流(effluent)壓力增加。

答案：A.

科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P1535 (B1138)

A condensate demineralizer differential pressure (D/P) gauge indicates 4.0 psid at 50% flow. Over the next two days plant power changes have caused condensate flow to vary between 25% and 100%.

Which one of the following combinations of condensate flow and demineralizer D/P, observed during the power changes, indicates an increase in the accumulation of corrosion products in the demineralizer?

	CONDENSATE FLOW	DEMINERALIZER D/P (PSID)
A.	100%	15.0
B.	75%	9.0
C.	60%	5.0
D.	25%	2.0

ANSWER: D.

一凝結水除礦器在50%流量下，差壓指示為4.0 psid。其後兩天中，因電廠功率變化，使得凝結水流量在25%與100%間變動。

電廠功率變化時，下列何組凝結水流量與除礦器差壓的數據組合，表示除礦器中腐蝕產物的累積增加？

	凝結水流量	除礦器差壓(psid)
A.	100%	15.0
B.	75%	9.0
C.	60%	5.0
D.	25%	2.0

答案：D.

科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P1736 (B1736)

A condensate demineralizer differential pressure (D/P) gauge indicates 6.0 psid at 50% flow rate. Which one of the following combinations of condensate flow and demineralizer D/P, observed later at various power levels over the next few days, indicates an increase in the accumulation of insoluble corrosion products in the demineralizer?

	CONDENSATE FLOW	DEMINERALIZER D/P (PSID)
A.	25%	1.5
B.	60%	8.5
C.	75%	16.5
D.	100%	23.5

ANSWER: C.

凝結水除礦器在50%流量下，差壓量測指示為6.0 psid。在往後幾天的不同電廠功率水平下，下列何組凝結水流量與除礦器差壓的數據組合，表示除礦器中不溶解的腐蝕產物累積增加？

	凝結水流量	除礦器差壓(psid)
A.	25%	1.5
B.	60%	8.5
C.	75%	16.5
D.	100%	23.5

答案：C.

科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P2035 (B2039)

Which one of the following conditions will lead to channeling in a demineralizer?

A. Suspended solids and insoluble particles forming a mat on the surface of the resin bed.

B. A sudden 10°F decrease in the temperature of the influent to the demineralizer.

C. Exhaustion of the resin bed due to high conductivity of the demineralizer influent.

D. Operation of the demineralizer with influent flow rate at 10% below design flow rate.

ANSWER: A.

下列何種狀況將導致除礦器發生通道效應(channeling)？

A. 懸浮固體與不溶粒子在樹脂床表面形成氈狀結構(mat)。

B. 除礦器的流入水流溫度突然降低10°F。

C. 除礦器流入水流的高導電度造成樹脂床耗竭。

D. 除礦器在流入流量較設計流量低10%的情況下運轉。

答案：A.

科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P2135 (B637)

High differential pressure in a demineralizer could be caused by all of the following except...

A. resin exhaustion.

B. resin overheating.

C. crud buildup.

D. high flow rate.

ANSWER: A.

下列何者不是除礦器形成高差壓的因素？

A. 樹脂耗竭。

B. 樹脂過熱。

C. 污垢累積。

D. 高流量。

答案：A.

科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P2235 (B2638)

A condensate demineralizer differential pressure (D/P) gauge indicates 4.0 psid at 50% flow rate. Which one of the following combinations of condensate flow and demineralizer D/P observed at various power levels indicates an increase in the accumulation of insoluble corrosion products in the demineralizer?

	CONDENSATE FLOW	DEMINERALIZER D/P (PSID)
A.	25%	0.9
B.	60%	6.3
C.	75%	8.7
D.	100%	15.6

ANSWER: B.

凝結水除礦器在50%流量下，差壓量測指示為4.0 psid。在電廠功率改變下，下列何組凝結水流量與除礦器差壓的數據組合，表示除礦器中不溶解的腐蝕產物累積增加？

	凝結水流量	除礦器差壓(psid)
A.	25%	0.9
B.	60%	6.3
C.	75%	8.7
D.	100%	15.6

答案：B.

科目： 191007
知能類：K1.01 [2.3/2.5]
序號： P2335 (B2338)

A condensate demineralizer differential pressure (D/P) gauge indicates 4.0 psid at 50% flow rate. Over the next two days plant power changes have caused condensate flow rate to vary between 25% and 100%.

Which one of the following combinations of condensate flow and demineralizer D/P, observed during the power changes, indicates an increased accumulation of corrosion products in the demineralizer?

	CONDENSATE FLOW	DEMINERALIZER D/P (PSID)
A.	100%	15.0
B.	75%	9.0
C.	40%	3.0
D.	25%	1.0

ANSWER: C.

凝結水除礦器在50%流量下，差壓量測指示為4.0 psid。在其後兩天中，電廠功率發生變化，導致凝結水流量在25%與100%間變化。

在電廠功率改變下，下列何組凝結水流量與除礦器差壓的數據組合，表示除礦器中腐蝕產物的累積增加？

	凝結水流量	除礦器差壓(psid)
A.	100%	15.0
B.	75%	9.0
C.	40%	3.0
D.	25%	1.0

答案：C.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P535 (B39)

Which one of the following is an indication of resin exhaustion in a demineralizer:

A. An increase in suspended solids in the effluent

B. A decrease in the flow rate through the demineralizer

C. An increase in the conductivity of the effluent

D. An increase in the differential pressure across the demineralizer

ANSWER: C.

下列何者為除礦器樹脂耗竭的指標？

A. 出口水流的懸浮固體增加。

B. 通過除礦器的流量減小。

C. 出口水流的導電度增加。

D. 通過除礦器的差壓增加。

答案：C.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P835 (B839)

The demineralization factor of a demineralizer can be expressed as...

A. (Inlet Conductivity) - (Outlet Conductivity).

B. (Outlet Conductivity) - (Inlet Conductivity).

C. (Inlet Conductivity) ÷ (Outlet Conductivity).

D. (Outlet Conductivity) ÷ (Inlet Conductivity).

ANSWER: C.

除礦器的除礦因素可以表示為……

A. (進口導電度) － (出口導電度)。

B. (出口導電度) － (進口導電度)。

C. (進口導電度)÷(出口導電度)。

D. (出口導電度)÷(進口導電度)。

答案：C.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P936

The ion exchange efficiency of a condensate demineralizer is determined by performing a calculation using the...

A. change in conductivity at the outlet of the demineralizer over a period of time.

B. change in pH at the outlet of the demineralizer over a period of time.

C. demineralizer inlet and outlet conductivity.

D. demineralizer inlet and outlet pH.

ANSWER: C.

凝結水除礦器的離子交換效率，利用下列何者算出？

A. 除礦器出口導電度於一段時間內的變化。

B. 除礦器出口 pH 值於一段時間內的變化。

C. 除礦器進口與出口導電度。

D. 除礦器進口與出口 pH 值。

答案：C.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P1735

Which one of the following will be caused by exhausted demineralizer resin?

A. Decreased demineralizer process water flow rate

B. Decreased demineralizer influent conductivity

C. Increased demineralizer differential pressure

D. Decreased demineralizer decontamination factor

ANSWER: D.

下列何者為除礦器樹脂耗竭所致？

A. 除礦器處理的水流量減少。

B. 除礦器的流入水流(influent)導電度降低。

C. 除礦器差壓增加。

D. 除礦器的除污因素降低。

答案：D.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P1835

The ion exchange efficiency of a condensate demineralizer can be determined by...

A. sampling the inlet and outlet of the demineralizer to determine the change in conductivity.

B. performing a calculation based on the ratio between the inlet pH divided by the outlet pH.

C. sampling the inlet and outlet of the demineralizer to determine the difference in radioactivity.

D. performing a calculation based on the change in differential pressure across the demineralizer.

ANSWER: A.

凝結水除礦器的離子交換效率，能利用下列何者決定？

A. 從除礦器進口與出口取樣以判斷導電度變化。

B. 從進口 pH 值除以出口 pH 值的比率算出。

C. 從除礦器進口與出口取樣以判斷輻射活性變化。

D. 根據除礦器的差壓變化算出。

答案：A.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P2236

To determine the demineralization factor for a demineralizer, the parameters that must be monitored are inlet and outlet _____.

A. pH

B. conductivity

C. suspended solids

D. pressure

ANSWER: B.

欲決定除礦器的除礦因素，必須監測的參數為進口與出口的_____。

A. pH 值

B. 導電度

C. 懸浮固體

D. 壓力

答案：B.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P2735 (B2737)

What percentage of impurities is being removed from the water passing through an ion exchanger if the ion exchanger has a decontamination factor of 25?

A. 99%

B. 96%

C. 88%

D. 75%

ANSWER: B.

若離子交換器的除污因素為25，則通過此離子交換器的水中雜質移除百分率為多少？

A. 99%

B. 96%

C. 88%

D. 75%

答案：B.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P3235 (B3238)

What percentage of ionic impurities is being removed from the water passing through an ion exchanger if the ion exchanger has a decontamination factor of 50?

A. 98%

B. 96%

C. 75%

D. 50%

ANSWER: A.

若離子交換器的除污因素為50，則通過此離子交換器的水中離子雜質移除百分率為多少？

A. 98%

B. 96%

C. 75%

D. 50%

答案：A.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P3435 (B3437)

The decontamination factor (also called the demineralization factor) of a condensate demineralizer has just been determined to be 50, based on conductivity measurements.

If condensate having a conductivity of 20 µmho/cm is flowing into this demineralizer, which one of the following is the conductivity of the condensate at the outlet of the demineralizer?

A. 0.4 µmho/cm

B. 1.0 µmho/cm

C. 4.0 µmho/cm

D. 10.0 µmho/cm

ANSWER: A.

根據導電度測量，某凝結水除礦器的除污因素(亦稱為除礦因素)為50。

若導電度為20 µmho/cm的凝結水流過此除礦器，則此除礦器出口處的凝結水導電度為何？

A. 0.4 µmho/cm

B. 1.0 µmho/cm

C. 4.0 µmho/cm

D. 10.0 µmho/cm

答案：A.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P3636 (B3637)

The decontamination factor (or demineralization factor) of a condensate demineralizer has just been determined to be 10, based on conductivity measurements.

If condensate having a conductivity of 20 µmho/cm is flowing into this demineralizer, which one of the following is the conductivity of the condensate at the outlet of the demineralizer?

A. 0.5 µmho/cm

B. 2.0 µmho/cm

C. 5.0 µmho/cm

D. 10.0 µmho/cm

ANSWER: B.

根據導電度測量，某凝結水除礦器的除污因素(亦稱為除礦因素)為10。

若導電度為20 µmho/cm的凝結水流過此除礦器，則此除礦器出口處的凝結水導電度為何？

A. 0.5 µmho/cm

B. 2.0 µmho/cm

C. 5.0 µmho/cm

D. 10.0 µmho/cm

答案：B.

科目： 191007
知能類：K1.03 [2.2/2.5]
序號： P4219 (B4219)

The decontamination factor (or demineralization factor) of a condensate demineralizer has just been determined to be 5.0, based on conductivity measurements.

If condensate having a conductivity of 20 µmho/cm is flowing into this demineralizer, which one of the following is the conductivity of the condensate at the outlet of the demineralizer?

A. 0.4 µmho/cm

B. 4.0 µmho/cm

C. 10.0 µmho/cm

D. 100.0 µmho/cm

ANSWER: B.

根據導電度測量，某凝結水除礦器的除污因素(亦稱為除礦因素)為5.0。

若導電度為20 µmho/cm的凝結水流過此除礦器，則此除礦器出口處的凝結水導電度為何？

A. 0.4 µmho/cm

B. 4.0 µmho/cm

C. 10.0 µmho/cm

D. 100.0 µmho/cm

答案：B.

科目： 191007
知能類：K1.06 [2.1/2.5]
序號： P635 (B2237)

How does demineralizer differential pressure indicate the condition of a demineralizer resin bed?

A. Low differential pressure indicates flow blockage in the demineralizer.

B. Low differential pressure indicates that the demineralizer resin bed is exhausted.

C. High differential pressure indicates flow blockage in the demineralizer.

D. High differential pressure indicates that the demineralizer resin bed is exhausted.

ANSWER: C.

除礦器差壓如何代表除礦器樹脂床的狀況？

A. 低差壓代表除礦器內流體阻塞。

B. 低差壓代表除礦器樹脂床耗竭。

C. 高差壓代表除礦器內流體阻塞。

D. 高差壓代表除礦器樹脂床耗竭。

答案：C.

科目： 191007
知能類：K1.06 [2.1/2.5]
序號： P836 (B539)

A lower than expected differential pressure across a demineralizer is an indication of...

A. depletion of the cation resin.

B. channeling through the resin bed.

C. improper resin regeneration.

D. excessive accumulation of suspended solids.

ANSWER: B.

通過除礦器的差壓較預期為小，代表了……

A. 陽離子樹脂消耗。

B. 樹脂床發生通道效應(channeling)。

C. 樹脂再生不當。

D. 懸浮固體過度累積。

答案：B.

科目： 191007
知能類：K1.06 [2.1/2.5]
序號： P1036 (B639)

As the operating time of a demineralizer resin bed increases, the differential pressure across the bed...

A. increases due to depletion of resin sites.

B. increases due to trapping of suspended solids.

C. decreases due to gradual resin breakdown.

D. decreases due to erosion of the resin sites.

ANSWER: B.

除礦器樹脂床的運轉時間增加，則通過樹脂床的差壓會……

A. 因樹脂處消耗而增加。

B. 因懸浮固體堵住而增加。

C. 因樹脂逐漸分解而降低。

D. 因樹脂處腐蝕而降低。

答案： B.

科目： 191007
知能類：K1.06 [2.1/2.5]
序號： P1136

Which one of the following will cause a large pressure drop across a demineralizer that is in operation?

A. Channeling of flow through the demineralizer

B. Depletion and resultant swelling of resin beads

C. Accumulation of suspended solids filtered by the resin beads

D. Improper demineralizer venting after resin fill

ANSWER: C.

下列何者將導致運轉中的除礦器壓差變大？

A. 流過除礦器的流體產生通道效應。

B. 樹脂顆粒因消耗而膨脹。

C. 樹脂顆粒過濾的懸浮固體累積。

D. 除礦器於填入樹脂後的排氣不當。

答案：C.

科目： 191007
知能類：K1.06 [2.1/2.5]
序號： P1236

An indication that a demineralizer resin bed is clogged is a...

A. large pressure drop across the bed.

B. high flow rate through the bed.

C. temperature rise in the effluent.

D. large conductivity increase across the bed.

ANSWER: A.

下列何者指出除礦器樹脂床堵塞？

A. 樹脂床壓差變大。

B. 通過樹脂床的流量變高。

C. 出口水流的溫度上升。

D. 樹脂床導電度大增。

答案：A.

科目： 191007
知能類：K1.06 [2.1/2.5]
序號： P1537 (B1539)

A higher than expected differential pressure across an operating demineralizer will be caused by...

A. depletion of the cation resin.

B. channeling through the resin bed.

C. insufficient resin backwash.

D. decreased demineralizer outlet conductivity.

ANSWER: C.

下列何者將導致通過一運轉中除礦器的差壓較預期為高？

A. 陽離子樹脂耗竭。

B. 樹脂床發生通道效應(channeling)。

C. 樹脂逆洗不足。

D. 除礦器出口導電度下降。

答案：C.

科目： 191007
知能類：K1.06 [2.1/2.5]
序號： P1836 (B337)

A demineralizer that is continuously exposed to flowing water with high concentrations of suspended solids will first develop an increase in the...

A. conductivity at the demineralizer outlet.

B. decontamination factor of the demineralizer.

C. differential pressure across the demineralizer.

D. pH at the demineralizer outlet.

ANSWER: C.

一持續暴露於高懸浮固體濃度水流的除礦器，將先發生何者的增加.....

A. 除礦器出口的導電度。

B. 除礦器的除污因素。

C. 通過除礦器的差壓。

D. 除礦器出口的pH值。

答案：C.

科目： 191007
知能類：K1.08 [3.0/3.1]
序號： P1636 (B838)

Which one of the following, if processed through a demineralizer, will rapidly reduce the effectiveness of the demineralizer?

A. Condensate

B. Oily water

C. Radioactive water

D. Makeup water

ANSWER: B.

下列何者若經由除礦器處理，將快速地降低除礦器的效率？

A. 凝結水

B. 油性水

C. 放射性水

D. 除礦水

答案：B.

科目： 191007
知能類：K1.08 [3.0/3.1]
序號： P2037

A nuclear power plant has been operating normally at 100% power for one month and with the same reactor coolant boron concentration for the last 24 hours.

Which one of the following changes associated with the in-service reactor coolant demineralizer will cause a reduction in reactor coolant boron concentration in the demineralizer effluent?

A. Increase the temperature of the reactor coolant being processed from 95°F to 105°F.

B. Decrease the temperature of the reactor coolant being processed from 105°F to 95°F.

C. Increase the flow rate of reactor coolant being processed from 75 gpm to 100 gpm.

D. Decrease the flow rate of reactor coolant being processed from 75 gpm to 50 gpm.

ANSWER: B.

核能電廠已於 100%功率下正常運轉一個月，過去二十四小時的反應爐冷卻水硼濃度相同。

下列哪項關於運轉中反應爐冷卻水除礦器的變化，將導致除礦器的出口水流硼濃度降低？

A. 處理中的反應爐冷卻水溫度從 95°F 增至 105°F。

B. 處理中的反應爐冷卻水溫度從 105°F 降至 95°F。

C. 處理中的反應爐冷卻水流量從 75 gpm 增至 100 gpm。

D. 處理中的反應爐冷卻水流量從 75 gpm 降至 50 gpm。

答案：B.

科目： 191007
知能類：K1.08 [3.0/3.1]
序號： P2836 (B2138)

Refer to the drawing of a parallel demineralizer loop that is currently aligned for normal flow direction through the demineralizer (see figure below).

A minor seawater leak has occurred into the process water system, which is a closed system. Which one of the following will decrease the time required for the demineralizer loop to reduce the concentration of ionic impurities in the process water system?

A. Reverse the flow direction through the demineralizer.

B. Divert 50% of the loop flow to bypass the demineralizer.

C. Increase the flow rate in the loop from 95 gpm to 105 gpm.

D. Decrease the temperature in the loop from 110°F to 100°F.

ANSWER: C.

請參照下圖中，目前排列為正常流向之並聯式除礦器環路。

一微量之海水滲漏發生而進入密閉之水處理系統中。下列何者將減少除礦器環路用於降低水處理系統中離子雜質濃度所需的時間？

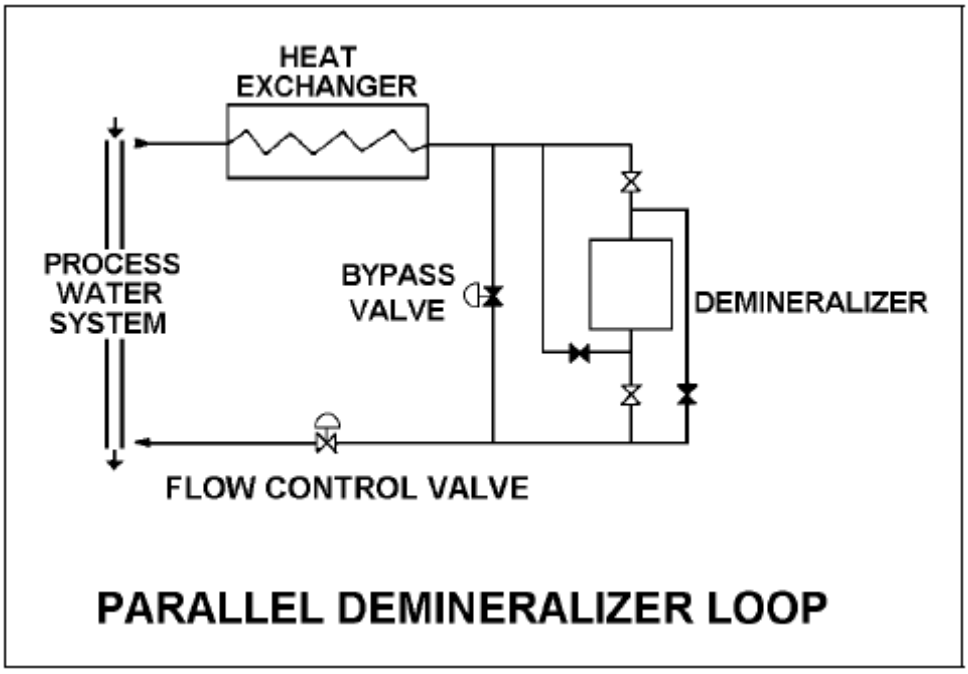
A. 將通過除礦器的流向逆轉。

B. 將50%的環路流分流旁通除礦器。

C. 將環路中水流量從95 gpm增加至105 gpm。

D. 將環路中水溫從110˚F降低到100˚F。

答案：C.



PARALLEL DEMINERALIZER LOOP

科目： 191007
知能類：K1.08 [3.0/3.1]
序號： P2837

A PWR nuclear power plant has two identical mixed resin bed reactor coolant ion exchangers, A and B, which were each conditioned and placed in parallel service continuously for about two weeks with the plant at full power after a refueling outage. Then, ion exchanger A was isolated for standby use while ion exchanger B remained in service. After 10 months of continuous operation at full power, it is necessary to place ion exchanger A in service and isolate ion exchanger B.

Which one of the following describes why the effluent from ion exchanger A is initially drained to a collection facility prior to placing the ion exchanger is service?

A. To avoid an undesired increase in reactor coolant pH.

B. To avoid an undesired decrease in reactor coolant pH.

C. To avoid an undesired increase in reactor coolant boron concentration.

D. To avoid an undesired decrease in reactor coolant boron concentration.

ANSWER: C.

一座採用壓水式反應器(PWR)的核能電廠，裝有兩部相同的混合床反應爐冷卻水離子交換器，分別為 A 與 B，電廠更換燃料大修後以全功率運轉，兩部離子交換器經過調整並聯運轉，而且已連續運轉兩週左右。然後，隔離離子交換器 A 做為備用，離子交換器 B 則繼續運轉。電廠以全功率連續運轉十個月後，必須讓離子交換器 A 進行運轉，同時隔離離子交換器 B。

下列何者說明了為何在離子交換器 A 運轉前，必須先將該離子交換器的出口水流排入收集槽？

A. 避免反應爐冷卻水的 pH 值，出現不想要的增加。

B. 避免反應爐冷卻水的 pH 值，出現不想要的降低。

C. 避免反應爐冷卻水的硼濃度，出現不想要的增加。

D. 避免反應爐冷卻水的硼濃度，出現不想要的降低。

答案：C.

科目： 191007
知能類：K1.08 [3.0/3.1]
序號： P2937 (N/A)

A nuclear power plant has been operating normally at 100% power for one month and with the same reactor coolant boron concentration for the last 24 hours.

Which one of the following changes associated with an in-service reactor coolant demineralizer will cause an increase in reactor coolant boron concentration in the demineralizer effluent?

A. Increase the temperature of the reactor coolant being processed from 95°F to 105°F.

B. Decrease the temperature of the reactor coolant being processed from 105°F to 95°F.

C. Increase the flow rate of reactor coolant being processed from 75 gpm to 100 gpm.

D. Decrease the flow rate of reactor coolant being processed from 75 gpm to 50 gpm.

ANSWER: A.

核能電廠已在 100%功率下正常運轉一個月，過去二十四小時的反應爐冷卻水硼濃度相同。

下列哪項關於運轉中反應爐冷卻水除礦器的變化，將導致除礦器出口水流的硼濃度增加？

A. 處理中的反應爐冷卻水溫度，從 95°F 增至 105°F。

B. 處理中的反應爐冷卻水溫度，從 105°F 降至 95°F。

C. 處理中的反應爐冷卻水流量，從 75 gpm 增至 100 gpm。

D. 處理中的反應爐冷卻水流量，從 75 gpm 降至 50 gpm。

答案：A.

科目： 191007
知能類：K1.09 [2.5/2.7]
序號： P3736 (B3739)

Refer to the drawing of a parallel demineralizer loop that is currently aligned for normal flow direction through the demineralizer (see figure below).

Which one of the following is most likely to cause a decrease in the demineralizer decontamination factor for ionic impurities?

A. Divert 50% of the demineralizer loop flow to bypass the demineralizer.

B. Decrease the process water system pressure from 125 psig to 75 psig.

C. Decrease the flow rate in the demineralizer loop from 105 gpm to 65 gpm.

D. Increase the temperature in the demineralizer loop from 140°F to 200°F.

ANSWER: D.

請參照下圖中，目前排列為正常流向之並聯式除礦器環路。

下列何者最有可能降低除礦器的離子雜質除污因素？

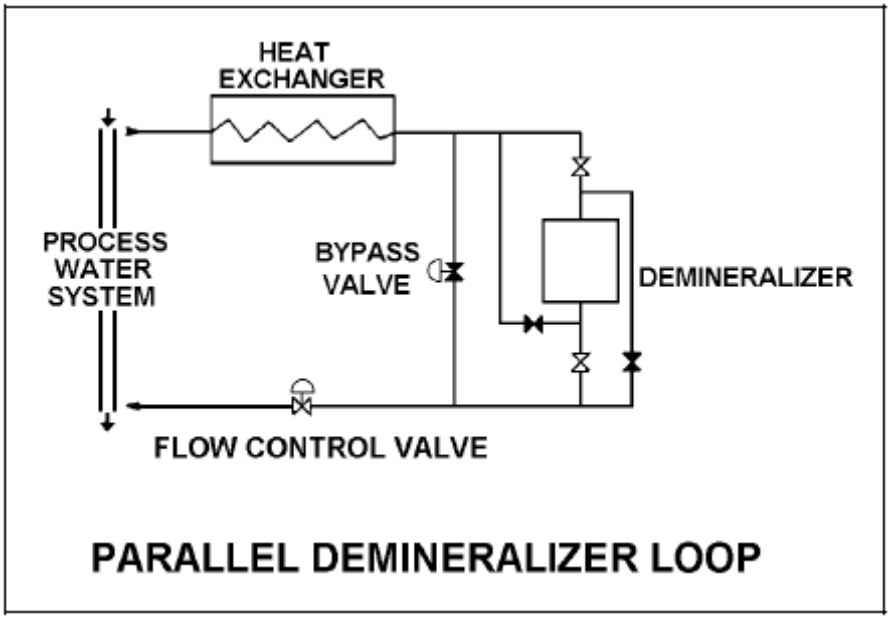
A. 將50%的環路流分流旁通除礦器。

B. 將水處理系統壓力從125 psig降低至75 psig。

C. 將除礦器環路流量從105 gpm降低至65 gpm。

D. 將除礦器環路溫度從140˚F增加到200˚F。

答案：D.



PARALLEL DEMINERALIZER LOOP

科目： 191007
知能類：K1.09 [2.5/2.7]
序號： P34

What is the reason for bypassing a demineralizer due to high temperature?

A. Resins expand and restrict flow through the demineralizer.

B. Resins decompose and restrict flow through the demineralizer.

C. Resins decompose and create preferential flowpaths through the demineralizer.

D. Resins decompose and contaminate the system.

ANSWER: D.

水溫高時，將除礦器旁通的理由為何？

A. 樹脂膨脹而限制通過除礦器的水流。

B. 樹脂分解而限制通過除礦器的水流。

C. 樹脂分解而形成通過除礦器的優先流徑(preferential flowpath)。

D. 樹脂分解而污染系統。

答案：D.

科目： 191007
知能類：K1.09 [2.5/2.7]
序號： P235 (B1838)

When a mixed-bed demineralizer resin is exhausted, the resin should be replaced or regenerated because...

A. ions previously removed by the resin will be released into solution.

B. the resin will fracture and possibly escape through the retention screens.

C. particles previously filtered out of solution will be released.

D. the resin will physically bond together, thereby causing a flow blockage.

ANSWER: A.

當一混合床除礦器樹脂耗竭時，應將樹脂替換或再生，因為……

A. 原本經由樹脂移除之離子將會被釋放進入溶液中。

B. 樹脂將破裂而穿透濾網(retention screen)流失。

C. 原先自溶液中被過濾的粒子將會被釋放。

D. 樹脂會發生物理性結合，因此導致水流阻塞。

答案：A.

科目： 191007
知能類：K1.09 [2.5/2.7]
序號： P236

A demineralizer that has been exposed to _____ should be bypassed because the resin beads may release unwanted ions.

A. high flow

B. low flow

C. high temperature

D. low temperature

ANSWER: C.

暴露於_____下的除礦器應旁通，因為樹脂顆粒可能釋出不想要的離子。

A. 高流量

B. 低流量

C. 高溫

D. 低溫

答案：C.

科目： 191007
知能類：K1.09 [2.5/2.7]
序號： P2637 (B239)

A result of proper demineralizer operation on water with ionic impurities is that the exiting water will always have a...

A. higher pH.

B. lower pH.

C. higher conductivity.

D. lower conductivity.

ANSWER: D.

以除礦器適當處理含離子雜質的水，則其出口水質將有.....

A. 較高的pH值。

B. 較低的pH值。

C. 較高的導電度。

D. 較低的導電度。

答案：D.

科目： 191007
知能類：K1.11 [2.5/2.8]
序號： P35

In the event of a system crud burst, what adverse effect does the crud burst have on demineralizer operation?

A. Increases pressure drop across the demineralizer

B. Increases flow rate through the demineralizer

C. Increases demineralizer outlet conductivity

D. Increases demineralizer inlet pH

ANSWER: A.

系統發生積垢迸裂(crud burst)時，將對除礦器的運轉造成何種不良影響？

A. 除礦器差壓增加。

B. 通過除礦器的流量增加。

C. 除礦器出口導電度增加。

D. 除礦器進口 pH 值增加。

答案：A.

科目： 191007
知能類：K1.11 [2.5/2.8]
序號： P336

Prior to a scheduled nuclear power plant shutdown, the reactor coolant system was chemically shocked to induce a crud burst. What effect will this have on the letdown purification demineralizers?

A. Decreased radiation levels around the demineralizers

B. Increased flow rate through the demineralizers

C. Decreased demineralizer outlet conductivity

D. Increased pressure drop across the demineralizers

ANSWER: D.

核能電廠按照預定時間停機前，反應爐冷卻水系統突然承受化學衝擊(chemically shocked)而引發積垢迸裂(crud burst)。此情形將對引水(letdown)淨化除礦器造成何種影響？

A. 降低除礦器周圍的輻射強度。

B. 增加通過除礦器的流量。

C. 降低除礦器的出口導電度。

D. 增加除礦器差壓。

答案：D.

科目： 191007
知能類：K1.11 [2.5/2.8]
序號： P1436

Prior to a scheduled nuclear power plant shutdown, the reactor coolant system was chemically shocked to induce a crud burst. What effect will the crud burst have on the letdown purification demineralizers?

A. Decreased demineralizer outlet conductivity

B. Decreased pressure drop across the demineralizers

C. Increased flow rate through the demineralizers

D. Increased radiation levels around the demineralizers

ANSWER: D.

核能電廠按照預定時間停機前，反應爐冷卻水系統突然承受化學衝擊(chemically shocked)而引發積垢迸裂(crud burst)。此情形將對引水(letdown)淨化除礦器造成何種影響？

A. 降低除礦器的出口導電度。

B. 降低除礦器的差壓。

C. 增加通過除礦器的流量。

D. 增加除礦器周圍的輻射強度。

答案：D.

科目： 191007
知能類：K1.11 [2.5/2.8]
序號： P2736 (N/A)

A nuclear power plant was operating at steady-state 100% power when the reactor coolant system experienced a large crud burst. Shortly afterward, the operators began to record parameters for the in-service coolant purification ion exchanger.

Assuming no additional operator actions, what trend will the recorded parameters show during the next few hours?

A. Increasing flow rate through the ion exchanger

B. Increasing pressure drop across the ion exchanger

C. Increasing ion exchanger inlet water conductivity

D. Increasing ion exchanger outlet water conductivity

ANSWER: B.

核能電廠採 100%功率穩態運轉時，反應爐冷卻水系統發生大型積垢迸裂(crud burst)。不久後，運轉員開始記錄運轉中的冷卻水淨化離子交換器參數。

假設運轉員沒有採取額外行動，往後數小時內的紀錄參數將顯示何種趨勢？

A. 通過離子交換器的流量增加。

B. 離子交換器的差壓增加。

C. 離子交換器進口水流導電度增加。

D. 離子交換器出口水流導電度增加。

答案：B.

科目： 191007
知能類：K1.11 [2.5/2.8]
序號： P3537

After 12 months of operation at 100% power, a nuclear reactor is shutdown with a plant cooldown in progress. An operator reports that the general area radiation levels around the operating shutdown cooling pumps have increased significantly since the cooldown started several hours ago.

Which one of the following is a typical cause of these indications, resulting from the cooldown?

A. Increased radioactive tritium in the reactor coolant

B. Increased radioactive nitrogen-16 in the reactor coolant

C. Increased radioactive oxygen dissolved in the reactor coolant

D. Increased radioactive corrosion products suspended in the reactor coolant

ANSWER: D.

核子反應爐以 100%功率運轉一年後停機，電廠此時逐漸降溫。運轉員通報從數小時前開始降溫起，運轉中停機用冷卻水泵周圍一般區域的輻射強度大增。

下列何者為這些冷卻導致現象的一般原因？

A. 反應爐冷卻水中的氚活性增加。

B. 反應爐冷卻水中的氮-16 活性增加。

C. 溶解於反應爐冷卻水中的氧活性增加。

D. 懸浮於反應爐冷卻水的輻射性腐蝕產物增加。

答案：D.

科目： 191007
知能類：K1.14 [2.4/2.6]
序號： P337

A nuclear power plant is operating at 70% steady-state power level when the temperature of the reactor coolant letdown passing through a boron-saturated mixed bed ion exchanger is decreased by 20°F.

As a result, the boron concentration in the effluent of the ion exchanger will _____ because the affinity of the ion exchanger for boron atoms has _____.

A. decrease; increased

B. decrease; decreased

C. increase; increased

D. increase; decreased

ANSWER: A.

核能電廠以 70%功率穩態運轉時，通過飽和硼酸(boron-saturated)混合床離子交換器的反應爐引水(letdown)冷卻水溫降低了 20°F。

因此，離子交換器的出口水流硼濃度將_____，因為離子交換器的硼原子親和力已經_____。

A. 降低；增加

B. 降低；降低

C. 增加；增加

D. 增加；降低

答案：A.

科目： 191007
知能類：K1.14 [2.4/2.6]
序號： P1335

A nuclear power plant is operating at 70% stable power level when the temperature of the reactor coolant letdown passing through a boron-saturated mixed bed ion exchanger is increased by 20°F.

As a result, the boron concentration in the effluent of the ion exchanger will _____ because the affinity of the ion exchanger for boron atoms has _____.

A. decrease; decreased

B. decrease; increased

C. increase; decreased

D. increase; increased

ANSWER: C.

核能電廠以 70%功率穩態運轉時，通過飽和硼酸(boron-saturated)混合床離子交換器的反應爐引水(letdown)冷卻水溫增加了 20°F。

因此，離子交換器的出口水流硼濃度將_____，因為離子交換器的硼原子親和力已經_____。

A. 降低；降低

B. 降低；增加

C. 增加；降低

D. 增加；增加

答案：C.

科目： 191007
知能類：K1.14 [2.4/2.6]
序號： P3337 (N/A)

Which one of the following indicates that a demineralizer receiving 75 gpm of reactor coolant is boron-saturated?

A. The decontamination factor of the demineralizer is less than 1.0.

B. The decontamination factor of the demineralizer is greater than 1.0.

C. Following a reactor coolant temperature increase, demineralizer effluent boron concentration exceeds influent boron concentration.

D. Following a reactor coolant temperature increase, demineralizer influent boron concentration exceeds effluent boron concentration.

ANSWER: C.

對於一部接收 75 gpm 反應爐冷卻水的除礦器，下列何者指出該除礦器為硼酸飽和 (boron-saturated)？

A. 除礦器除污因素小於 1.0。

B. 除礦器除污因素大於 1.0。

C. 反應爐冷卻水溫增加後，除礦器出口水流的硼濃度，高於進口水流的硼濃度。

D. 反應爐冷卻水溫增加後，除礦器進口水流的硼濃度，高於出口水流的硼濃度。

答案：C.

科目/題號：191007/1 (2016新增)
知能類：K1.03 [2.2/2.5]
序號：P4718 (B4719)

What percentage of ionic impurities is being removed from the water passing through an ion exchanger if the ion exchanger has a decontamination factor of 1.0?
A. 100 percent
B. 99 percent
C. 1 percent
D. 0 percent
ANSWER: D.

若離子交換器之除污因子為1.0，則通過此離子交換器之水中離子雜質移除百分比為：
A. 100%
B. 99%
C. 1%
D. 0%

答案： D

科目/題號：191007/2 (2016新增)
知能類：K1.03 [2.2/2.5]
K1.06 [2.1/2.5]
序號：P5418

Two indications of channeling through an operating demineralizer are a _____-than-normal demineralizer differential pressure and a _____-than-normal decontamination factor for ionic impurities.
A. higher; lower
B. higher; higher
C. lower; lower
D. lower; higher
ANSWER: C.

判斷某使用中的除礦器發生通道效應(channeling)的兩個指標是：除礦器的差壓比正常值_____，以及對離子雜質的除污因子比正常值_____。
A.高；低
B.高；高
C.低；低
D.低；高

答案： C

科目/題號：191007/3 (2016新增)
知能類：K1.06 [2.1/2.5]
序號：P7645 (B7645)

Which one of the following describes a possible cause and effect associated with a lower-than-normal differential pressure across a demineralizer during otherwise normal system flow conditions?
A. The resin has developed low resistance flow paths, which can decrease the decontamination factor for the demineralizer.
B. The resin has developed low resistance flow paths, which can increase the decontamination factor for the demineralizer.
C. The resin has become compacted, which can reduce the flow rate through the demineralizer and decrease the decontamination factor for the demineralizer.
D. The resin has become compacted, which can reduce the flow rate through the demineralizer and increase the decontamination factor for the demineralizer.
ANSWER: A.

在正常系統流量的情況下，除礦器進出口間的差壓低於正常值。下列何者說明是可能的原因及效應？
A.除礦器內的樹脂已經形成低阻力的水流通路，除礦器的除污因子因此降低
B.除礦器內的樹脂已經形成低阻力的水流通路，除礦器的除污因子因此升高
C.除礦器內的樹脂變得緊密，通過除礦器的水流量率因而降低，除污因子因此降低
D.除礦器內的樹脂變得緊密，通過除礦器的水流量率因而降低，除污因子因此升高

答案： A

科目/題號：191007/4 (2016 新增)
知能類：K1.08〔3.2/3.1〕
序號：P6018

A mixed-bed ion exchanger is being used to process reactor coolant letdown. The ion exchanger is boron-saturated for the existing reactor coolant conditions. Which one of the following describes a system change and resulting effect that will cause the boron concentration in the ion exchanger outlet water to be greater than the boron concentration in the inlet water?

A. An increase in reactor coolant ionic impurities with higher relative affinities for the resin exchange sites will displace borate ions from the resin exchange sites.
B. An increase in reactor coolant suspended solids with greater mass than the borate ions will mechanically remove borate ions from the resin exchange sites.
C. A decrease in the temperature of the inlet water will lower the relative affinity of the resin for the borate ions, which releases borate ions from the resin exchange sites.
D. A decrease in the flow rate through the ion exchanger will lower the retention capacity of the resin, which releases borate ions from the resin exchange sites.

ANSWER: A.

一混合床離子交換器用來處理反應器冷卻水之引水，目前該離子交換器已達硼酸飽和狀態。下列何種系統變化與其效應會導致離子交換器之出口硼酸濃度會大於其進口硼酸濃度？

A.增加反應器冷卻水中對樹脂有較高親和力的離子雜質，硼離子被該雜質所取代，因而釋出樹脂交換位置.
B.增加反應爐冷卻水中比硼離子質量更大的懸浮物，將在樹脂交換位置機械性的移除硼離子被該懸浮物擠出樹脂交換位置.
C.降低流經離子交換器之進口溫度，樹脂對硼離子的親和力因而弱化，因此硼離子被釋出樹脂交換位置.
D.降低流經離子交換器之流量率，樹脂的留置能力因而減弱，因此硼離子被釋出樹脂交換位置.

答案： A

科目/題號：191007/5 (2016新增)
知能類：K1.08 [3.0/3.1]
序號：P6318

A mixed-bed ion exchanger is being used to process reactor coolant letdown. The ion exchanger is boron-saturated for the existing reactor coolant conditions.
Reactor coolant letdown temperature at the inlet to the ion exchanger increases by 15°F, while remaining within the normal temperature range. Because of the temperature increase, the total number of boron atoms occupying the ion exchange sites will _____; and the boron concentration in the ion exchanger effluent will _____.
A. increase; decrease
B. increase; increase
C. decrease; decrease
D. decrease; increase
ANSWER: D

某混合床離子交換器用來處理反應器冷卻水之引水，目前該離子交換器已達硼酸飽和狀態。
倘若進入該離子交換器之反應器冷卻水引水溫度升高15°F ，且引水溫度仍然在正常溫度範圍內，則盤據在離子交換位置內的硼原子數量將_____；同時離子交換器出口之硼酸濃度將_____。
A.增加；降低
B.增加；升高
C.減少；降低
D.減少；升高

答案： D

科目/題號：191007/6 (2016新增)
知能類：K1.08 [3.2/3.1]
序號：P7018

Reactor coolant system (RCS) purification mixed-bed ion exchanger A was removed from service and isolated after several weeks of operation when the RCS boron concentration was 900 ppm. Currently, with ion exchanger B in service, the RCS boron concentration is 450 ppm. If ion exchanger B is isolated and ion exchanger A is immediately returned to service, RCS boron concentration will...

A. remain the same because the resin in ion exchanger A has already become saturated with boron during previous operation.
B. remain the same because the resin in ion exchanger A has no affinity for the boron in the reactor coolant.
C. increase until the volume of water in ion exchanger A mixes completely with the RCS.
D. increase until the resin in ion exchanger A reaches equilibrium with the existing RCS boron concentration.

ANSWER: D.

經過數週連續使用，反應器冷卻水系統(RCS)淨化混合床離子交換器A停用並隔離，當時RCS硼酸濃度為900 ppm。目前離子交換器B使用中，RCS硼酸濃度則為450 ppm。倘若離子交換器B這時被隔離，離子交換器A又立即再置入使用，RCS硼酸濃度將_____。

A.維持不變，因為經過前次的使用，離子交換器A內的樹脂已經飽和
B.維持不變，因為離子交換器A內的樹脂對反應器冷卻水中的硼已失去親和力
C.增高，等到離子交換器A內的流體與RCS完全混合後，RCS硼酸濃度才會穩定下來
D.增高，等到離子交換器A內的樹脂與RCS硼酸濃度達到平衡後，RCS硼酸濃度才會穩定下來

答案： D

科目/題號：191007/7 (2016新增)
知能類：K1.08 [3.2/3.1]
序號：P7218

A mixed-bed ion exchanger is being used to process reactor coolant letdown. The ion exchanger is boron-saturated for the existing reactor coolant conditions. Which one of the following describes a system change and resulting effect that will cause the boron concentration in the ion exchanger outlet water to be greater than the boron concentration in the inlet water?

A. An increase in the flow rate through the ion exchanger will lower the retention capacity of the resin, which releases borate ions from the resin exchange sites.
B. An increase in reactor coolant suspended solids with greater mass than the borate ions will mechanically remove borate ions from the resin exchange sites.
C. A decrease in the temperature of the inlet water will lower the relative affinity of the resin for the borate ions, which releases borate ions from the resin exchange sites.
D. A decrease in reactor coolant boron concentration will cause captured borate ions to be released to re-establish chemical equilibrium at the resin exchange sites.

ANSWER: D.

一混合床離子交換器處理反應器冷卻水之引水，目前該離子交換器已達硼酸飽和狀態。下列何種系統變化與其效應會導致離子交換器之出口硼酸濃度會大於其進口硼酸濃度？

A.提高離子交換器之流量，樹脂的留置能力因而減弱，因此硼離子被釋出樹脂交換位置
B.增加反應爐冷卻水中比硼離子質量更高的懸浮物，因此硼離子被該懸浮物擠出樹脂交換位置
C.降低離子交換器之進水溫度，樹脂對硼離子的親和力因而弱化，因此硼離子被釋出樹脂交換位置
D.降低反應爐冷卻水之硼酸濃度，已被捕獲的硼離子會被釋出，然後在樹脂交換區內重新建立一個新的化學平衡

答案： D

科目/題號：191007/8 (2016新增)
知能類：K1.09 [2.5/2.7]
序號：P7606 (B7606)

A mixed-bed ion exchanger is being used to process reactor coolant. The ion exchanger has been in service for 6 months at 100 percent power. A temperature controller malfunction causes the ion exchanger influent temperature to exceed the resin's maximum temperature limit before being manually restored to normal. Ion exchanger water chemistry analyses are being performed to check for resin decomposition.
Which one of the following water chemistry test results does not indicate that significant resin decomposition has occurred?
A. A significant decrease in the ion exchanger's decontaminator factor.
B. A significant increase in the ion exchanger's effluent conductivity.
C. A significant increase in the ion exchanger's effluent radioactivity.
D. A significant increase in the ion exchanger's effluent dissolved gases.
ANSWER: D.

某一混合床離子交換器用來處理反應器冷卻水，該離子交換器已經在全功率發電情況下使用了6個月。由於一只溫度控制器故障，導致在手動操作恢復正常前，該離子交換器的進水溫度已超過樹脂的最高溫度限值。之後採取該離子交換器的水樣本作化學分析，判斷其樹脂是否已經分解。
下列各採樣化學分析結果，何者不能顯示樹脂已經嚴重分解？
A.該離子交換器的除污因子明顯降低
B.該離子交換器的出水導電度明顯升高
C.該離子交換器的出水輻射強度明顯升高
D.該離子交換器的出水溶解氣體量明顯升高

答案： D

科目/題號：191007/9 (2016新增)
知能類：K1.11 [2.5/2.8]
序號：P5819 (B5820)

During a nuclear power plant cooldown, the reactor experiences a large crud burst. After 10 minutes, with stable reactor coolant chemistry parameters, the operators begin to record parameters for the in-service reactor coolant purification ion exchanger. The ion exchanger was recently filled with fresh resin.
Assuming no additional operator actions, what trend will the recorded parameters show during the next few hours?
A. Increasing ion exchanger inlet water conductivity.
B. Increasing ion exchanger outlet water conductivity.
C. Increasing flow rate through the ion exchanger.
D. Increasing radiation levels around the ion exchanger.
ANSWER: D.

某核電廠在降溫的過程中，反應爐內發生一次大型的積垢迸裂(crud burst)。10分鐘後反應爐冷卻水化學參數穩定，運轉員記錄反應爐冷卻水淨化離子交換器之參數。該離子交換器最近才剛換過新的樹脂。
倘若運轉員未採行其他的行動，則所記錄的參數在未來的數小時內將顯現怎樣的趨勢？
A.離子交換器進水導電度升高
B.離子交換器出水導電度升高
C.通過離子交換器的水流量率增加
D.離子交換器周圍的輻射強度升高

答案： D