September 9, 2009

Dr. Steven Biegalski, Director
Nuclear Engineering Teaching Lab
University of Texas at Austin
ETL-PRC Bldg 159
10100 Burnet Rd
Austin, TX 78758

SUBJECT: INITIAL EXAMINATION REPORT NO. 50-602/OL-09-02
UNIVERSITY OF TEXAS AT AUSTIN

Dear Dr. Biegalski:

On August 10, 2009, the NRC administered operator licensing examinations at your Nuclear Engineering Teaching Lab reactor. The examinations were conducted according to NUREG-1478, "Operator Licensing Examiner Standards for Research and Test Reactors," Revision 2. Examination questions and preliminary findings were discussed with those members of your staff identified in the enclosed report at the conclusion of the examination.

In accordance with Title 10 of the Code of Federal Regulations Section 2.390, a copy of this letter and the enclosures will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. The NRC is forwarding the individual grades to you in a separate letter which will not be released publicly. Should you have any questions concerning this examination, please contact Mr. Patrick Isaac at (301) 415-1019 or via internet e-mail patrick.isaac@nrc.gov.

Sincerely,

/RA/

Johnny H. Eads, Jr., Chief
Research and Test Reactors Branch B
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-602
Enclosures: 1. INITIAL EXAMINATION REPORT NO. 50-602/OL-09-02
2. Written examination

cc without enclosures:
Please see next page

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DISTRIBUTION w/ encls.:
PUBLIC PRTB r/f RidsNRRDPRPRTA RidsNRRDPRPRTB Facility File (CHart) O-7 F-08
ADAMS ACCESSION #: ML092430168 **TEMPLATE #:NRR-074**

OFFICE	PRTB:CE		IOLB:LA	E	PRTB:BC	
NAME	PIsaac/JNguyen		CRevelle		JEads	
DATE	08/31/2009		08/31/2009		09/9/2009	

OFFICIAL RECORD COPY

Governor's Budget and
Planning Office
P.O. Box 13561
Austin, TX 78711

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Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

U. S. NUCLEAR REGULATORY COMMISSION
OPERATOR LICENSING INITIAL EXAMINATION REPORT

REPORT NO.: 50-602/OL-09-02

FACILITY DOCKET NO.: 50-602

FACILITY LICENSE NO.: R-129

FACILITY: UNIVERSITY of TEXAS at AUSTIN

EXAMINATION DATES: August 10, 2009

SUBMITTED BY: ____________________________ __________
Patrick Isaac, Chief Examiner Date

SUMMARY:

During the week of August 10, 2009, the NRC administered an operator licensing examinations to two Reactor Operator candidates. All candidates passed all portions of the examination.

REPORT DETAILS

1. Examiners:
   Patrick Isaac, Chief Examiner, NRC
   John Nguyen, Examiner in training, NRC

2. Results:

	RO PASS/FAIL	SRO PASS/FAIL	TOTAL PASS/FAIL
Written	2/0	0/0	2/0
Operating Tests	2/0	0/0	2/0
Overall	2/0	0/0	2/0

3. Exit Meeting:
   Patrick Isaac, NRC
   John Nguyen, NRC
   Steven Biegalski, Director
   Michael Krause, Reactor Manager

   The NRC thanked the facility management for their support in administrating the examinations. The examiner noted that there were no indications of generic weaknesses, and that the candidates were well prepared.

ENCLOSURE 1

University of Texas – Austin

US NRC Licensed Operator Examination

Written Exam with Answer Key

August, 2009

Enclosure 2

QUESTION A.01 [1.0 points]
The delayed neutron fraction, β, is defined as a ratio of:

a. the number of delayed neutrons over the number of fast neutrons in the core.

b. the number of thermal neutrons over the number of fast neutrons in the core.

c. the number of delayed neutrons over the number of total neutrons in the core.

d. the number of thermal neutrons absorbed in fuel over the number of thermal neutrons absorbed in core materials including in fuel.

A.01 c
REF Introduction to Nuclear Operation, Reed Burn, 1982, Sec 3.2.2, page 3-11.

QUESTION A.02 [1.0 point]
Reactor power is rising on a 40-second period. Approximately how long will it take for power to double?

a. 15 seconds.

b. 28 seconds.

c. 32 seconds.

d. 80 seconds.

A.02 b
REF: $P = P_0 e^{t/T}$ —> ln(2) x 40sec = time; time = ln (2) x 40 sec ≈ 28 sec

QUESTION A.03 [1 points]
In a just critical reactor, adding one dollar worth of reactivity will cause:

a. a sudden drop in delay neutron.

b. the reactor period to be equal to $(\beta-\rho)/\lambda\rho$.

c. all prompt neutron term to become unimportant.

d. the resultant period to be a function of the prompt neutron generation time.

A.03 d
REF Introduction to Nuclear Operation, Reed Burn, 1982, Sec 4.3, page 4-4

QUESTION A.04 [1.0 point]
The reactor is on a CONSTANT positive period. Which ONE of the following power changes will take the LONGEST time to complete?

a. From 1 W to 5 W.

b. From 10 W to 30 W.

c. From 10 kW to 20 kW.

d. From 100 kW to 150 kW.

A.04 a
REF: $P = P_0 e^{t/T}$ —> t= T x Ln(P/ P_0); assume constant period = 1
t= Ln(P/ P_0) —> the largest ratio of P/ P_0 is the longest time to complete; so it is a 5W/1W ratio.

QUESTION A.05 [1.0 point]
About two minutes following a reactor scram, the reactor period has stabilized and the power level is decreasing at a CONSTANT rate. Given that reactor power at time t_0 is 100 kW power, what will it be three minutes later?

a. 2 kW

b. 10 kW

c. 30 kW

d. 50 kW

A.5 b
REF: $P = P_0 e^{-t/T} = 100 \text{ kW} \times e^{(180sec/-80sec)} = 100 \text{ kW} \times e^{-2.25} = 0.1054 \times 100 \text{ kW} = 10 \text{ kW}$

QUESTION A.06 [1.0 point]
The neutron multiplication factor is defined as a ratio of:

a. the number of thermal neutrons absorbed in fuel over the number of thermal neutrons absorbed in core materials.

b. the number of neutrons produced by fission in a generation over the number of neutrons produced by fission in the previous generation.

c. the number of neutrons produced by fission in the previous generation over the number of neutrons produced by fission in a generation.

d. the number of thermal neutrons produced by fission in a generation over the number of thermal neutrons produced by fission in the previous generation.

A.06 b
REF: REF Introduction to Nuclear Operation, Reed Burn, 1982, Sec 3.3.1, page 3-16.

QUESTION A.07 [1.0 point]
Which ONE of the following statements best describes the MAJOR contributor to the production and depletion of Xenon respectively in a STEADY-STATE OPERATING reactor?

	Production	Depletion
a.	Directly from fission	Neutron absorption
b.	Directly from fission	Radioactive Decay
c.	Radioactive decay of Iodine	Neutron absorption
d.	Radioactive decay of Iodine	Radioactive Decay

A.7 c (for depletion, Xe is burn off by neutron)
REF Introduction to Nuclear Operation, Reed Burn, 1988, Sec 8-2, page 8-3.

QUESTION A.08 [1.0 point]
Which ONE of the following atoms serves as the best medium to reduce fast energy fission neutrons to thermal energies by scattering interactions?

a. Boron atoms in the control rods.

b. Zirconium atoms in the fuel cladding.

c. Oxygen atoms in the water molecules.

d. Hydrogen atoms in the water molecules.

A.08 d
REF Introduction to Nuclear Operation, Reed Burn, 1988, Sec 2.5.3, page 2-45.

QUESTION A.09 [1.0 point]
A reactor (not the University of Texas reactor) is shutdown by \$11. A rate of 1000 counts per second (cps) is measured when a control rod worth of -\$4 is removed from the core. What was the previous count rate (cps)? Given $\beta = 0.007$

a. 653.

b. 753.

c. 853.

d. 1173.

A.09 a
REF $k = 1/1-\rho$; $\rho = \rho\$ * \beta$; assume $\beta=0.007$ —> $\rho_1=-\$11*.007=-0.077$; $K_{eff1}=1/1-\rho_1$
$K_{eff1} =1/(1-(-.077))$ —>$K_{eff1}= 0.9285$,
Remove –\$4 from the core, means adding +\$4 to the core when removing; new worth = -\$11 +4.0 =-\$7,
$\rho_2=-\$7*.007=-0.049$; $K_{eff2} = 1/1+0.049$; —>0.953
$Count_1*(1-K_{eff1}) = Count_{2*}(1-K_{eff2})$
$Count_1*(1-0.9285) = Count_{2*}(1-0.953)$
$Count_1*(1-0.9285) = 1000(1-0.953)$; $Count_1 = 653$ cps

QUESTION A.10 [1.0 point]
A reactor is critical at 1 MW power. Control rods worth of 0.10 Δk/k is rapidly inserted into the reactor core. Calculate the power level immediately after insertion of the control rods. Given βeff= 0.007

a. 50 kW.

b. 72 kW.

c. 134 kW.

d. 1.1 MW and scram.

A.10 b
REF $P_1 = P_0$ (βeff*(1-ρ))/(βeff-ρ)
P_1= 1MW (0.007 (1-(-.1)/(.007-(-.1) → P_1= 1 MW (.072) = 72 kW.

QUESTION A.11 [1.0 point]
Which ONE of the following describes the MAJOR contributor to the negative temperature coefficient of reactivity in the UT TRIGA reactor?

a. Decreasing of fuel density.

b. Zr-H Moderator Effects.

c. Decreasing of water pool density.

d. Increasing the resonance absorption in the fuel.

A.11 b
REF TRIGA fuel behavior

QUESTION A.12 [1.0 point]
A reactor contains three safety rods and a regulating rod. Which one of the following would result in a determination of the excess reactivity of this reactor?

a. The reactor is critical at a low power level, with all safety rods full out and the regulating rod at some position. The reactivity remaining in the regulating rod (i.e. its worth from its present position to full out) is the excess reactivity.

b. The reactor is shutdown. Two safety rods are withdrawn until the reactor becomes critical. The total rods worth withdrawn is the excess reactivity.

c. The reactor is at full power. The total worth of all rods withdrawn is the excess reactivity.

d. The reactor is at full power. The total worth remaining in all the safety rods and the regulating rod (i.e. their worth from their present positions to full out) is the excess reactivity.

A.12 a
REF REF: Burn, R., Introduction to Nuclear Reactor Operations, © 1988, §§ 6.2.1, pp. 6-2.

QUESTION A.13 [1.0 point]
The total amount of reactivity added by withdrawing a control rod from a reference height to any other rod height is called?

a. differential rod worth.

b. shutdown reactivity.

c. integral rod worth.

d. reference reactivity.

A.13 c
REF: Introduction to Nuclear Operation, Reed Burn, 1988, § 7.2 – 7.3 page. 7-1;7.5.

QUESTION A.14 [1.0 point]
A reactor has an effective delayed fraction (β_{eff}) of 0.0065. If a control rod withdrawal in this reactor increases the effective multiplication (k_{eff}) from 0.998 to 1.005, the reactor is:

a. subcritical.

b. exactly critical.

c. supercritical.

d. prompt critical.

A.14 c
REF: Introduction to Nuclear Operation, Reed Burn, 1982, Section 4.2, page 4-1.
Note: For prompt critical, k_{eff} has to be ≥ 1.0065

QUESTION A.15 [1.0 point]
The effective target area in cm^2 presented by a single nucleus to an incident neutron beam is defined as:

a. a macroscopic cross section.

b. a microscopic cross section.

c. a neutron flux.

d. a mean free path.

A.15 b
REF Introduction to Nuclear Operation, Reed Burn, 1982, Sec. 2.5.1, page 2-36.

QUESTION A.16 [1.0 point]
During a reactor startup, as K_{eff} approach criticality, the value of 1/M:

a. decreases toward one.

b. decreases toward zero.

c. increases toward one.

d. increase toward infinitive.

A.16 b
REF Introduction to Nuclear Operation, Reed Burn, 1982, Sec. 5.4, page 5-14 to 5-24.

QUESTION A.17 [1.0 point]
Which one of the following is the primary reason a neutron source is installed in the core?

a. To start the safety channels during a reactor startup.

b. To allow for testing and irradiation of experiments when the reactor is shutdown.

c. To provide a neutron level high enough to be monitor for a controlled reactor startup.

d. To increase the excess reactivity of the reactor that reduces the frequency for refueling.

A.17 c
REF Introduction to Nuclear Operation, Reed Burn, 1982, Sec. 5.2, page 5-2

QUESTION A.18 [1.0 point]
Which one of the following describes the difference between moderator and reflector?

a. A reflector increases the fast non-leakage factor and a moderator increases the thermal utilization factor.

b. A reflector increases the neutron production factor and a moderator increases the fast fission factor.

c. A reflector decreases the thermal utilization factor and a moderator increases the fast fission factor.

d. A reflector decreases the neutron production factor and a moderator decreases the fast non-leakage factor.

A.18 a
REF Glasstone & Sesonke, Nuclear Reactor Engineering, Chapter 1

QUESTION A.19 [1.0 point]
Which one of the following is the principle source of heat in the reactor after a shutdown from extended operation at 1 MW?

a. Production of delayed neutrons.

b. Subcritical reaction of photo-neutrons.

c. Spontaneous fission of U^{238}.

d. Decay of fission fragments.

A.19 d
REF Introduction to Nuclear Operation, Reed Burn, 1988, Sec. 3.3.2, page 3-4.

QUESTION A.20 [1.0 point]
If equal amounts of positive or negative reactivity are added to an exactly critical reactor, which one of the following describes the result on the absolute value of stable reactor period?

a. Positive period and negative period will be of equal value.

b. The positive period value will be greater than the negative period value.

c. The negative period value will be greater than the positive period value.

d. Positive and negative period will only be equal value until the reactivity added exceeds one dollar.

A.20 c
REF NRC standard question

***************** End of CAT A ********************************

Section B – Normal/Emergency Procedures and Radiology Controls

QUESTION B.01 [1.0 points]
Which ONE of the following statements is NOT a limitation of experiments?

a. Fuel experiments generating a strontium inventory greater than 2.5 millicuries shall not be irradiated in the reactor.

b. The total of absolute worth of in-core experiments shall not exceed $3.0.

c. Experiments having reactivity worths greater than $1.0 shall be secure experiments.

d. Worth of any single experiment shall be less than 2.50% Δk/k above cold, critical, and without xenon.

B.01 d
REF TS, Section 3.4

QUESTION B.02 [2.0 points, 0.5 each]
Match the type of radiation in column A with their quality factor in column B. Items in column B is to be used once, more than once or not at all.

Column A	Column B
a. Gamma	1. 1
b. Neutrons of unknown energy	2. 5
c. Alpha particles	3. 10
d. Beta	4. 20

B.02 a(1) b(3) c(4) d(1)
REF 10 CFR 20

QUESTION B.03 [1.0 point]
A radioactive source reads 35 Rem/hr on contact. Five hours later, the same source reads 1.5 Rem/hr. How long is the time for the source to decay from a reading of 35 Rem/hr to 100 mRem/hr?

a. 6.5 hours.

b. 7.5 hours.

c. 8.5 hours.

d. 9.5 hours.

B.03 d
REF $DR = DR_{o} * e^{-\lambda t}$
1.5 rem/hr $= 35$ rem/hr$* e^{-\lambda(5hr)}$
$Ln(1.5/35) = -\lambda*5$ --> $\lambda=0.623$; solve for t: $Ln(.1/35)=-0.623 *t$ → $t=9.4$ hours

QUESTION B.04 [2.0 points,0.5 each]
Match each of emergency events listed in column A with the correct emergency classes listed in column B. Items in column B is to be used once, more than once or not at all.

Column A	Column B
a. Personnel injury	1. Non-reactor Specific Emergency.
b. Pool level alarm indicating loss of water	2. Notification of Unusual Event.
c. Measured deep dose equivalent of 20 mRem/hr for 24 hr exposure at the site boundary.	3. Alert.
d. Receipt of a bomb threat with possible radiological release implication.	

B.04 a(1) b(2) c(2) d(2)
REF Plan -E, Emergency Response

QUESTION B.05 [1.0 point]
A radioactive material is decayed at a rate of 30% per day. Determine its half-life?

a. 1 day.

b. 2 days.

c. 3 days.

d. 5 days.

B.05 b
REF $DR = DR_{\circ} * e^{-\lambda t}$
30% is decayed, so 70% is still there
$70\% = 100\% * e^{-\lambda(1day)}$
$Ln(70/100) = -\lambda*1$ -->λ=0.356 t1/2=Ln(2)/ λ -->.693/.356 t=1.94 days

QUESTION B.06 [1.0 point]
During an initial start-up, the RO calculates a core excess reactivity (CER) of 5.0% Δk/k above cold, critical, without xenon. For this CER value, which ONE of the following is the best action?

a. Continue the start-up; increase power to 1 kW and re-verify the result.

b. Continue the start-up; increase power to desire level because the CER value is within TS limit.

c. Shutdown the reactor; immediately report the result to the SRO due to CER value being above TS limit.

d Shutdown the reactor; immediately report the result to NRC.

B.06 c
REF TS 3.1

QUESTION B.07 [1.0 point]
An area in which radiation levels from radiation source to the body could result in an individual receiving a dose equivalent in excess of 100 mRem/hr is defined as:

a. Radiation area

b. Unrestricted Area

c. High Radiation Area.

d. Very High Radiation Area

B.07 c
REF 10 CFR 20

QUESTION B.08 [1.0 point]
Which ONE of the following conditions requires a radiation work permit (RWP) in accordance with HP00-7?

a. Collect the pool sample for monthly test.

b. Open and close the reactor beam tubes.

c. A deep dose equivalent to an individual in excess of 2 mRem/hr.

d. Remove samples from the CAM.

B.08 b
REF HP00-7, RWP, page 4

QUESTION B.09 [1.0 point]
10 CFR 50.54(x) states that a licensee may deviate from its technical specifications to protect the public health and safety in case of an emergency. Which ONE of the following is the MINIMUM level that can authorize this deviation?

a. Reactor Director.

b. Reactor operator.

c. Reactor Manager.

d. Senior reactor operator.

B.09 d
REF 10 CFR 50(x),(y)

QUESTION B.10 [1.0 point]
Which ONE of the following materials shall be doubly encapsulated in the UT TRIGA reactor?

a. A volatile material.

b. A long half-life material.

c. A short half-life material.

d. A liquid fissionable material.

B.10 d
REF TS 3.4.2

QUESTION B.11 [1.0 point]
Which one of the following is the definition of Total Effective Dose Equivalent (TEDE) specified in 10 CFR Part 20?

a. The sum of thyroid dose and external dose.

b. The sum of the external deep dose and the organ dose.

c. The sum of the deep dose equivalent and the committed effective dose equivalent.

d. The dose that your whole body is received from the source, but excluded from the deep dose.

B.11 c
REF 10 CFR 20.1003.

QUESTION B.12 [1.0 point]
The UT TRIGA reactor has been shutdown due to a fuel element leak. Which ONE of the following radioactive gases poses the most significant hazard during the search for the leaking fuel element? (Assume the fuel element is leaking during the search)?

a. Argon.

b. Tritium.

c. Xenon.

d. Nitrogen.

B.12 c
REF Standard NRC question

QUESTION B.13 [1.0 point]
Which ONE of the following is the MINIMUM number of radiation monitors required for fuel movement?

a. Pool area radiation monitor only.

b. Air particulate monitor only.

c. Pool area radiation and air particulate monitors.

d. Pool area radiation, Ar-41 air, and air particulate monitors.

B.13 c
REF FUEL-1 Procedure, page 3

QUESTION B.14 [1.0 point]
When a high airborne radioactivity level alarms, the reactor operator shall immediately:

a. verify that the Argon Purge System is shutdown.

b. push the Emergency Alarm switch.

c. secure reactor and notify the SRO and HP.

d. secure reactor, perform emergency shutdown of HVAC system, then notify the SRO/HP.

B.14 d
REF OPER-5, Abnormal Conditions

QUESTION B.15 [1.0 point]
The scram time of a scramble control rod shall be measured:

a. monthly.

b. quarterly.

c. semi-annually.

d. annually.

B.15 d
REF TS 4.2.1

QUESTION B.16 [1.0 point]
A 2-curies, 1.8 Mev-gamma source is to be stored in the reactor building. How far from the source should a HIGH RADIATION AREA sign be posted?

a. 3.6 feet

b. 15 feet

c. 22 feet

d. 66 feet

B.16 b
REF 6CEN = R/hr @ 1 ft. -> 6x2X1.8 = 21.6 R/hr at 1ft. $I_0D_0^2$ = $I*D^2$ -> 21.6 R/hr*1 ft = 0.1 R/hr *D ^{2}
D= sqrt(21.6/0.1) = 14.7 ft.

QUESTION B.17 [1.0 point]
Which ONE of the following requires the direct supervision (i.e., presence) of a Senior Reactor Operator (SRO)?

a. Control rod calibrations.

b. Fuel temperature calibrations.

c. Pulsing the reactor.

d. Performance of a Class A experiment.

B.17 d
REF ADMN-6 , Authorization of Experiments.

QUESTION B.18 [1.0 point]
The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year is defined as:

a. Annual limit on intake (ALI)

b. Annual dose limit (ADI)

c. Derived air concentration (DAC)

d. Airborne radioactive limit (ARL)

B.18 a
REF 10 CFR 20

****************************** End of CAT B *******************************

Section C – Facility and Radiation Monitoring Systems

QUESTION C.01 [2.0 points, 0.5 each]
Match the input signals listed in column A with their respective responses listed in column B. (Items in column B is to be used more than once or not at all.)

Column A	Column B
a. Manual scram.	1. Indication only.
b. 30-sec period.	2. Indication and scram only.
c. No neutron source.	3. Indication and interlock only.
d. Watchdog circuit failure.	4. Indication, scram, and interlock.

C.01 a(2) b(1) c(3) d(2)
REF TS 3.2

QUESTION C.02 [1.0 point]
When the airborne particulate radioactivity exceeds the CAM setpoint, an automatic signal will cause

a. the exhaust and supply dampers open.

b. the exhaust and supply dampers close.

c. the exhaust dampers open while the supply dampers close.

d. the exhaust dampers close while supply dampers open.

C.02 b
REF SAR page 7-5

QUESTION C.03 [1.0 point]
Which ONE of the following best describes the reason for the high sensitive of Geiger-Mueller tube detector?

a. Coating with U-235.

b. A longer length tube, so target is larger for all incident events.

c. Lower voltage applied to the detector helps to amplify all incident events.

d. Any incident radiation event causing primary ionization results in ionization of entire detector.

C.03 d
REF Standard NRC question

Section C – Facility and Radiation Monitoring Systems

QUESTION C.04 [1.0 point]
Graphite inserts are placed in the top and bottom of the fuel element. Which ONE of the following best describes the function of these inserts?

a. To absorb thermal neutrons.

b. To reduce neutron leakage.

c. To absorb fission product gases.

d. To increase fast neutron flux.

C.04 b
REF SAR page 4-61

QUESTION C.05 [1.0 point]
Which ONE of the following conditions does not allow the reactor operator to change the reactor operation from the Steady State mode to SQUARE WAVE mode?

a. Pool water temperature is 40 °C.

b. Reactor power is less than 1 kW.

c. Air is applied to the Transient rod drive.

d. The Reg rod and both Shim rods are positioned at 50 units.

C.05 c
REF MAIN-1, page 27

QUESTION C.06 [1.0 point]
In order to minimize the release of Ar-41 from the pneumatic tube (rabbit) system, the …

a. piping is a recirculating loop with an N_2 purge.

b. piping is a recirculating loop with a CO_2 purge.

c. reactor building air supply is connected to the Ar-41 purge system.

d. reactor building air exhaust is connected to the Ar-41 purge system.

C.06 b
REF: UT TRIGA – Operation Support System, 3.2, Pneumatic Transfer System.

QUESTION C.07 [2.0 points, 0.5 each]
Match each radiological detector listed in column A with a specific purpose in column B. Items in column B is to be used only once.

Column A	Column B
a. Particulate air monitor	1. Monitor radiation level in the reactor bay
b. Gaseous air monitor	2. Detect radioisotopes released due to fuel failure
c. Area radiation monitor	3. Determine the effluent of Ar-41
d. Portable monitor	4. Survey of laboratory

C.07 a(2) b(3) c(1) d(4)
REF SAR, page 9-6 to page 9-9

QUESTION C.08 [1.0 point]
Which ONE of the following events does NOT require the direct supervision of a SRO?

a. Fuel movement.

b. First core excess of the day.

c. Significant power reduction.

d. Maintenance primary cooling pump.

C.08 d
REF TS, page 28

QUESTION C.09 [1.0 point]
If the reactor operator activates the NM1000 Rod Withdrawal Prohibit signal, RWP1, by removing the neutron source, the reactor operator:

a. will scram the reactor.

b. can move control rods up, but not down.

c. can move control rods down, but not up.

d. cannot move control rods either up or down.

C.09 c
REF MAIN-1, page 19

QUESTION C.10 [1.0 point]
Which one of the following pressure settings in the heat exchanger helps to prevent the possible spread of contaminated water to the environment?

a. The pressure of the shell outlet is higher than the pressure of the tube inlet.

b. The pressure of the shell outlet is lower than the pressure of the tube inlet.

c. The pressure of the shell outlet is equal to the pressure of the tube inlet.

d. Setting up the pressure difference cannot prevent the contamination.

C.10 a
REF SAR, page 5-9, table 5-1

QUESTION C.11 [1.0 point]
Conductivity averaged over a month shall not exceed ____ micromhos per centimeter in the UT TRIGA pool water.

a. 2

b. 3

c. 4

d. 5

C.11 d
REF TS, page 15

QUESTION C.12 [1.0 point]
To adjust the output of the ion chambers while performing a thermal power calibration, the reactor operator needs to:

a. adjust the circuit amplifier.

b. adjust the detector high voltage.

c. physically adjust the height of the detectors in the support assembly.

d. move the graphite reflector to change the neutron flux near the detectors.

C.12 c
REF NRC standard question

QUESTION C.13 [1.0 point]
Exposing a check source to the CAM detector to verify whether it is operable is considered to be:

a. a channel test.

b. a channel check.

c. a channel calibration.

d. a channel verification.

C.13 a
REF TS, page 5

QUESTION C.14 [1.0 point]
Which ONE of the following experimental facilities provides the greatest neutron flux?

a. Beam Port.

b. Pneumatic Tube.

c. Lazy Susan.

d. Central Thimble.

C.14 d
REF Center of the reactor core

QUESTION C.15 [1.0 point]
Which ONE of the following channels provides the peak flux (nv) information displayed on the reactor console?

a. NP-1000.

b. NM-1000.

c. NPP-1000.

d. Pulse frequency translator.

C.15 c
REF SAR Section 6.1.2

QUESTION C.16 [1.0 point]
Which ONE of the following conditions does NOT cause a reactor scram?

a. Loss of timer reset.

b. Pulse power = 2200 MW.

c. Fuel temperature = 500 °C.

d. Loss of High Voltage to NPP-1000.

C.16 c
REF TS 3.2

QUESTION C.17 [1.0 point]
Which ONE of the following is the method used at the UT reactor to prevent an accidental siphoning of reactor pool water?

a. Siphon break is automatically controlled by computer.

b. Low pool water level signal automatically initiates valves CLOSED.

c. Low pool water level signal automatically initiates pump power OFF.

d. Holes in the suction line of the coolant system.

C.17 d
REF SAR Section 5.2.1

QUESTION C.18 [1.0 point]
Which ONE of the following is the zirconium-hydride atom ratio for the UT TRIGA fuel element?

a. Nominal 1.0 hydrogen to zirconium.

b. Nominal 1.3 hydrogen to zirconium.

c. Nominal 1.4 hydrogen to zirconium.

d. Nominal 1.6 hydrogen to zirconium.

C.18 d
REF TS 5.3

******************* End of CAT C *****************************

******************* End of the Exam *************************