Georgia Institute of Technology
Neely Nuclear Research Center
Atlanta, Georgia 30332
(404) 894-3600

GEORGIA TECH 1885-1985

DESIGNING TOMORROW TODAY

February 4, 1985

Dr. Cecil O. Thomas
Standardization and Special Projects Branch
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: Docket No. 50-276

Dear Dr. Thomas:

This letter is being sent to you in response to your letter of January 17, 1985 requesting additional information regarding the decommissioning of the Georgia Tech AGN 201. I will answer your questions in the same order as they appeared in your letter. But first, I wish to inform you that on December 20, 1984, we defueled the AGN 201 and the fuel is being temporarily stored at the GTRR vault. This action is in accordance with your letter of November 13, 1984 which stated that it is permissible under our license, and provided we have a licensed operator, to defuel the AGN 201 and relocate the fuel in the GTRR vault for temporary storage. The Dismantling Plan which was submitted to you was by and large applied. The only exception was that a neutron monitor, which responds to both fast and thermal neutrons, was used. A radiation work permit was obtained (copy enclosed). In view of the fact that the fuel has been removed from the core of the AGN 201, the answers given below are based, in some cases, on measured data.

The licensed operator in charge for the defueling of the AGN 201 was Dr. Narl Davidson. His license expires November 7, 1986.

The following are our answers to the questions you raised.

A020
1/1

I.1 The measured dose from the RaBe source is 10 mrem/hr. gammas at 3 feet from the source. This dose rate is obtained when the source is in the air outside the lead pig. The corresponding fast neutron dose is 0.07 mrem/hr. The thermal neutron dose is negligibly small. The RaBe source will be used in radiation detection courses and is now listed on our State of Georgia license, GA-147-1, of radioactive isotopes at Georgia Tech. The Georgia Tech custodian for this source is the Radiation Safety Officer, Mr. Robert Boyd. We have no plan to dispose of the RaBe source.

I.2 The neutron monitor used during defueling was Eberline PNC-4 thermal and/or fast neutron detector comprising a BF_3 probe which can be operated in either of two modes: (1) in air; the response is due almost entirely to thermal neutrons and (2) the probe is inserted into a paraffin containing chamber surrounded by a Cadmium sheet. The chamber is an integral part of the monitor. The monitor output is counts per minute. A chart on the side of the instrument converts counts per minute to mrem/hr. The monitor sensitivity to neutrons is:
fast; 0.8 n/cm^2 sec or 0.1 mrem/hr.
thermal; 0.001 n/cm^2 sec or 0.004 mrem/hr.

I.3 The Radiation Safety Officer and his deputy were present at the beginning of the process. One hour into the defueling process the RSO was replaced by another health physicist. The RSO, Mr. R. Boyd, has more than 25 years of professional experience in health physics and his deputy, Mr. Steven Millspaugh, has more than 15 years.

The function of the health physicists was to monitor all aspects of the defueling operation and make sure that Georgia Tech health physics procedures were obeyed.

I.4 The personnel dosimetry devices used were: (a) film badges for betas, gammas and neutrons. These badges are processed for Georgia Tech by R.S. Landauer, Jr. and Company. This company is accredited by the U.S. National Bureau of Standards . A copy of their accreditation is enclosed. (b) TLD's and pocket dosimeters were also used.

Integral neutron exposures are obtained from the film badges and records on all personnel are kept by the RSO.

The monitors used for frisking were Eberline E-120 with a pancake probe, Eberline PS-1 with pancake probe, Geiger

counters, and portable scalers. The Radiation Work Permit for the defueling operation is appended. Georgia Tech health physics procedures were adhered to.

I.5 The actual exposures and doses received during defueling are attached to the appended Radiation Work Permit. The total man-mrem was 15 whole body.

I.6 The contact dose rate on the surface of the fuel was 37 mrem/hr. The total dose to hands was 70 mrem. This value was obtained by the Deputy RSO from dose rate measurement and stay time during defueling. No finger dosimeters were worn.

During defueling, continuous air monitoring for gas and particulate contamination in the breathing zone was made. Any releases would have been detected immediately.

I.7 The radiation exposure was minimal (less than 1 mrem/hr. actual data). In the opinion of the RSO the whole procedure was in accordance with ALARA.

I.8 All had lab coats, gloves and masks.

I.9 Air samples were counted on location. Background was low; no shielded counting room was deemed necessary. As mentioned earlier, the air sampling was continuous, from beginning to end.

I.10 The Cadmium rod and the Glory Hole tube were surveyed immediately after removal with Eberline instruments. The maximum exposure rate of the Cadmium rod and the Glory Hole tube was the same as background. (This reactor has not been operated since 1979.)

I.11 Our RSO has made extensive, but not yet complete, surveys. He finds that smearable contamination is less than 100 dpm/100 cm^2. His tentative conclusion is that the AGN 201 is as clean as a whistle!

I.12 0.015 man-rem (see exposure data).

II.1 In the opinion of our RSO, it is very low and <u>not</u> measurable.

II.2 The total energy generated during the lifetime of this reactor is about 68.4 watt-hours. This was done over a period of more than 15 years. Consequently, we feel that this question is not applicable to the Georgia Tech AGN 201.

II.3 All remaining components will be smear-surveyed and probed for alphas, betas and gammas. The survey will be conducted in accordance with Georgia Tech health physics procedures. The Eberline 120 pancake probe, the PSI pancake probe and a low Beta gas proportional counter will be used. These instruments have the following lower limit sensitivity, respectively; 100 dpm/100 cm^2 for betas and gammas; 30 dpm/100 cm^2 for alphas, and 50 dpm/100 cm^2 for betas and gammas.

Audits are routinely conducted by the Nuclear Safeguards Committee and by the Radiation Protection Committee.

II.4 We will comply with Regulatory Guide 1.86.

Sincerely,

R.A. Karam
Interim Director
Nuclear Research Center

RAK/jlr

Enclosures

pc: R.M. Boyd
J. Nelson Grace

Form RS-23
(11-78)

RWP Number 6177

RADIATION WORK PERMIT

GEORGIA INSTITUTE OF TECHNOLOGY

Date 12/19/84 Rev 12/20

Location AGN Chevy Engine Time 0800

Department or Group NRE operations & ORS

Description of Work or Operation Remove fuel and radioactive items from the AGN 201 reactor SHIELDING TAKE APART & TRANSFER fuel to NRE

Special Radiological Considerations and/or Instructions

1. H.P. Monitoring while work is in progress.
2. Follow dismantling & disposal plan that is attached.
3. Check all items for loose contamination before leaving Reed Over

CIRCLE OR ENTER APPROPRIATE PROTECTION EQUIPMENT OR DEVICES:

Head: Cap - Hood - Face Shield - Other Air Activity BRC.

Feet: Shoe Covers - Rubbers - Other

Hands: Canvas - Ruberized Canvas - Surgeons - Rubber - Other

Body: Coveralls - Lab Coat - Other

Dosimeters: Film Badge or Pencils - Finger Ring or - Other TLD

other as required by H.P.

EXPOSURE RATES AND TIME LIMITS: Indicate portion of body exposed, hands, feet, etc.

Rate A: < .5 mrem/hr

Rate B: 30 mrem/hr max

Rate C:

APPROVALS:

Health Physics [signature] Other

Reactor Operations R A Karam Other

PERMIT TERMINATED:

Signature	Date	Time
R.A. Karam	12/20/84	14:20

EXPOSURE DATA

LOCATION AGN 201

Name	Rate Used	MREM							Exposure MREM
J.F. Hendricks*	A	2							2
**	B	10							10
Millspaugh *	A	2							2
**	B	10							10
Davidson *	A	2							2
**	B	10							10
Simbrat *	A	2							2
**	B	10							10
Jay Poston *	A	2							2
**	B	10							10
Chester *	A	2							2
**	B	10							10
Mercer *	A	2							2
**	B	10							10
B. Boyd *	A	<1							<1
R.A. Karam *	A	<1							<1

* WHOLE BODY EXPOSURE
** HAND EXPOSURE

United States Department of Commerce
National Bureau of Standards

NVLAP

Certificate of Accreditation

R. S. LANDAUER JR. & COMPANY
Glenwood, Illinois

is recognized under the National Voluntary Laboratory Accreditation Program
for satisfactory compliance with criteria established in Title 15, Part 7a Code of Federal Regulations for:

providing specific Personnel Radiation Dosimetry Processing Services

Effective until October 1, 1986

John L. Donaldson

For the National Bureau of Standards

Chapter	GEORGIA TECH RESEARCH REACTOR	Procedure 9250
11		Approved 2/28/78
Health Physics Operations	Procedure for Making Floor Plan Radiation Surveys	Latest Rev. 2/28/78
		Page 1 of 1

I. PURPOSE

The purpose of this procedure is to describe basically how a floor plan radiation survey is to be made. Radiation surveys are required by 10 CFR 20.

II. MATERIAL REQUIRED

A. Floor Plan Map of the appropriate area

B. Appropriate radiation counting equipment (liquid scintillation for H-3 and C-14, Gas Proportional Flow Counter for alpha and beta, G. M. for beta gamma, Ionization Chambers for dose rates, etc.)

C. Smear disk, masslinn, cotton swabs, etc.

III. PROCEDURE

A. Use a floor plan map survey data sheet.

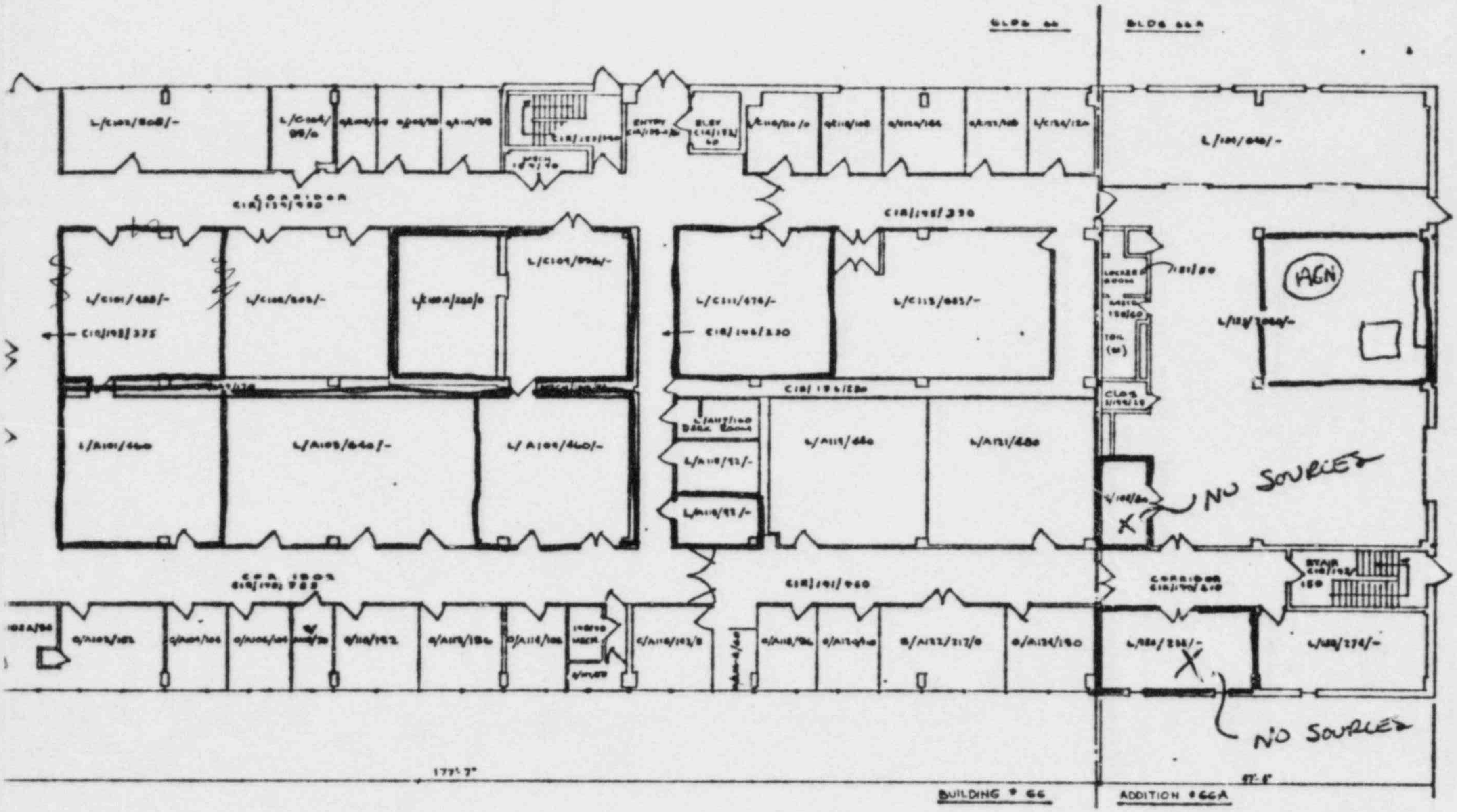
B. Number on the floor plan map the location where the wipe or smear and/or dose rate was determined.

C. Record results in d/m/100 cm^2 and mrem/hr on the survey data sheet

D. Inform the Radiological Safety Officer of the results of the survey so he can take corrective actions if necessary. Action points for contamination control are listed in the Georgia Tech Radiation Safety Manual.

E. File radiation survey for future inspections.

NOTE: SEE ATTACHED FLOOR PLANS



FIRST FLOOR

10 5 0 10 20 30 40

GRAPHIC SCALE

GEORGIA INSTITUTE OF TECHNOLOGY

bldg name RADIOISOTOPES & BIOENGINEERING

bldg no 66 & 66A

SURVEY DATA SHEET

NOTE: If no entry is made the smear results is <100 d/m/100 cm^2 and/or the dose rate is < 0.5 mrem/hr

ocation	d/m/100Cm^2	mrem/hr	Location	d/m/100Cm^2	mrem/hr
1			30		
2			31		
3			32		
4			33		
5			34		
6			35		
7			36		
8			37		
9			38		
10			39		
11			40		
12			41		
13			42		
14			43		
15			44		
16			45		
17			46		
18			47		
19			48		
20			49		
21			50		
22			51		
23			52		
24			53		
25			54		
26			55		
27			56		
28			57		
29			58		