West Virginia University
RADIATION SAFETY SERVICES

November 7, 2005

M516
Q-5

U.S. Nuclear Regulatory Commission
Region 1, DNMS - Commercial and R&D Branch
Elizabeth Ullrich, Senior Health Physicist
475 Allendale Road
King of Prussia, PA 19406-1415

Subject: Final Status Report for Decommissioning
Control Number: 137512

Re: West Virginia University Institute of Technology
NRC License No. SNM-1990, Docket 07003071

Dear Ms. Ullrich

This is in reference to your letter dated September 30, 2005 requesting for additional information concerning application for amendment to the license. Enclosed you will find supplemental information with reference to Final Status Survey for Decommissioning for West Virginia University Institute of Technology and documents verifying the disposition of U-Natural (Form-540). I appreciate your patience and assistance in this decommissioning project and related licensing issues.

Sincerely,

Nasser Razmiamfar
Director and Radiation Safety Officer

Enclosure

CC: Gerald E. Lang, WVU Provost and Vice President for Academic Affairs and Research
Charles Bayless, Campus President, WVU Institute of Technology
Scott M. Hurst, Assoc. Provost, WVU Institute of Technology

Robert C. Byrd Health Sciences Center
West Virginia University
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G-139 Health Sciences North
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Morgantown, WV 26506-9006

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137512

NMSS/RGN1 MATERIALS-002

Additional Information

1. License No. SNM-1990 was issued April 30, 1991, superceding License No. SNM-608. At the time the license was issued, it authorized 3850 kilograms of natural uranium (U-natural) in aluminum cans. Based on licensing and inspection records, 2492 kilograms of U-natural were used in a water-moderated sub-critical assembly, and 1358 kilograms of U-natural were used in a graphite-moderated sub-critical assembly. On July 15, 1991, a corrected coy of License No. SNM-1990 was issued, authorizing only the 1358 kilograms of U-natural, based on documentation that the 2492 kilograms of U-naturals were properly transferred in 1982, and you no longer possessed the water-moderated assembly. During an inspection in May 2002, the inspector was told that all the remaining U-natural had been transferred, and the August 2002 renewal application did not request any possession of U-natural. However, during a telephone conversation in February 2003 with the NRC health physicist reviewing the renewal application, the reviewer was informed that a can assembly containing approximately 150 pounds of material was found in a storage cabinet. Therefore, when the license was renewed, it authorized 250 kilograms of U-natural.

a. Confirm if all U-natural has been removed from your facility, and provided documentation demonstrating that the material was properly transferred to an authorized recipient. Confirm if reports of transfers were reported on Form 741 "Nuclear Material Transaction Report" in accordance with 10 CFR Parts 40.64 and 72.78.

b. Confirm if the aluminum cans containing the uranium were routinely leak-tested; if so, state if any of the cans were ever determined to leak.

Please see attachment in reference to the disposal. (Attachments) In addition we had been working with the original License (License # SNM-1990 Docket # 070-03071) which did not refer the material as a sealed source, and at the same time the material was in storage for a period of time.

2. The Final Status Survey for Decommissioning for West Virginia University Institute of Technology, Engineering Classroom Building, Room 105" (FSS Report) prepared by Ecology Services, Inc., and enclosed with your letter dated August 9, 2005, states that License No. SNM1990 expired May 31, 1996, in Section I.A. By the letter dated March 1, 1996 the term of the license was extended to May 31, 2001. This date was later extended to August 31, 2002 and the license was renewed as required, and currently has an expiration date of February 29, 2013. The FSS Report should be corrected.

Section I.A. of the FSS titled Site Information should read ... "Radioactive Materials License number SNM-1990 expiration date of February 29, 2013".

3. Section I.B. of the FSS Report refers to License No. 45-23035-01. Based on the FSS Report, this license is unrelated to the decommissioning of Room 105, and references to this license should be removed from the FSS Report.

This is correct. Reference to License No. 4-23035-01 is hereby omitted from section I.B. titled Site History.

4. Section I.B. of the FSS Report refers to radioactive waste that was shipped April 17, 2003, prior to the survey activities in Room 105. Confirm if the radioactive waste was stored in Room 105. If so, provide copies of the waste manifest documenting that all material stored in Classroom 105 was properly disposed of. If the waste contained material other that U-natural, provide the basis for deciding that additional surveys for the other types of radioactive material were not necessary, or provide appropriate survey information.

There was no other material contained in the waste. A copy of NRC form 540 is attached for documentation of disposal.

5. Section I.C. does not specify the actual release criterion. Based on Table 6 of Attachment 1 (also referred to as Enclosure 1), it appears that the Derived Concentration Guideline Level (DCGL) for the total residual contamination was calculated to be 250 disintegrations per minute (dpm) per 100 square-centimeters of area (100 cm^2). Confirm if this is correct.

This is correct. The 250 dpm/100 cm^2 guideline level is derived from the release criteria of 25 mrem/year.

6. Section I.D. states that the final status survey was restricted to the interior of the facility. Based on Section III.A and Attachment 2, the facility is Room 105, floor only. However, Section IV.C.2. refers to volumetric contamination although it does not appear that any surveys for surveys for volumetric contamination were performed or if any such surveys were necessary; and pate 2 of Attachment 1 states that buried structures and equipment will be treated on a case-by-case basis, although it does not appear that any surveys of such structures or equipment were performed.

a. Explain why walls of Room 105 were not included as a survey unit for static surveys. Explain why wipe surveys for removable contamination included walls as well as the floor.

The walls of Room 105 were considered a Class 2 area, since they were not likely to have concentrations of residual radioactivity that exceed the DCGLw. As such, these were scanned, and wipe samples were taken, however, no pattern for unbiased static measurements was constructed.

b. Confirm if any surveys were performed for volumetric contamination; if not, explain why not; if so, provide the criteria used and the survey data. See also item 11 below.

No surveys for volumetric contamination were made, since there was no evidence to indicate that volumetric contamination was ever an issue during the historical site assessment, and further, the licensee's survey data shows that any history of contamination on building surfaces was surficial and non-volumetric. The construction of the facility was such that there was no floor drains or evidence of significant cracks or breaches of integrity in the floors that would raise volumetric issues.

c. Confirm if any surveys of equipment (laboratory benches, refrigerators, cabinets, etcetera) or buried structures (drain lines, sewerage pipes, etcetera) were performed; if not, explain why not; if so provide the criteria used and the survey data.

There was no equipment or buried structures.

7. Section I.E.2., Table 1, states that scanning surveys and static measurements would identify fixed and removable contamination. Typically, scanning surveys and static measurements would identify only total residual contamination (the sum of fixed contamination plus removable contamination). Scanning surveys are typically less sensitive but cover large surface areas, and static measurements are very sensitive over a small area (the surface area of the detector). Confirm that scanning surveys and static measurements were used to detect total

residual activity, or explain how scanning surveys and static measurements detected fixed and removable contamination. See also item 12.b. below.

It is assumed that in Section I.E.2 Table 1, under Parameter identified, that total residual contamination is fixed and removable contamination together. We are simply stating that scanning surveys and static measurements can detect both (i.e. the sum of) fixed and removable contamination, and by no means can distinguish between the two (12.b. below)

8. Section III.D.2 states that the "MDCSCAN" for the instruments on site were less than or equal to the required MDCSCAN; however, the values were not stated. Based on Attachment 1, Section H, your required MDCSCAN is the required "Scan MDC", necessary to demonstrate that no areas or elevated contamination exceed the DCGLEMC (where EMC is Elevated Measurement Comparison). And this corresponded to a calculated value of 1812 dpm/100 cm^2. This value, for U-238 + C, included the radiation emitted from the parent radionuclide plus all progeny. However, this section does not state the actual MDCSCAN for the instruments. See also items 16 and 17 below.

a. Based on information in Attachment 1, page 3, a Ludlum Model 12 with a Ludlum 43-90 probe was used for alpha scanning, and no MDCSCAN was calculated. Please explain why the FSS Report states that the instrument MDC SCAN was less than the required MDCSCAN.

The required MDCscan, rather than being calculated as was done for MDCstatic, was instead set at 250 dpm/100cm², and then the various scanning parameters calculated (such as scanning speed) such that a detection probability of 90% or better would be achieved.

b. There is no information in Attachment 1 for a beta/gamma scanning survey instrument, and no data was provided for beta/gamma scan surveys in Attachment 3. Please note that Table 3 of Section III.D.2 lists a Ludlum Model 44-17 detector used for static surveys, not scanning surveys, although the last column of that table is titled "scanning coverage fraction". Provide the manufacturer and model of the instrument and detector used for beta/gamma scanning surveys, and the information used to determine the MDCSCAN for that instrument.

INSTRUMENT MDC_{SCAN} BETA/GAMMA EMITTERS							
INSTRUMENT MAKE/MODEL	DETECTOR	ACTIVE AREA	BACKGROUND (CPM)	MDCR (NET CPM)	RADIO-NUCLIDE	EFFICIENCY (4π)	MDCSCAN dpm/100cm^2
Ludlum Model 12	44-17	17.8	950	233	^{238}U	24.8%	**9,329**

c. Section IV.A. of the FSS Report states that no areas of elevated activity were noted during any of the scan surveys. Explain this conclusion, given that no scanning data was provided for beta/gamma measurements.

There was only one potential radionuclide identified for this survey, namely ^{238}U. The most sensitive methods for detecting this radionuclide are the alpha survey methods, which were used in this case. Although ^{238}U also emits β and γ, the MDCscan for these emissions is much higher than the α MDCscan, and is also above the required MDCscan.

9. Section IV.A. states that all wipe sample results were shown to be less than the DCGL. Although this is true, the DCGL of 250 dpm/100 cm2 is the limit for total residual contamination, of which the removable cannot exceed 10% or 25 dpm/100 cm2. The results of removable contamination surveys were provided in cpm per sample, and as "less than MDA" values (where MDA is the minimum detectable activity). MARSSIM guidance stated that results should be provided using actual numbers, not "less than" values. In addition, the MDA was also provided in dpm per sample. Provide results of removable contamination surveys in dpm/100 cm2, and describe how wipes samples were taken.

The data presented in the sample analysis reports includes the gross counts, which are the "actual numbers", along with other sample evaluation criteria, such as count time, counter efficiency, instrument background count rates, etc. MARSSIM requires that the counting data be preserved, so that subsequent analyses, such as statistical analyses, can be performed. This is the case here, since the only variable is the gross count data. The dpm is related to the gross count data by a constant, which in this case, is the same from sample to sample. The specification of "dpm" as a counting result, when they are less then the detection limit (L_D) has no reliability. Further, the presentation of results in units of "negative radioactivity" is nonsensical. Following is a portion of the first sample analysis report, showing the data presented and adding a dpm calculation column.

Sequence Number	Sample ID	Gross Counts	Ct Time (m)	CF	Decay Factor	DPM/Sample	Error at 95% C.L.	Calculation Fields: DPM Calc
1	Floors: Wipe No. 1	1	5	1	1.0	< MDA	N/A	-1
2	2	1	5	1	1.0	< MDA	N/A	-1
3	3	0	5	1	1.0	< MDA	N/A	-1
4	4	2	5	1	1.0	< MDA	N/A	0
5	5	3	5	1	1.0	< MDA	N/A	0
6	6	4	5	1	1.0	< MDA	N/A	0
7	7	3	5	1	1.0	< MDA	N/A	0
8	8	2	5	1	1.0	< MDA	N/A	0
9	9	3	5	1	1.0	< MDA	N/A	0
10	10	3	5	1	1.0	< MDA	N/A	0
11	11	1	5	1	1.0	< MDA	N/A	-1
12	12	2	5	1	1.0	< MDA	N/A	0
13	13	1	5	1	1.0	< MDA	N/A	-1
14	14	1	5	1	1.0	< MDA	N/A	-1
15	15	11	5	1	1.0	< MDA	N/A	3

This shows that the representation of this column in units of "dpm/100 cm^2" has no meaning.

The method for taking wipe samples is the following: "The amount of removable radioactive material per 100 cm^2 of surface area was determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency."

10. Section IV.C.1.b. and c. states that results of measurements were below the DCGL of the most restrictive radionuclide, U-238. If other radionuclides were used in Room 105 for which

surveys were required, describe these other radionuclides and the history of their use in the room, including the time periods of use and typical amounts handled.

There were no other radionuclides used. Reference License SNM-1990.

11. Section IV.C.2 states that there was no evidence of volumetric contamination. Section V states that "volumetric constituents did not indicate to the contrary" (that grids were properly classified). However, there was no information provided as to what "volumetric constituents" were evaluated, or how it was determined that there was no volumetric contamination. State if volumetric contamination was likely, and if so, provide information describing the types of surveys performed and the results of any samples or surveys for volumetric contamination.

Section IV.C.2 is correct. There was no evidence of volumetric contamination. Section V can be revised to read, contamination above the DCGL's, and there is no consideration for volumetric contamination,

12. Attachment 1, Section D, states that four methods will be used to determine fixed or removable contamination levels for evaluation against the DCGLs. Table 1 lists the evaluation methods.

a. The only DCGL determined for use appears to be the total residual contamination DCGLW of 250 dpm/100 cm2. Of this total, not more than 10%, or 25 dpm/100 cm2, could be in the form of removable contamination. A $DCGL_{EMC}$ of 1812 dpm/100 cm2 was also calculated. If other DCGL's were calculated, provide the radionuclides and DCGL value.

Other DCGL's were not calculated, since ^{238}U was the only potential radionuclide.

b. Scanning surveys and static measurements may be used to determine total residual contamination, but typically cannot distinguish between fixed and removable contamination. Confirm that the report will be corrected, or explain how scanning surveys and static measurements were used to detect fixed contamination and distinguish it from removable contamination.

Scanning surveys and static measurements can detect both fixed and removable contamination. We are not stating that these two methods are being used to distinguish between fixed and removable. Wipe surveys are used to distinguish removable from fixed.

13. Attachment 1, Section E, "Reference Grids", states that instrument background for fixed contamination surveys and scans would be collected in surrounding hallways of similar construction, with no history of radioactive materials use. However, no background data was provided for the static measurements performed with the Ludlum 43-1 probe, listed on Attachments 2. In addition, no comparison of this data to the DCGLW was provided.

No background data was collected for the 43-1 detector, other than the regular background determination (by averaging 3 measurements) of 3 cpm. Although this would preclude the analysis of the static data through the use of the WRS test, the data shows that all readings were less than the DCGL, which makes the WRS test moot.

14. Attachment 1, Section, "Meter Scan Requirements", states that 100% of surface was scanned with a Ludlum 43-90 alpha detector. It also states that a Ludlum Model 12 with a 43-1 detector was used for static alpha measurements.

a. Confirm that 100% of the floor surfaces were scanned. State if any walls, lab bench tops, or other surfaces were, or were not, scanned. If surfaces other than the floors were

not scanned, explain why. If other surfaces were scanned, provide the results of those scanning surveys.

100% of the floor surfaces were scanned with the 43-90 detector. In addition, the lower portion of the walls were scanned to a height of approx. 1 meter. This data was included in the scan data shown in Attachment 3.

b. Explain how the efficiencies shown in Table 3 were determined. Specify the type of calibration standard used, and show the calculation of each efficiency.

$$Efficiency = \varepsilon_i \times \varepsilon_s$$

The efficiencies shown in Table 3 were calculated as follows:

Where ε_i = the net count rate / the 2π emission rate and ε_s = No. of emissions from surface / total emissions released from source

The intrinsic efficiency for the 43-90 detector was found to be .40 (2π) for ^{239}Pu (using a 2π calibration standard) and the surface efficiency was estimated to be .29 (scabbled concrete with ZnS detectors for Th-230). (ISO 7503 and NUREG 1507, Table 5.4)

c. Explain how the efficiency shown in Table 10 for the Ludlum 43-1 detector was determined. Explain why Table 10 shows a background of 2 cpm, although the Attachment 2 states a background of 3 cpm for the same detector. Provide re-calculated MDCSTATIC if necessary, and provide corrected count results if necessary. See also Item 17 below...

The efficiency shown in Table 10 was determined in the same way as the efficiency shown in Table 3. (See b. above) Table 10 shows a background of 2 cpm because it represents the background taken during a characterization survey which was used for the FSS planning and design. The background of 3 cpm was taken during the final survey and turned out to be 1 cpm higher, after averaging and rounding.

15. Attachment 1, Section G, shows the calculation for the number of samples required. The results of the calculation of the number of samples is incorrect when using the values provided in Table 6. If the DCGL is 250, and the lower bound for the gray region (LBGR) is 125, then the (shift) is (250-125) = 125. The If the standard deviation, is 3 dpm, then the relative shift, /, is 125/3 or 42. Table 6 shows the relative shift as 125. Please provide a corrected table, and show the calculation of the number of samples required.

An error was made in the table. The corrected data is shown below. Note that a relative shift of 4.0 or more results in the same number of samples. Therefore, the number of samples remains the same.

TABLE 6 – DETERMINATION OF REQUIRED SAMPLE POPULATION

	Parameter								
Radio-nuclide	DCGL for 25 mrem (dpm/100 cm^2)	LBGR (dpm)	σ_s (dpm)	Δ/σ_s	P_r	$Z_{1-\alpha}$	$Z_{1-\beta}$	N	N+20 %
^{238}U+C	250	125	3	41.6	1.000	1.645	1.645	14.4	18
Source	Calculated (DandD v2.1.0)	Estimated (½ DCGL)	Estimated (Characterization Data)	Calculated	Table 5.1, MARSSIM	Table 5.2, MARSSIM	Table 5.2, MARSSIM	Calculated	Calculated

16. Attachment1, Section I., "Calculation of Instrument MDCscan", describes the probability of detecting a count using an alpha detector, rather than a true MDCscan.

a. Using the data provided in Table 8 and the formula provided, the Probability "P" is calculated to be 0.40, not 0.959 as shown in Table 8. Explain why results of the calculation are different than shown in the table. The probability of 0.40 would not be an acceptable sensitivity.

There was an error in the spreadsheet used to calculate this table. A corrected Table 8 is shown below:

Table 8 – Alpha MDC_{SCAN} Probability				
G	E	d	v	P(n≥1)
250	0.12	7	1.5	0.903

b. The following items refer to the calculation of the time required to confirm a contamination during scanning surveys.

I. If the contamination activity of 128 dpm/probe area is equivalent to the DCGL of 250 dpm/100cm2, as stated, then the calculated probe area is then 51 cm2. However, a probe area of 100 cm2 is used in Table 9 to calculate the time needed for a static count to determine if a positive result is detected, instead of the actual probe area of 51 cm2 as required in the MARSSIM calculation. Explain why this was done, or supply the corrected information.

Following is a corrected table 9, showing the wait time required to confirm a positive reading.

Table 9 – Alpha MDC_{SCAN} Static Count Time			
C	A	E	t
250	100	0.12	4.76

II. Explain why a 2-pi efficiency was used, although the original equation from MARSSIM recommends using the 4-pi efficiency.

A 4π efficiency was used. See I. above.

III. Using the values shown in table 9, the resulting time is 2.3 seconds, not 4.49 seconds as stated. Explain why the results of the calculation are different than shown on the table.

See I. above. t = 4.76

c. Item I.b. states that all instruments selected for scanning meet or exceed the required sensitivity. However, the information in this section only refers to alpha scanning, and section III of the FSS Report states that gamma surveys were also done. Provide the scanning sensitivity for the gamma instruments, if these were used as a basis to demonstrate that the facility meets the NRC license termination screening levels.

Gamma scans were used on a judgmental basis to determine if unanticipated radionuclides or contamination existed. No evidence of these was found. They were not used directly to demonstrate that the NRC license termination screening levels were achieved.

17. Attachment 1, Section J., "Calculation of Instrument MDCstatic", provides the calculations used to demonstrate that instruments used for static surveys were sufficiently

sensitive. In Table 10, it states that the background of the Ludlum 12 with 43-1 detector was 2 cpm; however, in the attachment, "Radiation Safety Survey" of Room 105, it states that the background for the Ludlum 12 with the 43-1 detector was 3.0 cpm; and the background for the Ludlum 5 was 15 microR per hour.

a. Provide correct information for the alpha static survey sensitivity.

See Item 14c. Changing the background from 2 to 3 would increase the L_D to 23 and the MDCstatic to 230 dpm/100 cm^2.

b. Specify the calculations and the instrument efficiency that was used to determine the results of the static measurements in the "Radiation Safety Survey"; using the efficiency of 0.12 stated in Table 10, we cannot replicate the results.

A corrected report is attached. All results remain less than the DCGL. Attachment 2

18. The attachment "WRS Test" states that the "scan data was taken with 43-90 (open probe area: 100 cm2)". However, the WRS test should be performed with static data, not scan data. Provide a correct WRS test.

All of the static data show results that are less than the DCGL, therefore, the sample population mean must be less than the DCGL, and the WRS test is not required.

Form 540 This form contains all of the information required in the NRC form 540 (3/95)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST
SHIPPING PAPER

5. Shipper - Name and Facility
Ecology Services, Inc. for:
West Virginia University Institute of Technology
406 Fayette Pike
Montgomery WV 25136

Shipper I.D. Number: N/A
☐ Collector
☐ Processor

7. NRC Form 540 and 540A Page 1 of 1 Page(s)
NRC Form 541 and 541A 2 Page(s)
NRC Form 542 and 542A Page(s)
Additional Information Page(s)

8. Manifest Number (Use the number on all continuation pages)
20415-05

gency Telephone Number (Include Area Code)
(410) 377-3742

User Permit Number

Shipment Number: 20415

☒ Generator type (exactly): Other

9. Consignee - Name and Facility Address
RACE, LLC
2550 Channel Ave
Memphis, TN 38113

Contact Jimmy Harris
Telephone Number (901) 775-0690

nization: ECOLOGY SERVICES, INC.

Contact Bob Burdette
Telephone Number (excl. Area Code) (304) 442-3063

Signature - Authorized consignee acknowledging waste receipt

Date

this an "Exclusive Use" shipment?
☒ YES
☐ NO

3. Total number of packages identified on this manifest ==> 8

Carrier - Name and Address
Tri-State Motor Transit Co.
PO Box 113
Joplin, MO 64802

EPA ID Number: MOD 095 038 998
Shipping Date: 4/17/02

10. Certification
This is to certify that the above-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. This also certifies that the materials are classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 20 and 61, or equivalent state regulations.

es EPA regulated waste
ring a manifest accompany ☐ NO
hipment?
e" provide manifest number ==========>

EPA Manifest Number: N/A

Contact Cessie Gradner
Telephone Number (include Area Code) 800-234-8768

Signature - Authorized carrier acknowledging waste receipt: James D. Mullen
Date: 4/17/02

Authorized Signature: Ray Johnson
Title: Chair Physics Dept
Date: 4/17/02

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL "RADIOACTIVE"	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES			16. TOTAL PACKAGE ACTIVITY IN SI UNITS	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (use appropriate unit)	19. IDENTIFICATION NUMBER OF PACKAGE
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-01
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-~~01~~ 02 BGL
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-~~01~~ 03 BGL
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-~~01~~ 04 BGL
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-~~01~~ 05 BGL
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-~~01~~ 06 BGL
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-~~01~~ 07 BGL
ioactive Material, LSA, N.O.S., 7, UN 2912	~~N/A~~ Y-II BGL	~~N/A~~ 0.1 BGL	Uranium metal articles		U-nat		2779.544 MBq	LSA I	182.0 kgs	WVUT20417-~~01~~ 08 BGL

Consignee Use Only

(596)

UNIFORM LOW-LEVEL RADIOACTIVE WASTE MANIFEST SHIPPING PAPER

1. Shipper's Name and Facility
Ecology Services, Inc. for:
West Virginia University Institute of Technology
405 Fayette Pike
Montgomery, WV 26136

Shipper I.D. Number
IVA
☐ Collector
☐ Processor
☒ Generator type (specify)
(Other)

NRC Form 541 and 541A
NRC Form 542 and 542A
Additional Information

Page 1 of
1 Page(s)
Page(s)
Page(s)

4. Manifest Number
(Use this number on all continuation pages)
30414-17

Emergency Telephone Number (with Area Code)
(410) 377-3742

User Permit Number
IVA

Shipment Number
30414

Telephone Number
(with Area Code)
(304) 442-3063

Contact Mr. Bob Burdette

Contact Jo Ann Byrd
Telephone Number
(901) 775 0890
Date
4/17/03

Organization
ECOLOGY SERVICES, INC.

2. Is this an "Exclusive Use" shipment?
☒ YES
☒ NO

3. Total number of packages identified on this manifest
1

Carrier - Name and Address
Tri-State Motor Transit
PO Box 113
Joplin, MO 64802

EPA ID Number
[redacted]

Shipping Date
04/17/2003

Telephone Number
(with Area Code)
800-734-8758

Contact Cassie Gaucher
800-734-8758

Signature - Acknowledging receipt of waste

Date
04/17/03

9. Consignee - Name and Facility Address
Race, LLC
2660 Channel Avenue
Memphis, TN 38113

Signature - Acknowledging receipt of waste

10. Certification

This is to certify that the above-named materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. The date set for the transportation as classified, packaged, marked, and labeled and are in proper condition for transportation and disposal as described in accordance with the requirements of 10 CFR Parts 71 and 61, or equivalent state regulations

Authorized Signature

Title
Physics Dept Chair

Date
4/17/03

4. Does EPA regulated waste requiring a manifest accompany this shipment?
If "yes" provide manifest number
☐ YES
☒ NO

EPA Manifest Number
N/A

11. U.S. DEPARTMENT OF TRANSPORTATION DESCRIPTION (including proper shipping name, hazard class, UN ID number, and any additional information)	12. DOT LABEL RADIOACTIVE	13. TRANSPORT INDEX	14. PHYSICAL AND CHEMICAL FORM	15. INDIVIDUAL RADIONUCLIDES			16. TOTAL PACKAGE ACTIVITY UNITS	17. LSA/SCO CLASS	18. TOTAL WEIGHT OR VOLUME (use appropriate units)	19. IDENTIFICATION NUMBER OF PACKAGE
Radioactive Material, LSA, N.O.S., 7, UN 2912	N/A	N/A 0.1	Solid; Uranium metal articles	U-nat			1853.04 MBq 50.082 uCi	LSA II	75.0 kg (lot (lbs)	WVUT30417-01

For Consignee Use Only

RE Form 540, Vs 8 (696)

ECOLOGY SERVICES, INC.
10220 OLD COLUMBIA RD.
COLUMBIA, MD 21046
1-800-932-7299
1-410-381-2600
1-410-381-2602 FAX

RADIATION SAFETY SURVEY

COMPANY NAME: **WVU Institute of Technology**

BUILDING: **Engineering Classroom Building**

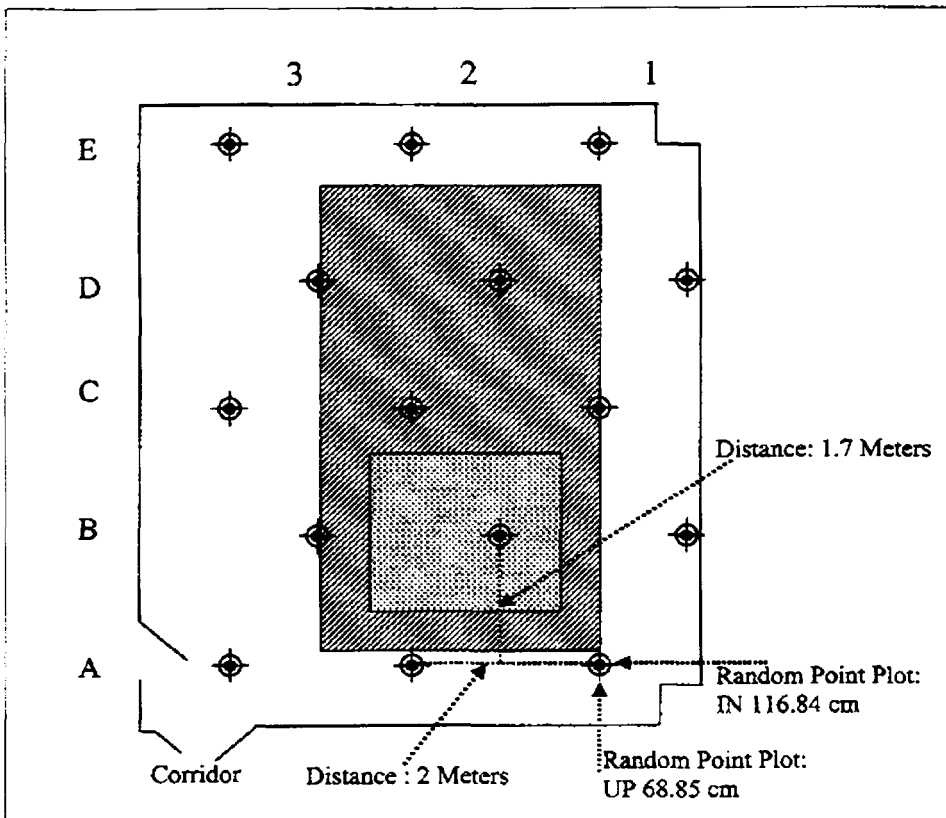
RADIATION SAFETY OFFICER: **MR. STEVE ROOT**

ROOM NO.: **105**

SURVEYOR: HOWETT,GOSNELL

SURVEY DATE: **5/20/05**

AREA DIAGRAM:



INSTRUMENT
MODEL; SN; CALIBRATION DATE; BACKGROUND READING.

Ludlum-12 w/ 43-1; SN: 94204; background = 3 cpm

Ludlum-5; 118176; background = 15 µR/hr

SAMPLE ID	ACTION/WIPE SEQUENCE
Floor Wipes:	**1-15**
Wall I	**16-33**
Wall II	**34-49**
Wall III	**50-68**
Wall IV	**69-82**

STATIC MEASUREMENTS WITH 43-1 PROBE:

GRID AREA	GCPM	DPM/100CM^2
(A,1)	3	≤MDA
(A,2)	1	≤MDA
(A,3)	4	10.39
(B,1)	0	≤MDA
(B,2)	4	10.39
(B,3)	6	31.16
(C,1)	3	≤MDA
(C,2)	18	155.8
(C,3)	2	≤MDA
(D,1)	3	≤MDA
(D,2)	0	≤MDA
(D,3)	10	72.7
(E,1)	2	≤MDA
(E,2)	1	≤MDA
(E,3)	7	41.55

SUMMARY OF RESULTS:
All wipe sample results were less than the instrument L_D except as noted below. (The instrument L_D is less than 2200 dpm /100 cm^2)

Wipe location/ #	dpm/ 100 cm^2

COMMENTS: TOTAL AREA COVERS 46.8 SQUARE METERS.

Raised surf

Concrete

Original data is available for review upon request at ESI, Columbia, MD. 800-932-7299.