

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 31, 32, 33, 34, 35, 36, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below: to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s); and to import such byproduct and source material. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee		
1. Battelle Columbus Laboratories		3. License number SNM-7 as renewed
2. 505 King Avenue Columbus, Ohio 43201		4. Expiration date April 30, 1988
		5. Docket or Reference No. 70-8
6. Byproduct, source, and/or special nuclear material <u>Special Nuclear Material</u>	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
<u>West Jefferson Site</u>		
A. Uranium enriched in the U-235 isotope --irradiated	A. Any	A. 125 kilograms of contained U-235 plus the associated and unseparated plutonium
B. Uranium enriched in the U-235 isotope --unirradiated	B. Any	B. 1900 grams of contained U-235
C. Plutonium (Pu-238 principal isotope)	C. Sealed source	C. 13 grams
D. Plutonium (Pu-239 principal isotope)	D. Oxide	D. 17 grams
<u>King Avenue Laboratories</u>		
E. Uranium enriched in the U-235 isotope --unirradiated	E. Any	E. 500 grams of contained U-235

For the U.S. Nuclear Regulatory Commission

Date April 29, 1983

By *Richard C. House*
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

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Source Material

West Jefferson and King Avenue Sites

F. Uranium (natural and depleted) and thorium F. Any F. 500 kilograms

(Note: Licensee is also authorized to possess any source material that may be contained in the irradiated uranium of Item A above.)

Byproduct Material

West Jefferson Site

G. Any byproduct material	G. Irradiated fuel material, activated reactor materials and components	G. 22,000,000 Ci total, not more than 100,000 Ci of any one radioisotope (excluding Items H through Q below)
H. Hydrogen-3	H. Any	H. 500 Ci
I. Polonium-210	I. Any	I. 500 Ci
J. Californium-252	J. Any	J. 500 Ci
K. Sulfur-35	K. Gas	K. 15,000 Ci
L. Chlorine-36	L. Gas	L. 15,000 Ci
M. Iodine-131	M. Any	M. 1000 Ci
N. Iodine-129	N. Any	N. 60 Ci
O. Cobalt-60	O. Any	O. 315,000 Ci
P. Cesium-137	P. Any	P. 250,000 Ci
Q. Strontium-90	Q. Any	Q. 250,000 Ci

For the U.S. Nuclear Regulatory Commission

Date April 29, 1983

By LeLand C. House
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

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King Avenue Laboratories

- R. Any byproduct material R. Any R. 500 Ci total, not more than 35 Ci of any one radioisotope

9. Authorized Use:

For use in accordance with statements, representations and conditions contained in the following portions of the licensee's application for renewal (BCL Document 1081) submitted by letter dated October 23, 1981, except as may be modified by the conditions of this license:

- a. Pages vi through xi, Introduction
- b. Part I, License Conditions
- c. Appendix A, Radiological Safety Committee Charter

The effective pages of these portions of the application shall be those identified in Annex A that is attached to this license.

10. Authorized Places of Use:

The licensee's West Jefferson Site and King Avenue Laboratories located as described in pages vii through xi and pages 2.1 through 2.5, Part II, of the licensee's application for renewal submitted by letter dated October 23, 1981.

11. The licensee shall comply with the provisions of Annex B (attached), "License Condition for Leak Testing Sealed Byproduct Material Sources," for byproduct sealed sources in its possession. These leak test procedures shall also be used for the Pu-238 sealed source (Item 6.C above) at such time as it is removed from its storage package in the JN-2 Vault for use or transfer.
12. Notwithstanding Table III and Table IV presented in Part I, Sections 3.4 and 3.5, for the release of materials, equipment and facilities for unrestricted use the licensee shall adhere to the provisions of Annex C attached to this license, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use" dated July 1982.
13. Item 9 above incorporates Appendix A (Radiological Safety Committee Charter) of the licensee's renewal application (BCL-1081) as a condition of the license to clarify and define more fully administrative procedures for review, approval and audit of activities covered by the license, as described in Section 1.3 and Section 2.0 of Part I. The licensee may make revisions to the provisions of Appendix A, based upon written evaluation of the changes,

For the U.S. Nuclear Regulatory Commission

Date April 29, 1983

By

Leland C. Rouse
Division of Fuel Cycle and
Material Safety

Washington, D.C. 20555

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13. continued

without NRC approval if it is determined that such changes will not decrease the effectiveness of the Committee in carrying out its functions. Revisions to the Charter and supporting evaluations shall be submitted to the Director, Division of Fuel Cycle and Material Safety, NRC, with a copy to the Administrator, Region III Office, NRC, within 60 days following such changes.

14. In addition to the subjects identified in Section 5.1.1, Appendix A, the annual review and appraisal of facilities shall include an assessment of occupational radiation exposures and releases of radioactive material over the past year with regard to maintaining such exposures and releases as low as is reasonably achievable, as stated in Section 20.1(c), 10 CFR Part 20.

15. Part I, Section 2.1 of the licensee's application specifies when mandatory criticality reviews for new operations are required by the Nuclear Safety Subcommittee. The reviews by the Nuclear Safety Subcommittee shall include (1) an initial analysis by an individual qualified in accordance with provisions of Section 1.2.2 and Section 2.2, Part I; (2) an independent review by a second qualified individual to determine that the methods used in the analysis are appropriate and that the results are correct; and (3) as appropriate, physical inspection by the individual performing the original analysis to assure that the physical environment and parameters assumed in the analysis are valid.

16. Part I, Section 2.4 of the application for renewal provides for use of KENO as an acceptable criticality analysis method. Prior to use of this analytical method for nuclear safety evaluations under this renewed license, the licensee shall submit a demonstration (as an addition to Part II or a new Appendix) of its use to NRC for approval.

17. Notwithstanding the formula in Section 4.3.1(1)(c) of the Radiation Safety Committee Charter (Appendix A of the application for renewal), the licensee shall use the formula:

$$\frac{\text{Grams U-235}}{L_{235}} + \frac{\text{Grams Pu}}{220 \text{ grams}} \leq 1$$

where L_{235} is the mass limit from Table 1, Appendix A of the application, for the appropriate U-235 enrichment,

18. The licensee is hereby exempted from the provisions of Section 70.24, 10 CFR Part 70, insofar as this section applies to special nuclear material authorized under this license for possession and use at the licensee's King Avenue Laboratories. *(No criticality alarms at King Ave. are required as we are under 700 gms. of U-235) HZ*

For the U.S. Nuclear Regulatory Commission

Date April 29, 1983

By Roland C. Rowal
Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

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19. The licensee shall provide three copies each year of its annual environmental report to the Director, Division of Fuel Cycle and Material Safety, NRC, and a copy to the Administrator, Region III Office, NRC.
20. Sections 2.1 and 3.10, Part I refer to provisions for training and periodic retraining of employees, as appropriate and related to employee work assignments with radioactive and fissionable materials. Such training shall be conducted, as appropriate, for new employees and prior to initiating new operations approved by the Radiological Safety Committee and retraining shall be conducted on topics appropriate to employee work assignments at least annually. Documentation of such training and retraining shall be maintained.
21. Section 4.0, Part I of the licensee's renewal application incorporates the text of previous amendments issued by the NRC to Special Nuclear Material License No. SNM-7 and Byproduct Material License No. 34-6854-5. For clarification, the licensee's authority to permit increases in the radioactivity in the Hot Cell Laboratory pool water to levels above the limits for routine operations, as specified in Section 4.0 is hereby affirmed, subject to the following provisions:
 - a. The period that non-routine levels of radioactivity exist in the pool shall not exceed 45 days before they are reduced to routine levels or below;
 - b. Work requests, as approved by the Laboratory Operations Manager and the resident Health-Physicist, shall be utilized during the non-routine operations to assure that personnel are aware of the specific radiological safety considerations for the operation;
 - c. The pool lid cover shall be in place during down time and after hours;
 - d. Radiation monitoring will be performed at least twice weekly around the perimeter of the pool and radiation levels with the cover in place and the cover removed will be posted;
 - e. Pool water samples will be collected and analyzed at least weekly; and
 - f. The resin bags of ion columns will be replaced when readings of 300 mR/hour at one foot are reached.

The above provisions, extracted from the licensee's letter to the NRC of October 31, 1980, eliminate the need for reference in this license to this letter, which requested the non-routine operational levels to accommodate such activities as pool cleaning and maintenance, examination and maintenance of storage racks, and the handling of additional fuel assemblies.

For the U.S. Nuclear Regulatory Commission

Date April 29, 1983

By *Richard C. House*
 Division of Fuel Cycle and
 Material Safety
 Washington, D.C. 20555

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- 22. The licensee shall implement, maintain, and execute the response measures of his Radiological Contingency Plan submitted to the Commission on March 5, 1982. The licensee shall also maintain implementing procedures for his Radiological Contingency Plan as necessary to implement the Plan. This Radiological Contingency Plan and associated implementing procedures incorporate the emergency planning requirements of 10-CFR 70.22(i) as they refer to onsite planning and notification procedures. The licensee shall make no change in his Radiological Contingency Plan that would decrease the response effectiveness of the Plan without prior Commission approval as evidenced by a license amendment. The licensee may make changes to his Radiological Contingency Plan without prior Commission approval if the changes do not decrease the response effectiveness of the Plan. The licensee shall maintain records of changes that are made to the Plan without prior approval for a period of two years from the date of the change and shall furnish the Chief, Advanced Fuel and Spent Fuel Licensing Branch, Division of Fuel Cycle and Material Safety, NMSS, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and the Region III NRC Regional Office at the address specified in Appendix D of 10 CFR Part 20, a report containing a description of each change within six months after the changes is made.
- 23. Section 5.0, Part I, of the licensee's renewal application incorporates the text of previous amendments issued by NRC to Special Nuclear Material License No. SNM-7 and Byproduct Material License No. 34-6854-5 covering decontamination and decommissioning plans applicable to the Battelle Hot Cell Laboratory. It is hereby affirmed that the provisions of these decontamination and decommissioning plans, including financial arrangements, continue in effect under this renewed license.
- 24. At such time that facilities covered by this license are decontaminated for proposed unrestricted release (in accordance with Annex C), the licensee shall submit a report that identifies the facilities where radioactive materials were used and stored, or disposed on the site. The report shall briefly describe operations conducted and radioactive materials used in the facilities and shall assess the results of the decontamination activities. The report shall provide the basis for unrestricted release of the facilities and the site, including a description of sampling and survey methods and instrumentation used, and shall include final contamination survey data for the facilities and grounds. The licensee may segment the report to obtain release of certain areas of facilities or individual structures if it is demonstrated that ongoing activities in other areas will not lead to recontamination of the area or structure proposed for release.
- 25. The licensee is authorized to backfill the retired filter bed area on the West Jefferson site where contaminated soil was removed as described in the licensee's letter of May 13, 1981. The homogenized bed containing low levels of residual contamination shall be covered with approximately three feet of soil as stated in the letter of May 13, 1981.

For the U.S. Nuclear Regulatory Commission

Date April 29, 1983

By

Leland C. House

Division of Fuel Cycle and
Material Safety
Washington, D.C. 20555

ANNEX A
 LIST OF EFFECTIVE PAGES
 BATTELLE COLUMBUS LABORATORIES APPLICATION
 AS REFERENCED BY ITEM 9
 OF
 LICENSE NO. SNM-7, DOCKET NO. 70-8

<u>Page No.</u>	<u>Date</u>	<u>Page No.</u>	<u>Date</u>
Introduction			
vi	10/05/81	1.26	10/05/81*
vii	10/05/81	1.27	10/05/81
viii	10/05/81	1.28	10/05/81
ix	10/05/81	1.29	10/05/81
x	10/05/81	1.30	10/05/81
xi	10/05/81	1.31	10/05/81
Part I License		1.32	10/05/81
Conditions		1.33	10/05/81
		1.34	10/05/81
		1.35	10/05/81
1.1	10/05/81		
1.2	10/05/81		
1.3	10/05/81		
1.4	10/05/81		
1.5	10/05/81		
1.6	10/05/81		
1.7	10/05/81		
1.8	10/05/81		
1.9	10/05/81		
1.10	10/05/81		
1.11	10/05/81		
1.12	10/05/81		
1.13	10/05/81		
1.14	10/05/81		
1.15	10/05/81		
1.16	10/05/81		
1.17	10/05/81		
1.18	10/05/81		
1.19	10/05/81		
1.20	10/05/81		
1.21	10/05/81		
1.22	10/05/81		
1.23	10/05/81		
1.24	10/05/81		
1.25	10/05/81		

Part II, Appendix A, as submitted with renewal application by letter dated 10/23/81.

Dated April 29, 1983

*Replacement Page Dated AUG 16 1983
 (Reference to page 1.26 inadvertently omitted from Annex A issued April 29, 1983.)

Annex B

LICENSE CONDITION FOR

LEAK TESTING SEALED BYPRODUCT MATERIAL SOURCES

- A. Each source shall be tested for leakage at intervals not to exceed six (6) months. In the absence of a certificate from a transferor indicating that a test has been made within six (6) months prior to the transfer, the sealed source shall not be put into use until tested.
- B. The test shall be capable of detecting the presence of 0.005 microcurie of contamination on the test sample. The test sample shall be taken from the source or from appropriate accessible surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.
- C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired by a person appropriately licensed to make such repairs or to be disposed of in accordance with the Commission regulations. Within five (5) days after determining that any source has leaked, the licensee shall file a report with the Director, Division of Fuel Cycle and Material Safety, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, describing the source, the test results, the extent of contamination, the apparent or suspected cause of source failure, and the corrective action taken. A copy of the report shall be sent to the Director of the nearest NRC Inspection and Enforcement Office listed in Appendix D of Title 10, Code of Federal Regulations, Part 20.
- D. The periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six (6) months prior to the date of use or transfer.

ANNEX C

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT
PRIOR TO RELEASE FOR UNRESTRICTED USE
OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE,
OR SPECIAL NUCLEAR MATERIAL

U. S. Nuclear Regulatory Commission
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

July 1982

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.
2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.
3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.
4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:
 - a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.
 - b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:
 - a. Identify the premises.
 - b. Show that reasonable effort has been made to eliminate residual contamination.
 - c. Describe the scope of the survey and general procedures followed.
 - d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE 1
ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES ^a	AVERAGE ^{b c f}	MAXIMUM ^{b d f}
U-nat, U-235, U-238, and associated decay products	5,000 dpm α /100 cm ²	15,000 dpm α /100 cm ²
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm ²	300 dpm/100 cm ²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm ²	3000 dpm/100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm $\beta\gamma$ /100 cm ²	15,000 dpm $\beta\gamma$ /100 cm ²

^aWhere surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for nuclides should apply independently.

^bAs used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated.

^cMeasurements of average contaminant should not be averaged over more than 1 square meter. For objects of less area, measurements should be derived for each such object.

^dThe maximum contamination level applies to an area of not more than 100 cm².

^eThe amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with a known efficiency. When removable contamination on objects of less surface area is determined, the pertinent limits should be applied proportionally and the entire surface should be wiped.

^fThe average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters are 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter total absorber.