

MATERIALS LICENSE

rsuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, le of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 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). 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		OCT 05 1993	
1. Battelle Columbus Division		3. License number	SNM-7 Amendment 4
2. 505 King Avenue Columbus, Ohio 43201-2693		4. Expiration date	April 30, 1988 (on timely renewal)
		5. Docket or Reference No.	70-08

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
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Special Nuclear Material

West Jefferson Site

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|--|------------------|---|
| A. Uranium enriched in the U-235 isotope -- irradiated | A. Any | A. 100 grams of contained U-235 plus the associated and unseparated plutonium |
| B. Uranium enriched in the U-235 isotope -- unirradiated | B. Any | B. 50 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 |
| E. Plutonium (Pu-238 principal isotope) | E. PuBe Source | E. 0.053 grams |
| F. Plutonium (Pu-239 principal isotope) | F. PuBe Source | F. 80.7 grams |

King Avenue Site

- | | | |
|---|--------|--------------------------------|
| G. Uranium enriched in the U-235 isotope --unirradiated | G. Any | G. 50 grams of contained U-235 |
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Source Material

West Jefferson and King Avenue Sites

H. Uranium (natural and depleted) and thorium	H. Any	H. 300 kilograms
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Byproduct Material

West Jefferson Site

I. Any byproduct material	I. Irradiated fuel material, activated reactor materials and components	I. 10,000 Ci total, not more than 1000 Ci of any one radioisotope (excluding Items J through S below)
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J. Hydrogen-3	J. Any	J. 500 Ci
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K. Polonium-210	K. Any	K. 500 Ci
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L. Californium-252	L. Any	L. 500 Ci
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M. Sulfur-35	M. Gas	M. 1000 Ci
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N. Chlorine-36	N. Gas	N. 1000 Ci
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O. Iodine-131	O. Any	O. 1000 Ci
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P. Iodine-129	P. Any	P. 60 Ci
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Q. Cobalt-60	Q. Any	Q. 5000 Ci
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R. Cesium-137	R. Any	R. 5000 Ci
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S. Strontium-90	S. Any	S. 5000 Ci
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T. Carbon-14	T. Any	T. 3 Ci
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King Avenue Site

U. Any byproduct material	U. Any	U. 500 Ci total, not more than 35 Ci of any one radioisotope
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V. Iridium-192	V. Sealed source	V. 150 Ci
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(Note: Licensee is also authorized to possess any source material that may be contained in the irradiated uranium of Item A above.)

9. 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.

10. Authorized use:

a. 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:

1. Pages vi through xi, Introduction
2. Part I, License Conditions
3. Appendix A, Radiological Safety Committee Charter

b. Conduct controlled field studies using up to a maximum of 3 curies of carbon-14 labelled compounds at the licensee's West Jefferson, Ohio site.

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

c. The principal use for items A and B under Conditions 6, 7, and 8 are as residual contamination in the Hot Cells of the West Jefferson Facility Building JN-1.

d. The principal uses for item H under Conditions 6, 7, and 8 are use as residual contamination at BMI's King Avenue and West Jefferson facilities, and as sealed source shielding.

e. Items E and F under Conditions 6, 7, and 8 have been transferred to the license from DOE inventory to be used for calibration.

11. Sealed byproduct material sources shall be subject to the leak testing and actions specified in the attached procedure titled "License Condition for Leak Testing Sealed Byproduct Material Sources," dated April 1993. Sealed plutonium sources shall be subject to the leak testing and actions specified in the attached procedure titled "License Condition for Leak Testing Sealed Plutonium Sources," dated April 1993.

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 the attached "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use

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of Termination of Licenses for Byproduct Source, or Special Nuclear Material," dated April 1993.

13. Item 10 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 revision to the provisions of Appendix A, based upon written evaluation of the changes, 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 Safety and Safeguards, 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. The licensee shall provide three copies each year of its annual environmental report to the Director, Division of Fuel Cycle Safety and Safeguards, NRC, and a copy to the Administrator, Region III Office, NRC.
16. 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.
17. 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 operations;

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- 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 300mR/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.

- 18. 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 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 license 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, Fuel Cycle Safety Branch, Division of Fuel Cycle Safety and Safeguards, 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 change is made.
- 19. 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 Materials License No. 34-6854-5 covering decontamination and decommissioning plans applicable to the Battelle Hot Cell Laboratory. It is hereby affirmed that the provisions to these decontamination and decommissioning plans, including financial arrangements, continue in effect under this renewed license, and also apply to the retired Battelle Research Reactor.
- 20. 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

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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.

- 21. 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.
- 22. The licensee shall perform quarterly surveys, not to exceed 4 months, for radiation, contamination and integrity of physical barriers at the retired Battelle Research Reactor. Records of such surveys shall be maintained by the licensee.
- 23. The licensee shall conduct controlled field studies using carbon-14 labelled compounds in accordance with the statements and representations contained in the licensee's application for amendment submitted by letter dated August 5, 1988.
- 24. Notwithstanding the possession limits stated in Conditions 6, 7, and 8, the licensee is authorized to possess and use, at its King Avenue site, up to 50 milligrams of SNM contained in irradiated spent fuel, provided such use is limited to the activities defined in the enclosure to the licensee's letter dated September 7, 1993, (from Gregory Fess to NRC's Chief, Licensing Branch, Division of Fuel Cycle Safety and Safeguards).

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: 10/5/93

By *R. C. Pierson*
 Robert C. Pierson
 Division of Fuel Cycle Safety
 and Safeguards
 Washington, DC 20555

Enclosures:

- 1. Annex A
- 2. LC for Leak Testing Sealed Byproduct Material Sources, dtd 4/93
- 3. LC for Leak Testing Sealed Plutonium Sources, dtd 4.93
- 4. Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproduct, or Special Nuclear Material, dtd 4/93

ANNEX A
 LIST OF EFFECTIVE PAGES
 BATTELLE COLUMBUS LABORATORIES APPLICATION
 AS REFERENCED BY CONDITION 10
 OF
 LICENSE SNM-7, DOCKET 70-08

<u>Page No.</u>	<u>Date</u>	<u>Page No.</u>	<u>Date</u>
Introduction			
vi	08/15/83	1.26	10/05/81
vii	03/06/87	1.27	10/05/81
viii	12/30/88	1.28	10/05/81
ix	12/30/88	1.29	10/05/81
x	12/30/88	1.30	10/05/81
xi	10/05/81	1.31	10/05/81
		1.32	09/15/84
		1.33	09/15/84
		1.34	09/15/84
		1.35	08/15/83
		1.36	08/15/83

Part I License Conditions

1.1	08/15/83
1.2	09/15/84
.3	09/15/84
1.4	08/15/83
1.5	08/15/83
1.6	10/05/81
1.7	10/05/81
1.8	10/05/81
1.9	03/06/87
1.10	08/15/83
1.11	10/05/81
1.12	10/05/81
1.13	10/05/81
1.14	08/15/83
1.15	10/05/81
1.16	10/05/81
1.17	08/15/83
1.18	10/05/81
1.19	10/05/81
1.20	08/15/83
1.21	10/05/81
1.22	08/15/83
1.23	10/05/81
1.24	08/15/83
1.25	10/05/81

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

LICENSE CONDITION FOR
LEAK TESTING SEALED BYPRODUCT MATERIAL SOURCES

APRIL 1993

- A. Each source shall be tested for leakage at intervals not to exceed 6 months. In the absence of a certificate from a transferor indicating that a test has been made within 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's regulations. Within 5 days after determining that any source has leaked, the licensee shall file a report with the Director, Division of Fuel Cycle Safety and Safeguards, U. S. Nuclear Regulatory Commission, Washington, DC 20555, describing the source, test results, extent of contamination, apparent or suspected cause of source failure, and corrective action taken. A copy of the report shall be sent to the Administrator of the nearest NRC Regional 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 6 months prior to the date of use or transfer.

LICENSE CONDITION FOR LEAK TESTING

SEALED PLUTONIUM SOURCES

APRIL 1993

- A. Each plutonium source shall be tested for leakage at intervals not to exceed 6 months. In the absence of a certificate from a transferor indicating that a test has been made within 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 alpha 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 alpha 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's regulations. Within 5 days after determining that any source has leaked, the licensee shall file a report with the Division of Fuel Cycle Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, describing the source, test results, extent of contamination, apparent or suspected cause of source failure, and corrective action taken. A copy of the report shall be sent to the Administrator of the nearest NRC Regional 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 6 months prior to the date of use or transfer.

**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 Safety
and Safeguards
Washington, DC 20555**

April 1993

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 Safety and Safeguards, U. S. Nuclear Regulatory Commission, Washington, DC 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}	MAXIMUM ^{b,d}
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	1000dpm/100cm 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 emitting nuclides should apply independently.

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

^cMeasurements of average contaminant should not be averaged over more than 1 square meter. For objects of less than 1 square meter, the average 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 soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe using a detector of known efficiency. When removable contamination on objects of less surface area is determined, the limits should be reduced proportionally and the entire surface should be wiped.

^fThe average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 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 of absorber.