Supplement A

Item 5 and 6 Radioactive material, chemical and physical form, maximum amount requested, proposed use, and location of use.

Penn State University requests authorization to process the following materials in the locations listed below. The material will be used as is indicated below. There is a decrease in the requested inventory from our current license. The project which required item "H" in our current license has been completed and the material has been returned to the supplier.

Material A

Radionuclide:	Uranium enriched in the U-235 isotope.
Form:	Any form.
Requested amount:	132 grams
Location of use:	At the University Park campus at the Radiation Science and Engineering Center and the Academic Projects Building.
Proposed use:	This material will be used in fission counters and chambers, in fission foils for flux monitoring, and for other teaching, calibration and research and development purposes.

The current inventory of this material is about 100 grams, but Penn State requests a possession limit of 132 grams, as is currently authorized by the NRC, to allow for the acquisition of other detectors if that becomes desirable.

~~**Material B**~~

~~Radionuclide:~~	~~Uranium enriched in the U-235 isotope.~~
~~Form:~~	~~417 un-irradiated Pathfinder Super-heater Fuel Elements (415 elements containing UO_2 enriched to 6.95 weight percent of U-235, 2 elements containing UO_2 enriched to 7.5 weight percent of U-235.)~~
~~Requested amount:~~	~~1,100 kilograms of UO_2.~~
~~Location of use:~~	~~In a locked storage vault at the University Park campus.~~
~~Proposed use:~~	~~None pending return to the owner. This material will only be handled to the extent necessary for inventory, surveillance, and shipment purposes.~~

~~This material has been in storage since 1970. The material has never been used and there are no plans for use of this material. This material is owned by the Department of Energy. Penn State has been requesting the removal of this material since before 1980 and is awaiting DOE followup. Because of the nature of this material, it is not prudent to give more details as to its design or its current storage location.~~

~~These fuel assemblies are stored on the same storage racks previously used by Northern States Power Company (NSPC) under license DPR-11. Criticality calculations used by NSPC show that the storage racks loaded with fuel have a K_{eff} of less than 0.8 when flooded with water. The criticality safety of the storage arrangement should be at least as safe as that used by NSPC. Penn State requests renewal of its exemption to the requirements of 10 CFR 70.24 for a criticality monitor in the storage room because the room is rarely occupied and the K_{eff} is less~~

~~than 0.8 even if the above grade room were flooded with water. Such an exemption has been granted for many years.~~

~~The sources will not be opened or modified in any way. The sources will not be subject to potentially damaging conditions such as exposure to corrosive chemicals, dirt, abrasion, mechanical shock, temperature extremes, or high pressure.~~

~~No changes, other than the shipment of this material, are planned for the life of this license. The NRC has approved a Type B shipping cask for this material and procedures for the return of this material to DOE are being developed.~~ ***This material was transferred to the Department of Energy and shipped to Sandia National Laboratories in a series of shipments from September 9, 2003 through November 18, 2003. Eric Boeldt, RSO 11/23/2009.***

Material C

Radionuclide:	Uranium enriched in the U-233 isotope.
Form:	Any
Requested amount:	3 grams
Location of use:	At the University Park campus, primarily at the Radiation Science and Engineering Center and the Academic Projects Building. There are no current plans to use this material in any other area.
Proposed use:	This material will be used for monitoring, teaching, calibration and research and development as is the material in section A.

Material D

Radionuclide:	Plutonium 239 (and impurities and decay products)
Form:	Encapsulated Plutonium-Beryllium sources manufactured by Mound Laboratory.
Requested amount:	Six approximately 16 gram sources with Mound serial numbers M-102, M-103, M-104, M-105, M-106, and M-187. One approximately 80 gram source with Mound serial number —317. A total of 180 grams is requested.
Location of use:	At the University Park campus, primarily at the Radiation Science and Engineering Center and the Academic Projects Building. There are no current plans to use this material in any other area.
Proposed use:	These sources will be used for teaching, calibration and research and development purposes. The six smaller sources are also used within the subcritical graphite pile as described below and for other teaching purposes in much the same manner as they have been used since 1957. The larger source will be used for calibration and research and development purposes. The sources will not be opened or modified in any way. The sources will not be subject to potentially damaging conditions such as exposure to corrosive chemicals, dirt, abrasion, mechanical shock, temperature extremes, or high pressure.

Material E

Radionuclide:	Plutonium 239 (and impurities and decay products).
Form:	Plated alpha sources or fission foils.
Requested amount:	5 microcuries
Location of use:	At the University Park campus, primarily at the Radiation Science and Engineering Center and the Academic Projects Building. There are no current plans to use this material in any other area.
Proposed use:	PSU has ten plated alpha sources manufactured at the Savannah River Plant ranging from about 0.002 uCi to 0.04 uCi. The sources will be used as part of educational programs, meter calibrations, or to check instruments. The sources will be mostly used in the manner as the General Licenses described in 10 CFR 70.19. The sources have been used in this manner since before 1970.

~~**Material F**~~

~~Radionuclide:~~	~~Natural uranium~~
~~Form:~~	~~Cylindrical metal slugs canned in aluminum~~
~~Requested amount:~~	~~2,500 kilograms~~
~~Location of use:~~	~~University Park campus, within the Radiation Science and Engineering Center or the Academic Projects Building.~~
~~Proposed use:~~	~~This material will continue to be used in a natural uranium and graphite subcritical pile for teaching and research and development purposes.. This pile has been used without incident for student laboratory experiments in nuclear engineering since 1958.~~
	~~The sources will not be opened or modified in any way. The sources will not be subject to potentially damaging conditions such as exposure to corrosive chemicals, dirt, abrasion, mechanical shock, temperature extremes, or high pressure.~~

~~**Material G**~~

~~Radionuclide:~~	~~Source Material~~
~~Form:~~	~~Any~~
~~Requested amount:~~	~~10 kilograms~~
~~Location of use:~~	~~University Park campus.~~
~~Proposed use:~~	~~Teaching and research and development purposes.~~
	~~This material is requested to be on this license because our possession of source material occasionally exceeds the 15 pound limit of 10 CFR 40.22(a). This material will be used in the same manner in which material would be used under the General License of 10 CFR 40.22(a). In addition, Penn State will comply with the provisions of 10 CFR parts 19, 20, and 21 as is required by 40.22(b).~~ **Material F and G will continue to be used under Pennsylvania License PA-100 --- Eric Boeldt, RSO 11/23/2009**

Material H (new addition November 25, 2009 --- Eric Boeldt, RSO)
Radionuclide: Plutonium isotopes
Form: Non-dispersible (sealed, plated, or solid, but not powder)
Amount: 0.1 mCi each isotope
Location: University Park Campus
Use: Teaching and research and development purposes.

PSU desires authorization to possess plutonium isotopes for research and development and teaching purposes. Specifically PSU requests the following materials, forms, and limits. The requested limits are listed in units of activity and mass along with the half-life for convenience. As with other materials authorized by this license, use of this material will be in accordance with specific written authorization approved by Penn State's radiation safety committee.

	Maximum amount that PSU would possess at one time of this material		
Material	mCi	Equivalent in grams	half life
Plutonium -238	0.1	5.8 E-06	87.8 years
Plutonium -239	0.1	1.6 E-03	24,390 years
Plutonium -240	0.1	4.3 E-04	6540 years
Plutonium -241	0.1	9.7 E-07	14.4 years
Plutonium -242	0.1	2.5 E-02	387,000 years

Use of this radioactive material within the Breazeale Nuclear Reactor will be in accordance with PSU's Nuclear Reactor Operating License No. R-2. Handling of this material before or after use in the reactor will be in accordance with this license (SNM-95).