Class Projects

Situation

To expand the storage capacity of highly enriched uranium stockpiles, the Nuclear Engineering Department has won a contract to store uranium/water solutions in the Nuclear Engineering Building.

Each of the class projects will concern the writing of a Criticality Safety Evaluation representing one potential combination of a particular storage canister (as many canisters as you can handle—Dr Hines will charge on a per canister basis) and a particular storage location in the building. (Each student will have a different combination of canister and location.)

Feel perfectly free to share information (including measurements and pictures) with other students who have your same canister or building location. But run your own cases (unless you have special permission otherwise) and write your own report.

IMPORTANT: Your final project must be delivered by the deadlines as an email containing a SINGLE WORD document (if you provide more, you will be counted off) that is NO BIGGER than 3 MB in size (if it is bigger, you will be counted off)

Assumptions

Parameters:

1. We can get you as many canisters as you need.
2. UT maintenance will build shelves as you request. They will be ¾" plywood. (Just model the plywood, not supports, etc.)
3. The only limitation you can place on the folks creating your canister is the maximum U-235 mass allowed per canister; you CANNOT limit the enrichment or H/U ratio. You can, of course, put any controls you deem necessary on the STORAGE of the canisters while in the building: How many canisters in your location, how high they can be stacked, etc.
4. We want to store as many canisters as possible.
5. The canisters will be loaded somewhere else, tightly closed, and brought to the building using procedures that you are not responsible for. Each will be labeled with the mass of U-235 in the canister, known within a 30% error.
6. Assume an appropriate uncertainty on any dimension measurement you make. You decide based on the measurements you make, but be sure to document how you made this choice in your CSE.
7. The uranium will be assumed to be uniformly mixed with water and fill the canister.
8. Do not model canister walls—conservatively assume that the U/water mixture goes all the way to the outer dimensions of the canister.
9. All walls in the building (even interior walls) will be assumed to be concrete. (The wallboard will be replaced for structural reasons.)

10. Site fire protection tells us that the fire sprinklers are capable of filling the air with 0.01 g/cc water mist in ALL rooms in the building (i.e., assume a sprinkler system even if you don't see one!) AND that water could accumulate as deep as 2 inches on the floor.
11. We are still going to use every room in the building as it currently is used. (i.e., leave room for people to walk down the stairs, walk down halls, use the kitchen equipment, etc. (Although you can clear out any stored material that is in the way right now.)

Responsibilities

The project assignments are as follows:

Student	Canister	Storage Location
Boettinger	A	A
Davies	B	A
Forehand	C	A
Hipkins	A	B
Huston	B	B
Iysheh	C	B
Mitchell	A	C
Novais	B	C
Scott	C	C

Canister and Location Definitions

	Canister	Storage Location
A	Nesco clear hot water container	On first floor, to left of the water fountain (to the post)
B	Bunn coffee pot (handle removed)	Kitchen: On the other side of the refrigerator
C	Biochem 100% Whey container	Kitchen: Under the counter to the left as you enter.