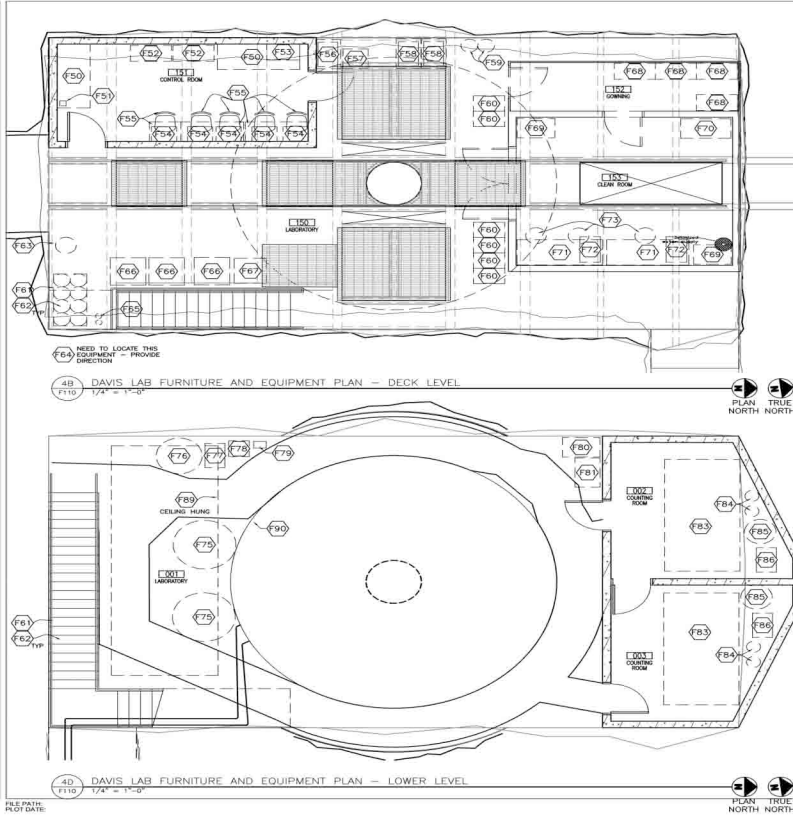


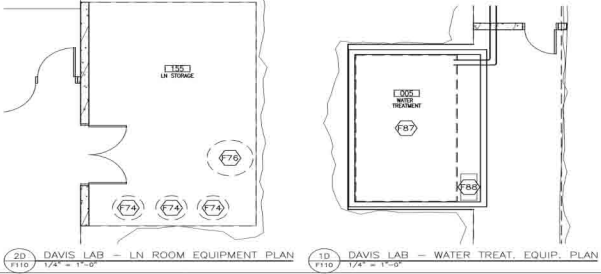
Sanford Lab and Future Plans

Dongming Mei

Sanford Lab



LUX EXPERIMENT FURNITURE AND EQUIPMENT SCHEDULE					
EQUIPMENT	PROVIDED BY:	INSTALLED BY:	EQUIPMENT	PROVIDED BY:	INSTALLED BY:
50 WORK BENCH	LUX	X	70 CLEAN ROOM PNT STORAGE BOX	RELOCATE FROM SURFACE	SDSTA
51 ESPRESSO MACHINE	LUX	X	71 CLEAN ROOM WORK BENCH	RELOCATE FROM SURFACE	SDSTA
52 STORAGE CABINET	LUX	X	72 CLEAN ROOM TOOL BOX	RELOCATE FROM SURFACE	SDSTA
53 TOOL BOX	LUX	X	73 CLEAN ROOM STOOL	RELOCATE FROM SURFACE	SDSTA
54 COMPUTER	LUX	X	74 LN DENWHS (TL)	LUX	X
55 DESK AND CHAIR	LUX	X	75 KE CHARCOAL TANK VERTICAL	LUX	X
56 SLOW CONTROL PANEL	RELOCATE FROM SURFACE	X	76 SRV TANK (400L)	LUX	X
57 SLOW CONTROL COMPUTER & UPS RACK	RELOCATE FROM SURFACE	X	77 STORAGE PANEL	LUX	X
58 CIRCULATION PANEL	RELOCATE FROM SURFACE	X	78 RADIOACTIVE SOURCES STORAGE SAFE	RELOCATE FROM SURFACE	X
59 HP BOTTLES	RELOCATE FROM SURFACE	X	79 RADON MONITORING SYSTEM	RELOCATE FROM SURFACE	X
60 ELECTRONIC PANEL	RELOCATE FROM SURFACE	X	80 PLATFORM TRUCK	LUX	X
61 HP GAS BOTTLES RACK	RELOCATED FROM SURFACE	X	81 CYLINDER CART/INTERFACE RACK	RELOCATE FROM SURFACE	X
62 KE BOTTLES	RELOCATE FROM SURFACE	X	82 (KR SYSTEM)	LUX	X
63 LN DENWR FOR THERMOHYDRO	LUX	X	83 SHIELD & SUPPORT (FUTURE EXPERIMENT)	NA	NA
64 SPARE DENWR (200L)	LUX	X	84 HZ DENWR (100L) (FUTURE EXPERIMENT)	NA	NA
65 FLEX CONDUIT	LUX	X	85 DETECTOR (FUTURE EXPERIMENT)	NA	NA
66 DETECTOR HANGER	LUX	X	86 ELECTRONIC RACK (FUTURE EXPERIMENT)	NA	NA
67 COUNTER BALANCE	LUX	X	87 WATER SYSTEM	SDSTA	X
68 CLEAN ROOM STORAGE CABINET	RELOCATE FROM SURFACE	SDSTA	88 HEAT TRANSFER UNIT	SDSTA	X
69 CLEAN ROOM SS CART	RELOCATE FROM SURFACE	SDSTA	89 XENON BALLOON	LUX	X
			90 WATER TANK	CONTRACTOR	CONTRACTOR



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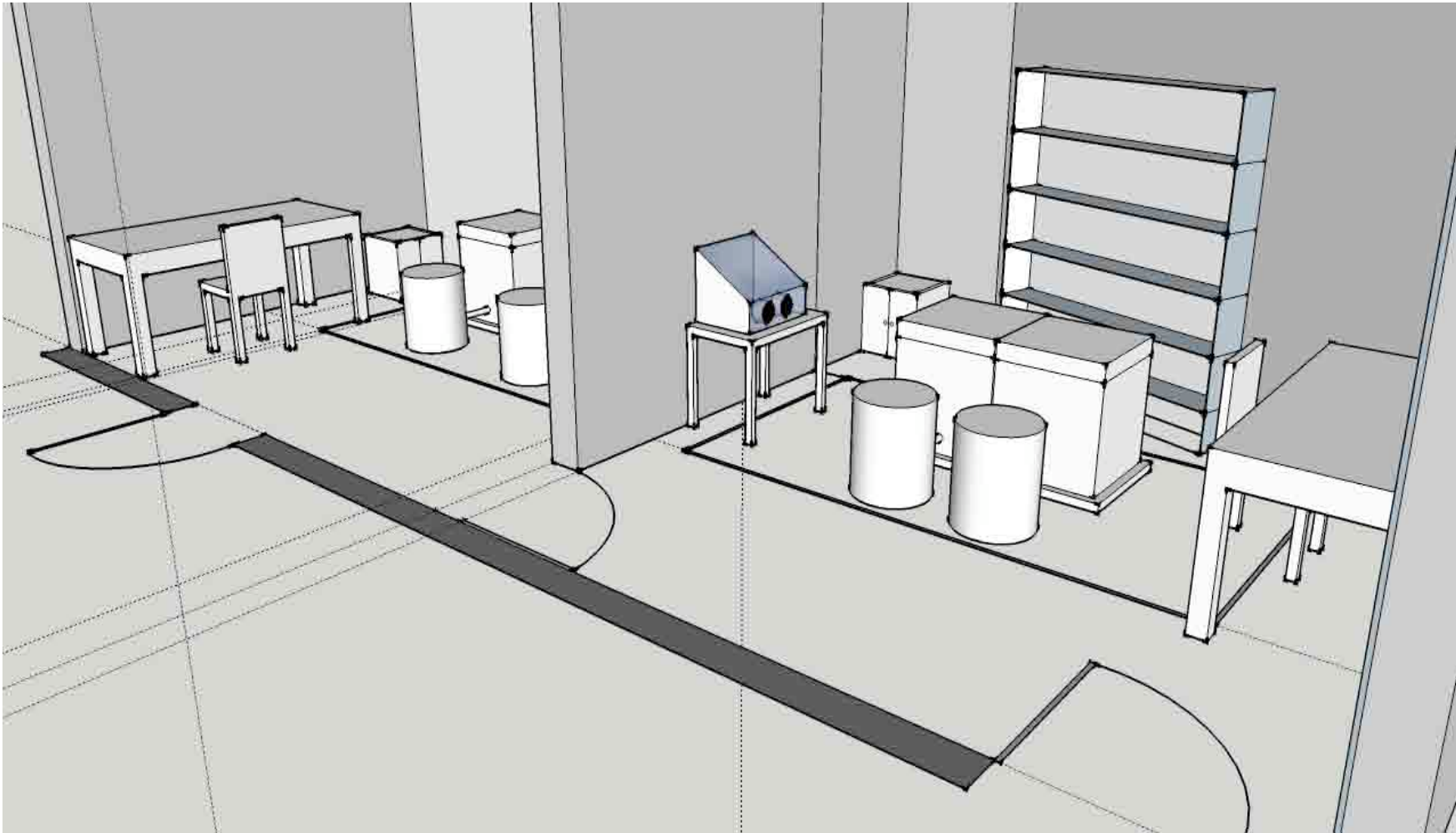
NOT FOR CONSTRUCTION
DESIGN DEVELOPMENT REVIEW

DATE: 11/11/2020
DRAWN: BFM/ACD
CHECKED: GSD

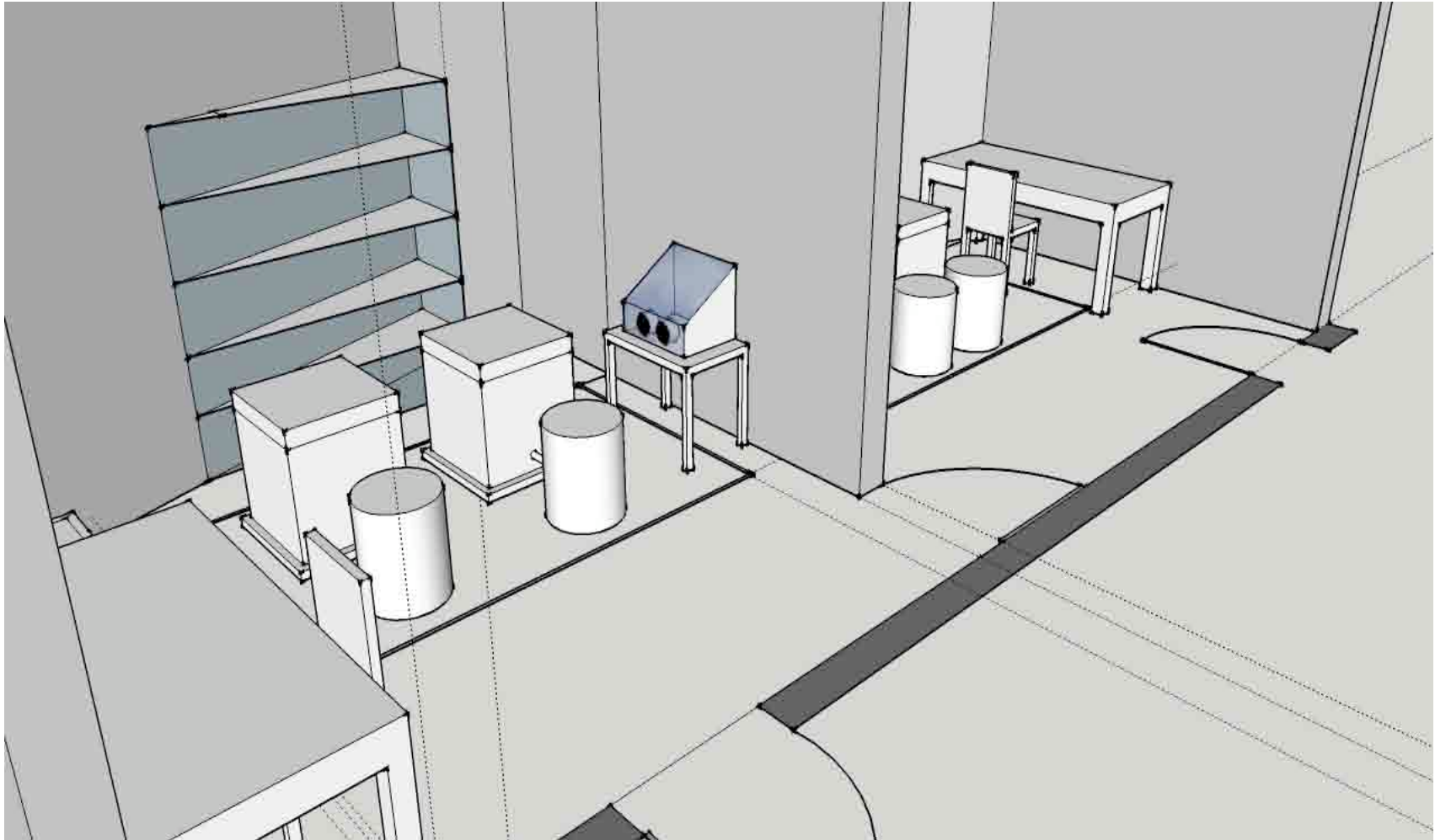
DAVIS LABORATORY FURNITURE AND EQUIPMENT PLANS

F110

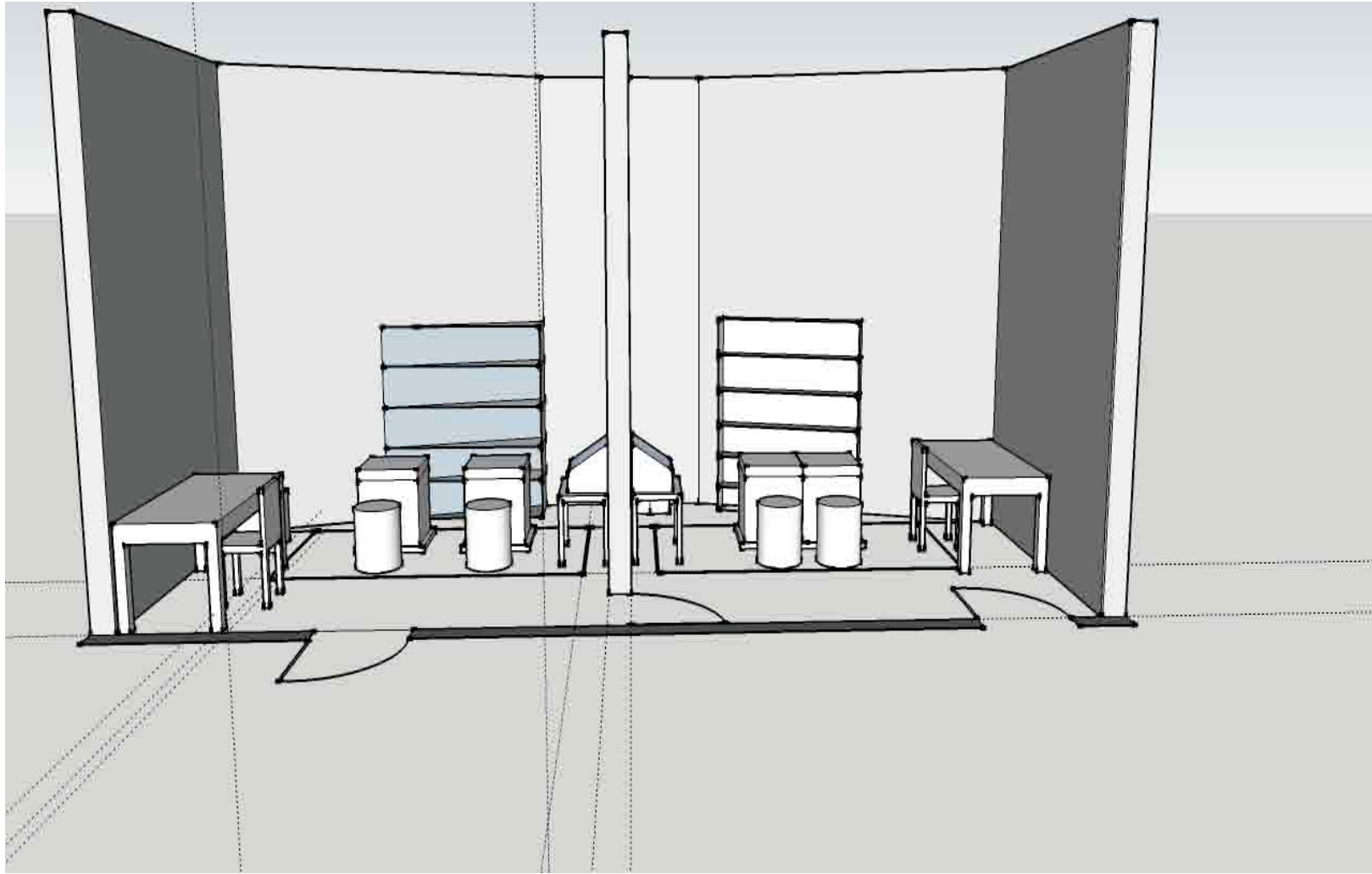
Count room layout (1)



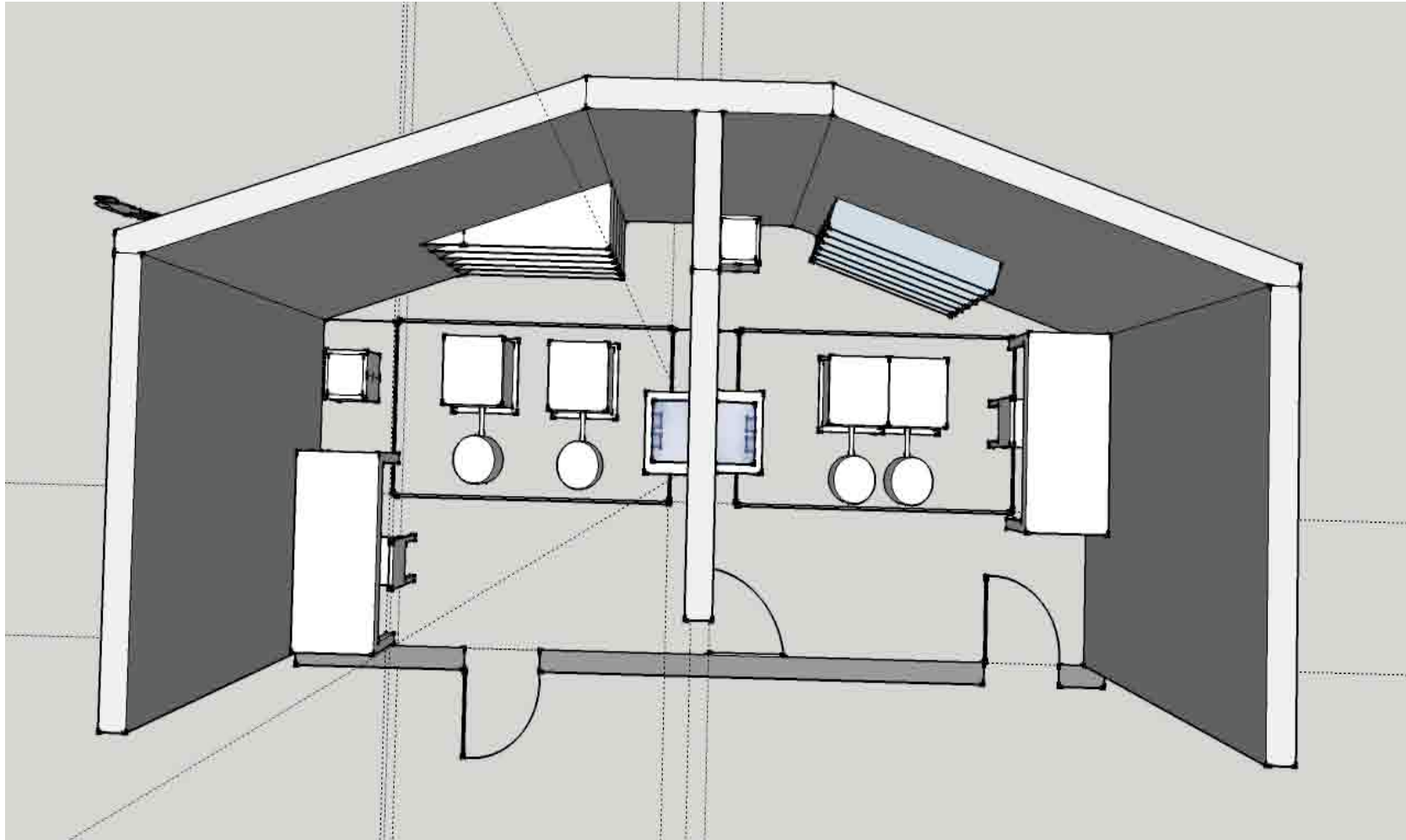
Count room layout (2)



Counting room layout (3)



Count room layout (4)



Operation of the Detector (similar to SNOLab)



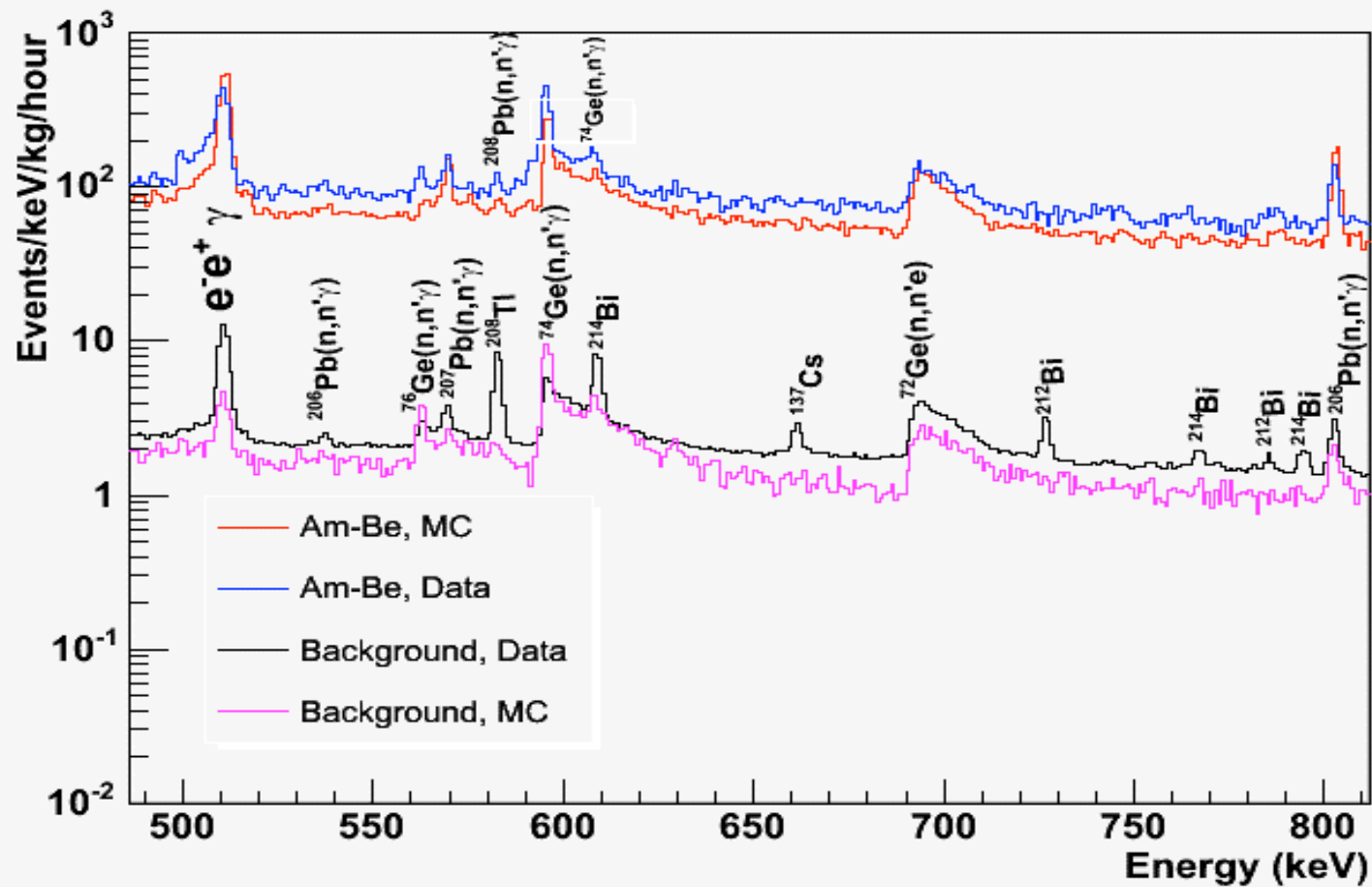
Future Plans – counting facility

1. One detector is bought and its shield is under construction
2. It will be tested at USD before move to Sanford Lab by the end of this year
3. Two more detectors have budgeted with higher sensitivity
4. SOLO detectors may be moved to the Sanford Lab

Future Plans – Background Characterization

1. Radon mapping continuously at different levels
2. Ventilation model and radon emanation, diffusion
3. Radon reduced air system
4. Gamma-ray flux measurements at the 4850-ft level
5. Muon/neutron measurements at the 4850-ft level
 1. Thermal neutrons with He3 counters
 2. Fast neutron rate with large liquid scintillator
 3. Fast neutron energy spectrum with HPGe detectors utilizing inelastic scattering processes

Neutron inelastic scattering



Cost of the facility

Gamma-ray screeners:					
	HPGe Detector	Inner shield n(cu)	Outer shield (Pb)	Radon Exclusion Box	Total
Sensitivity in sub ppb (6)	\$60K	\$15K		0\$3K	\$468K
Sensitivity in ppt (4)	\$90K	\$30K	\$80K	\$5K	\$820K
Crane (1)					\$3K
LN Auto Supply (1)					\$25K
Office supplies					\$10K
DAQ					\$35K
Total					\$1361K