

HOMESTAKE MINE SITUATION

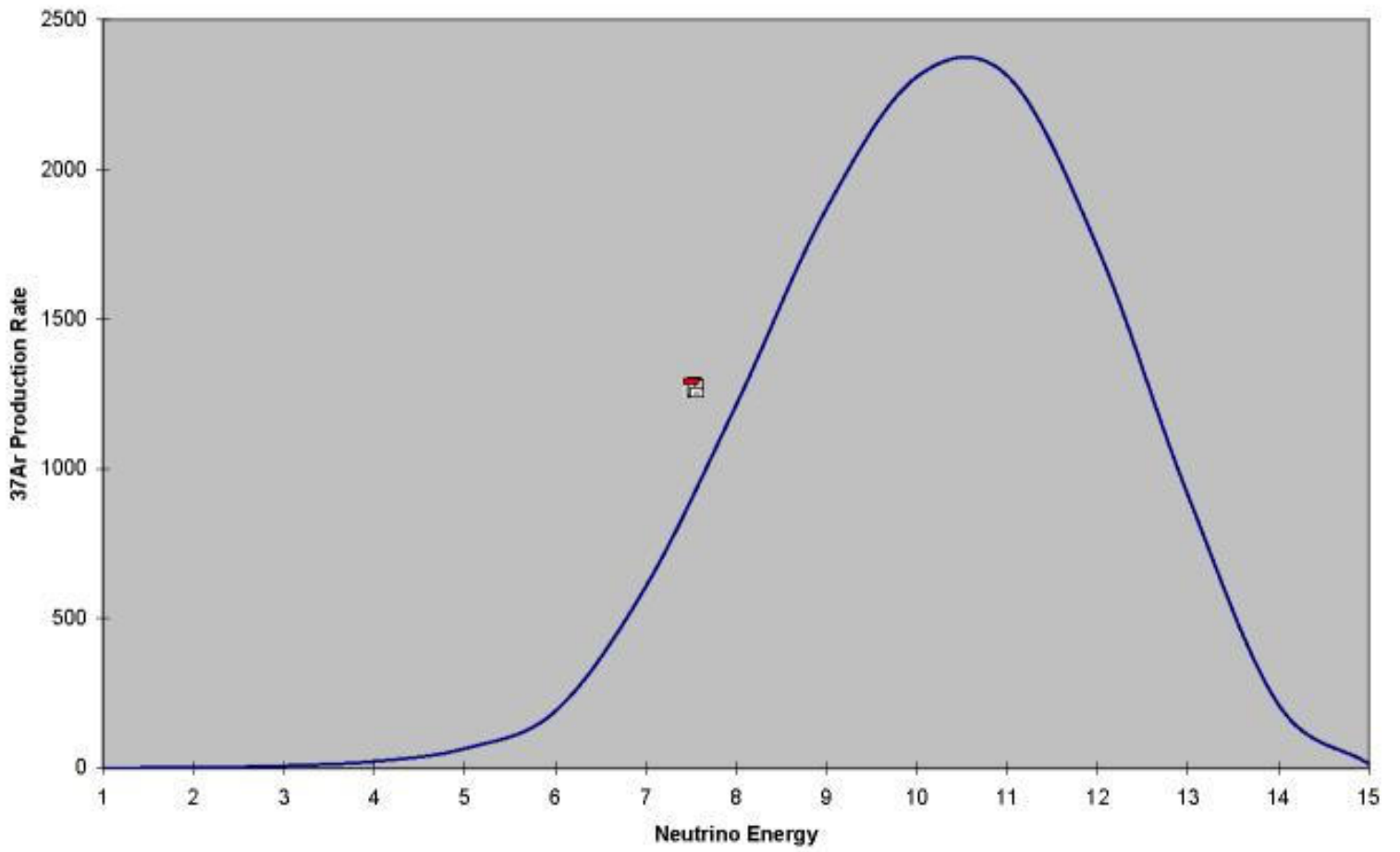
- 1) On September 11, 2000, the Homestake Mining Company announced that because of low prices, they would stop mining gold.**
- 2) We immediately proposed converting this mine into a National Underground Science Laboratory. Several national science advisory committees strongly endorsed this proposal.**
- 3) At the end of 2001, Congress passed and President Bush signed enabling legislation. Discussions about liability are ongoing between Barrick Mining Co. (the new owners of Homestake) and various governmental entities.**
- 4) Barrick has asked us to immediately remove the Chlorine detector. All data taking has ceased and all counting of previous runs has terminated.**

**COMPARISON OF PROPOSED HYBRID
CHLORINE DETECTOR WITH PRESENT
RADIOCHEMICAL CI DETECTOR**

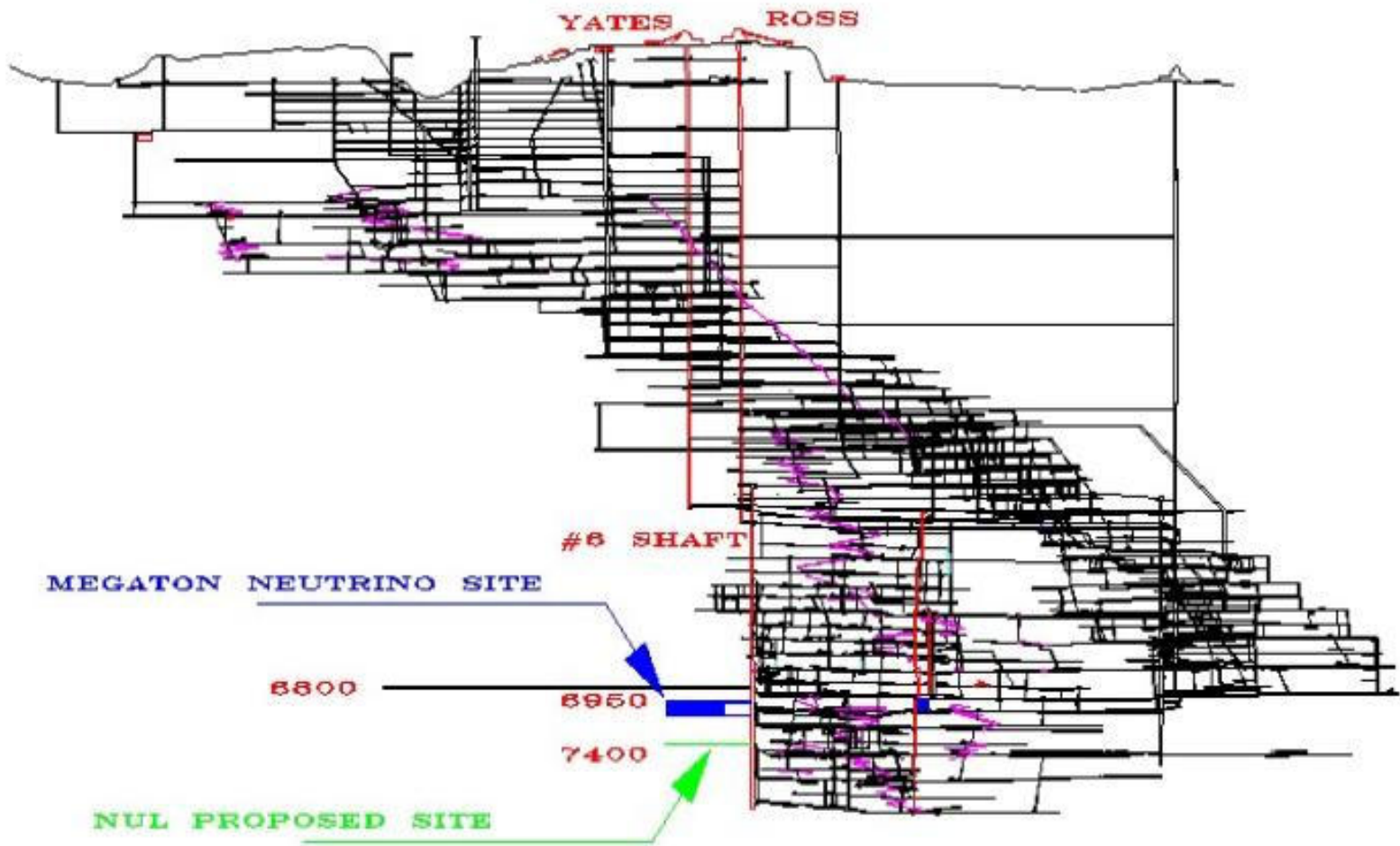
	Present Detector	Systematic Uncertainty	Hybrid Detector	Systematic Uncertainty
MASS	600 TONS		6000 TONS	
DEPTH	4850 FT		7000 FT	
³⁷ Ar - C.R.	1/10 solar	±2.7%	1/100 solar	±0.5%
Extract Eff	90-95%	±3%/run	99%	±<1%
Extr action	25 hrs		4 min/module	
Count. Eff.	~40%	±2.5%	~80%	±<1%
Time Discriminat ion	No		Yes	
⁸ B - ⁷ Be event sep ar ation	No		No - Normal Yes-Hybrid	

Chart1

8B Neutrino Interaction Rate in ^{37}Cl vs Energy



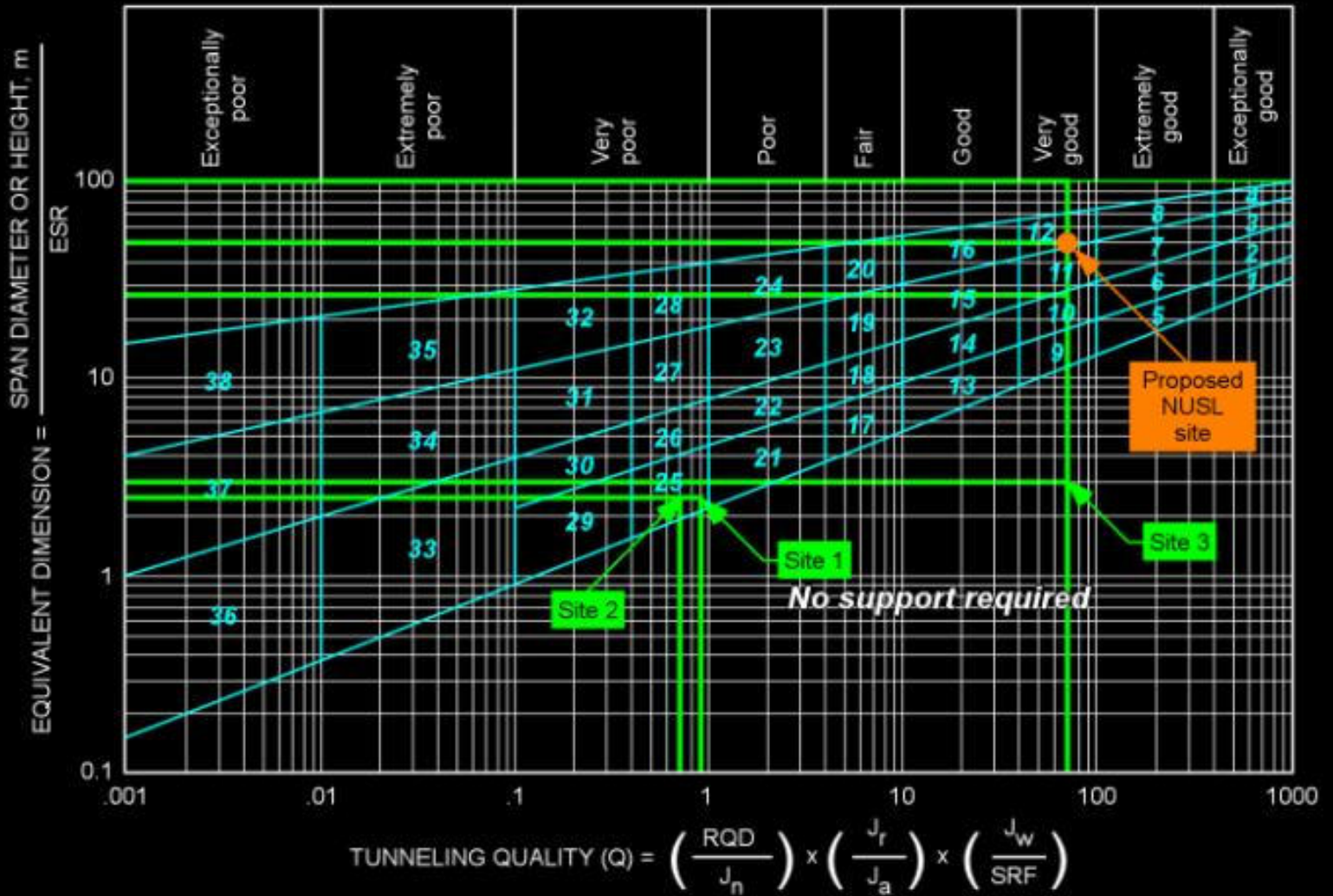




Feasibility of a Large Excavation at the Homestake Mine

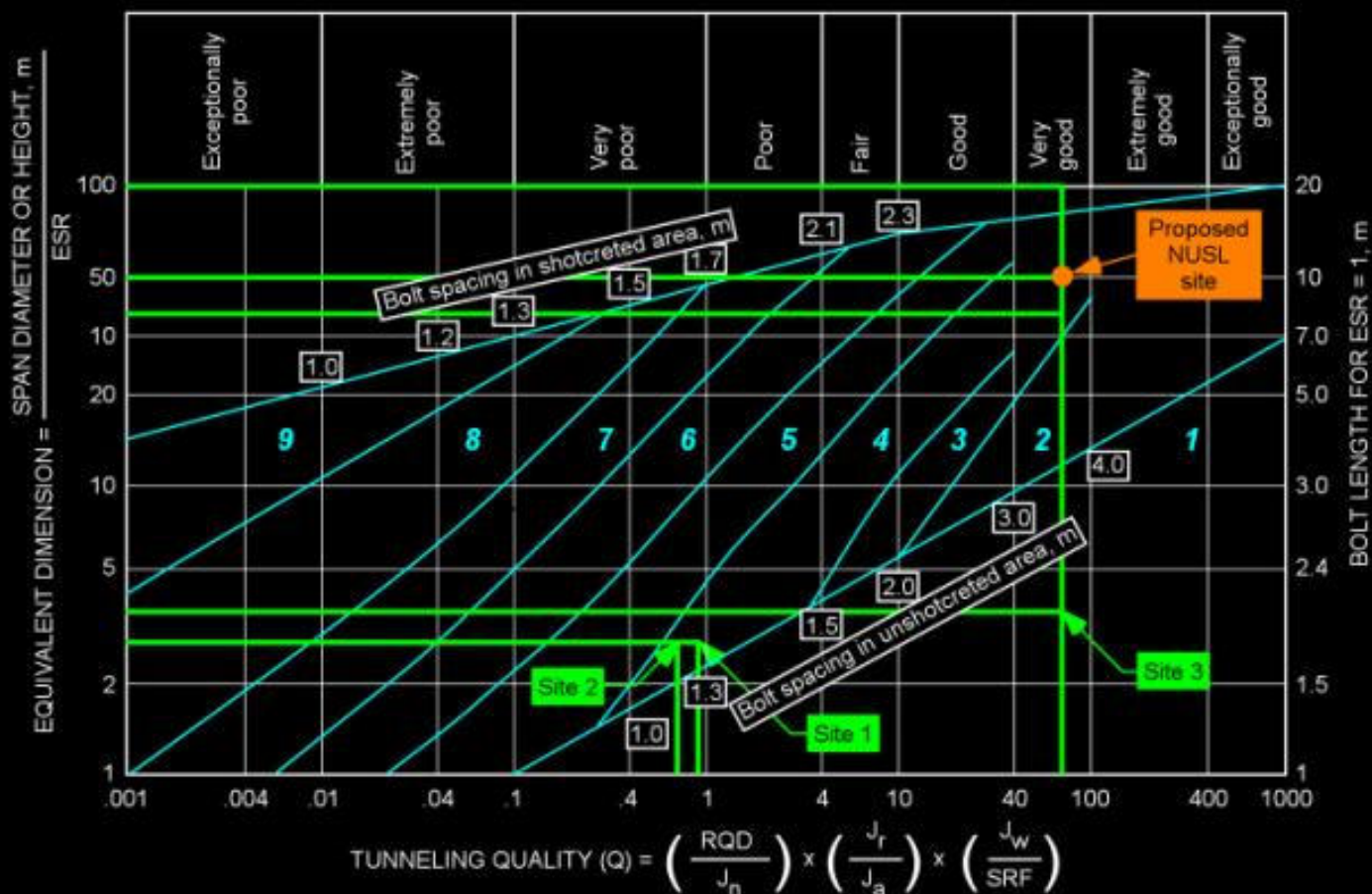
**(Using Barton's Tunneling Quality Index)
Also done by 3D finite element analysis**

**Doug Tesarik, Jeff Johnson, Karl Zipf
Hard Rock Stability Group
NIOSH Spokane Research Laboratory**



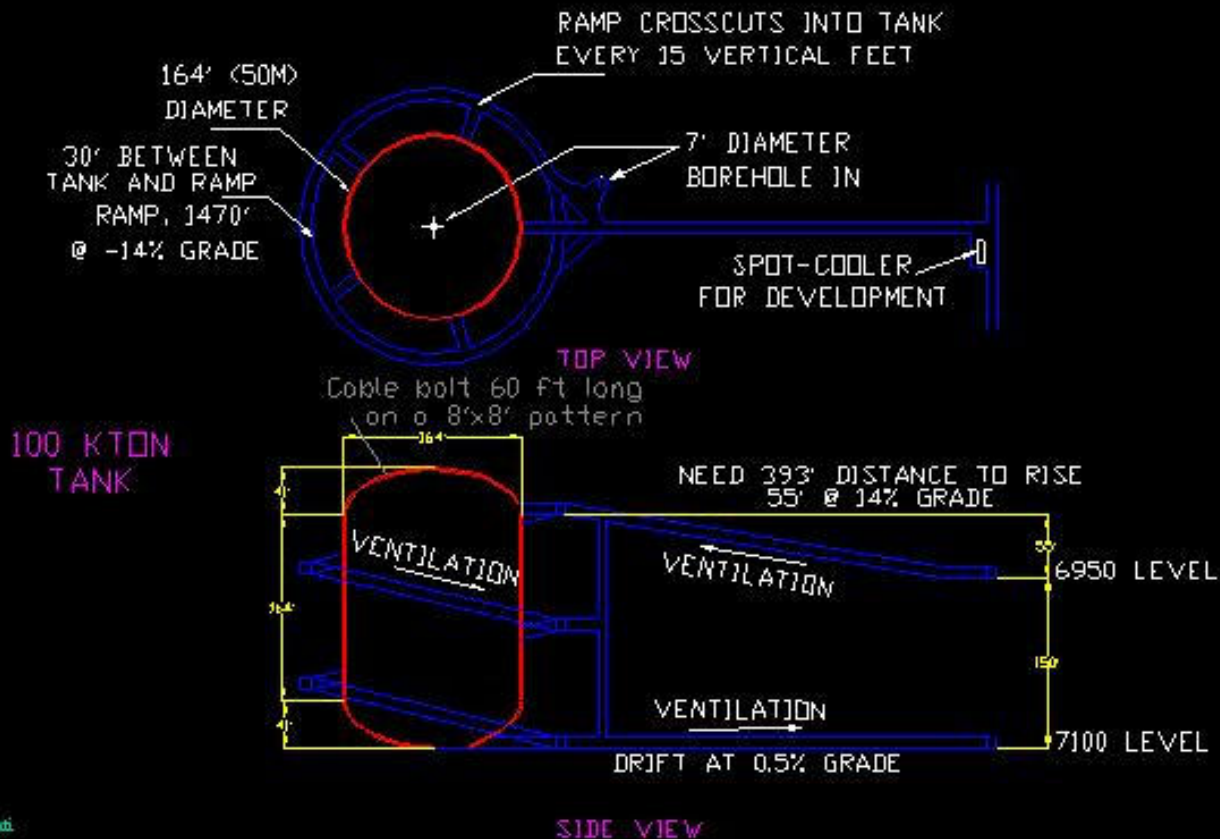
KEY

- | | |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 1 Unsupported | 6 Fibre reinforced shotcrete, 90-120 mm, and bolting |
| 2 Spot bolting | 7 Fibre reinforced shotcrete, 120-150 mm, and bolting |
| 3 Systematic bolting | 8 Fibre reinforced shotcrete, 150-250 mm, with reinforced ribs of shotcrete and bolting |
| 4 Systematic bolting with 40-50 mm unreinforced shotcrete | 9 Cast concrete lining |
| 5 Fibre reinforced shotcrete, 50-90 mm and bolting | |



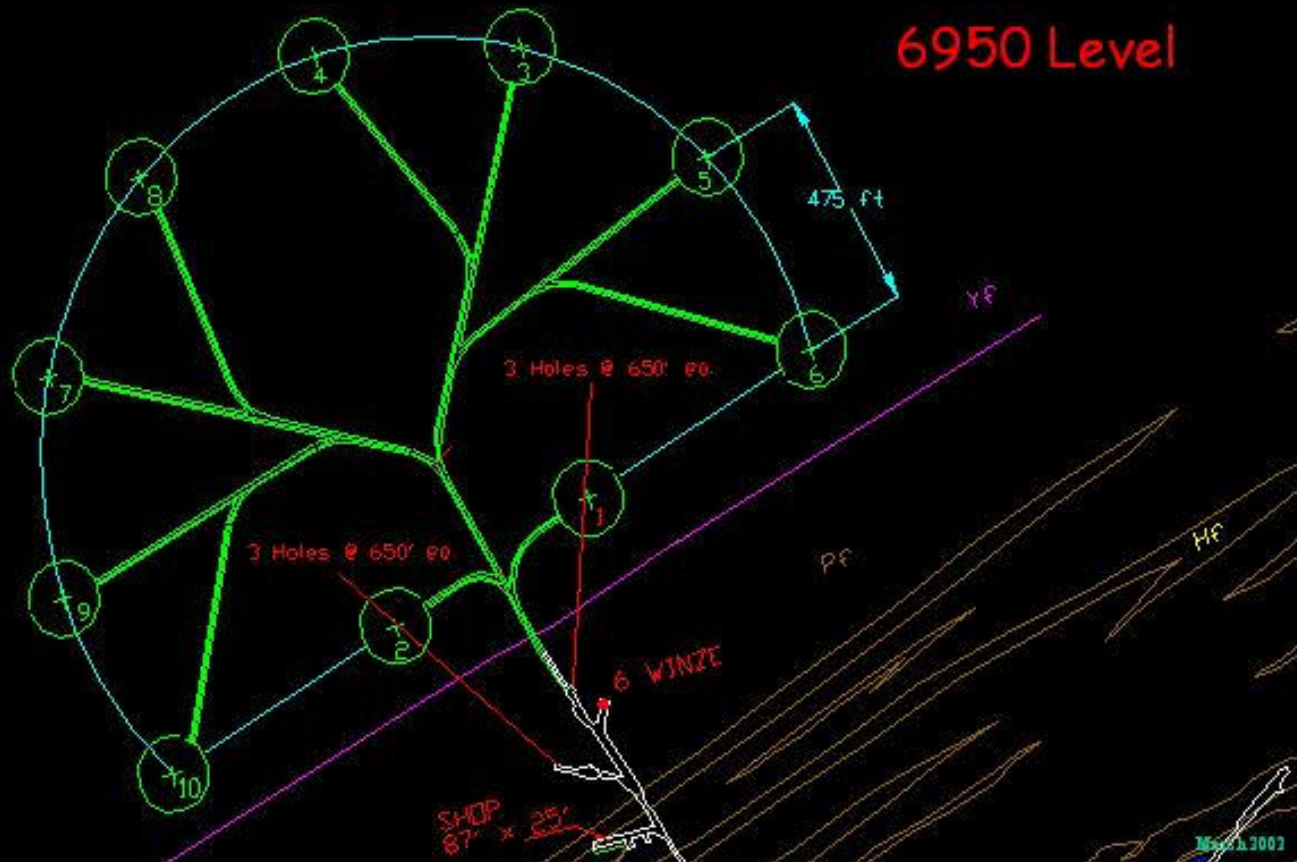
MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

✓ Modular Configuration



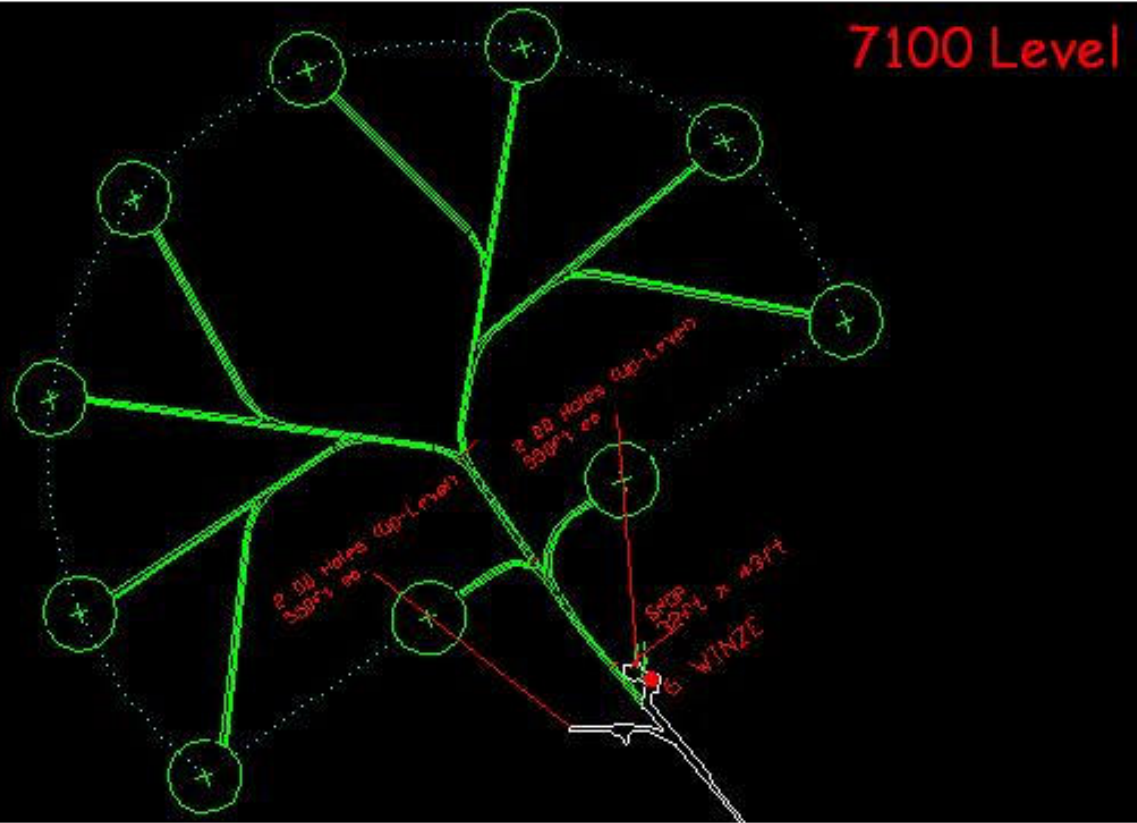
MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

✓ Modular Configuration



MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

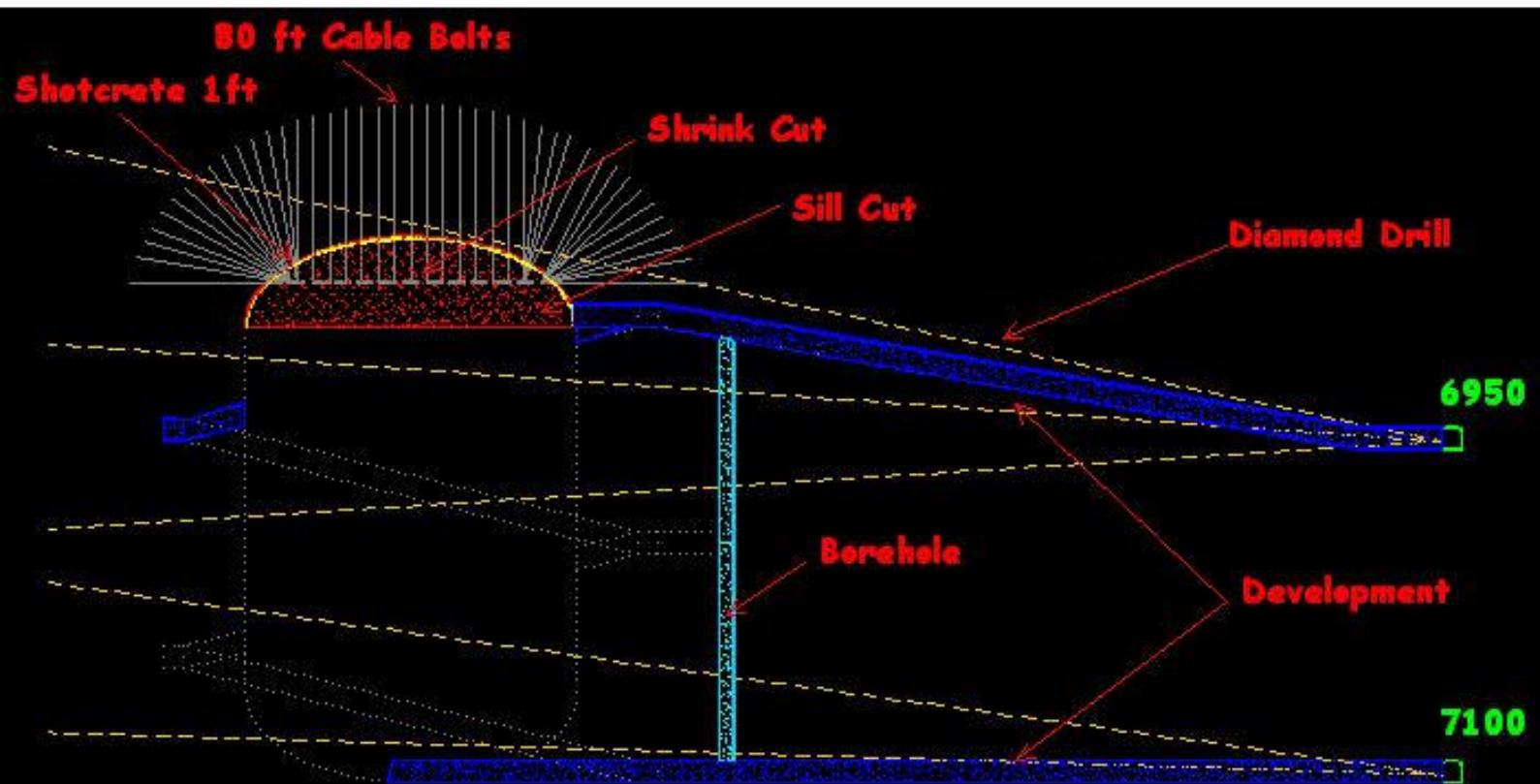
✓ Modular Configuration



MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

✓ Estimated Timeline

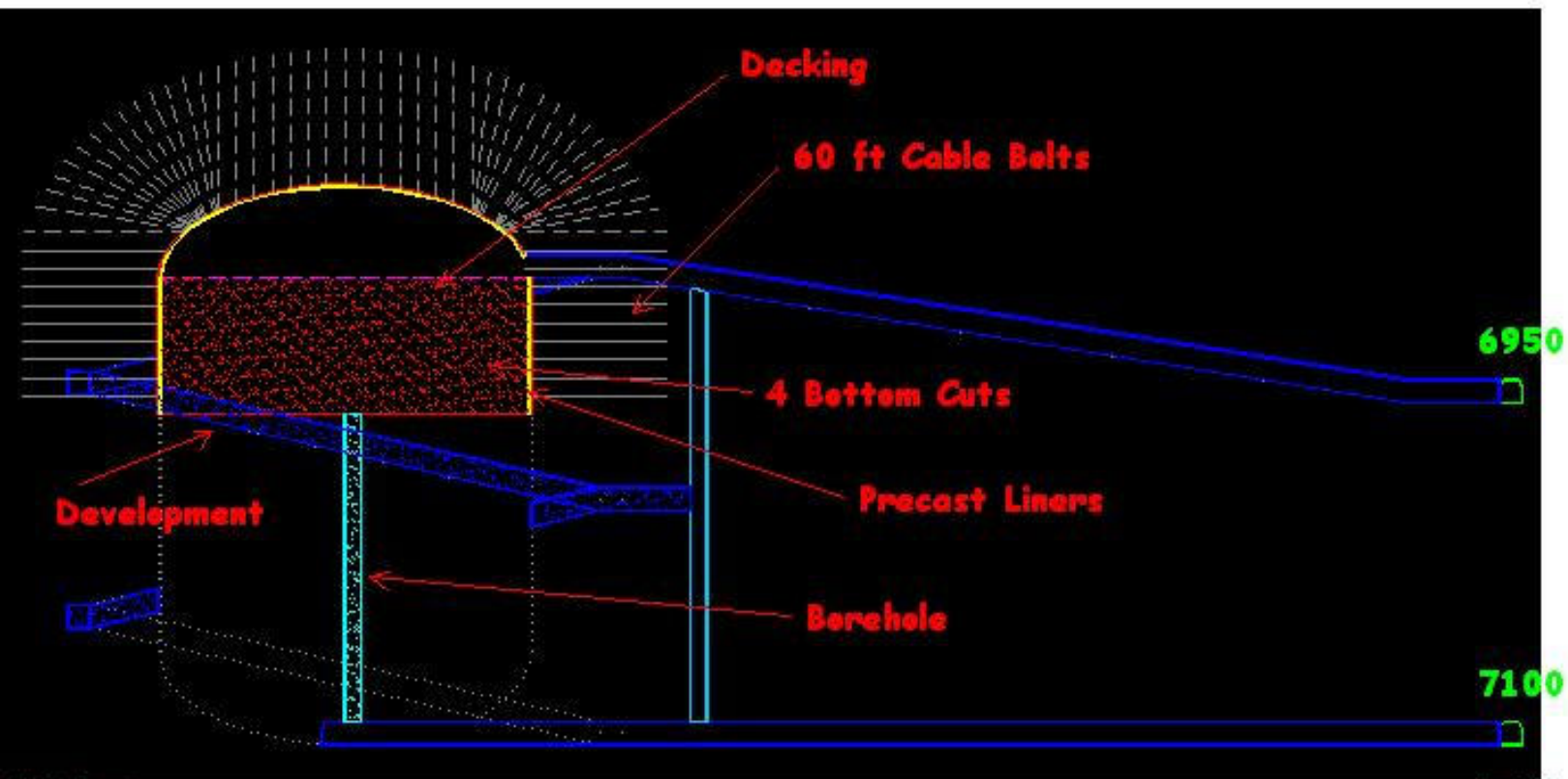
Year One



MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

✓ Estimated Timeline

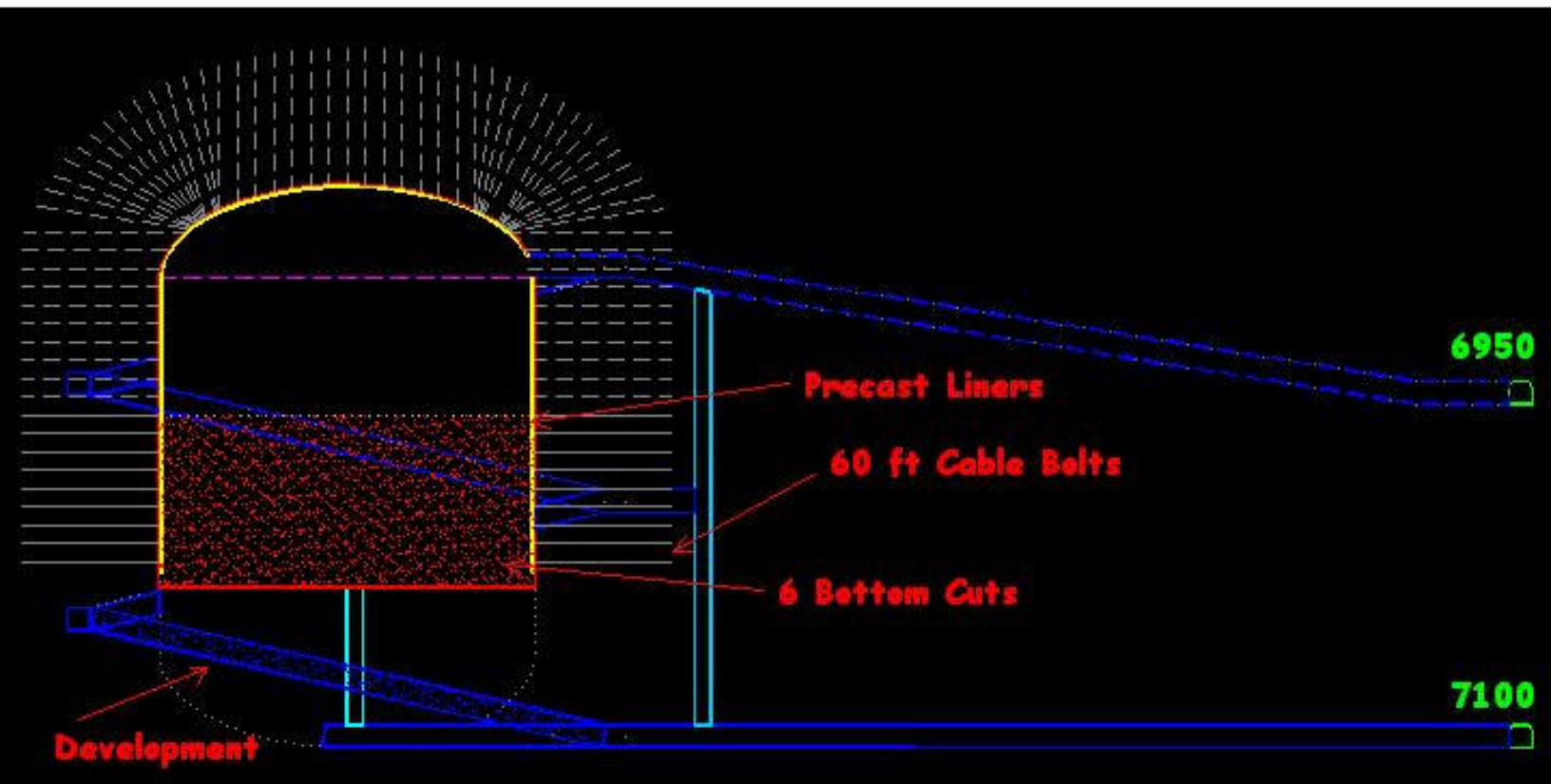
Year Two



MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

✓ Estimated Timeline

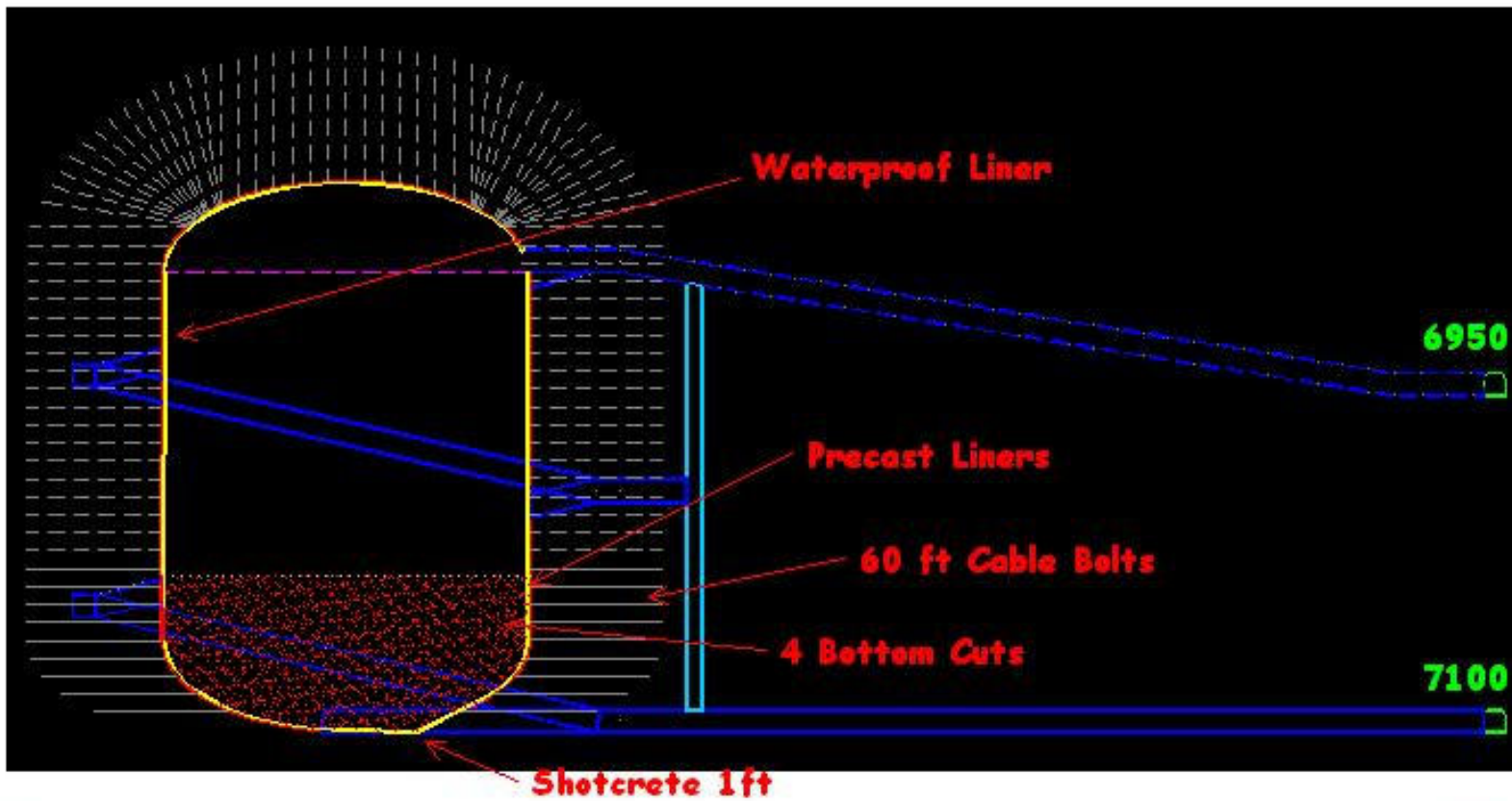
Year Three



MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

✓ Estimated Timeline

Year Four

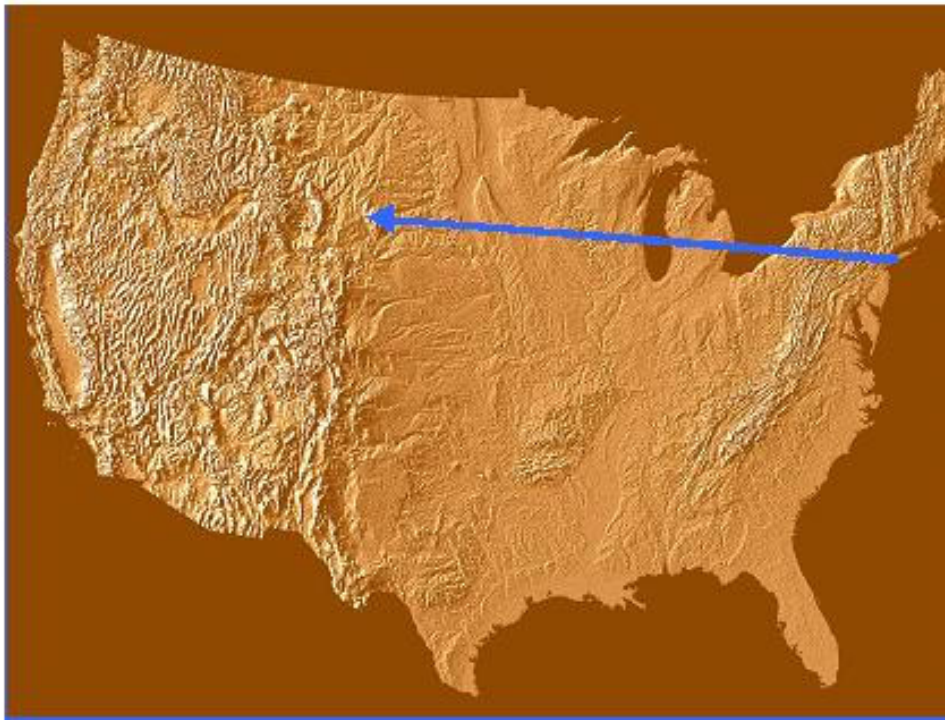


Detector

Phase Mass

1 0.5 Mtons

2 1.0 Mtons



Enhanced AGS

Phase Power

1 0.53 Mw

2 1.3 Mw

Neutrino Beam from Brookhaven National Laboratory to
the National Underground Science Laboratory

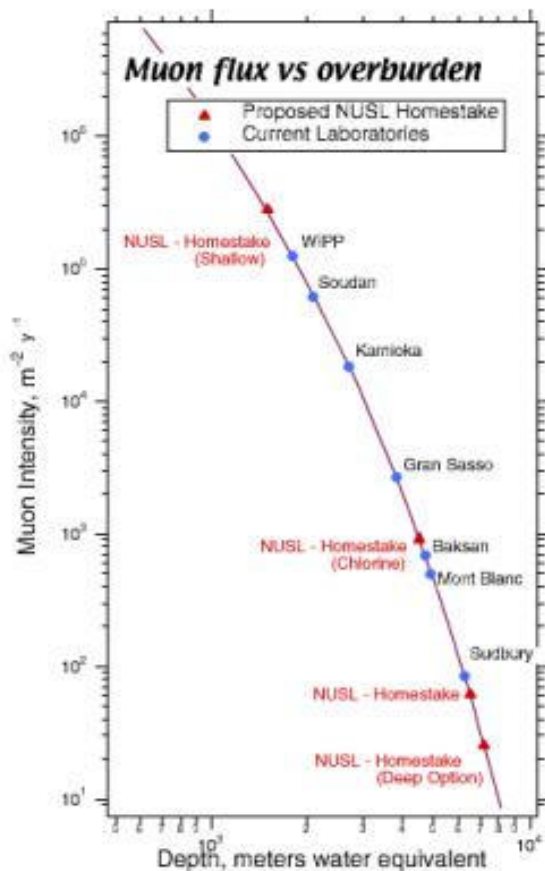
Neutrino flight path – 2540 km

Letter of Intent- <http://minos.phy.bnl.gov/nwg/papers/nwg-loi.pdf>

Muon Intensity at NUSL from AGS Neutrino Beam

Phase	AGS Power	Detector Mass	Muons/Year* (Quasi-Elastic) (if no oscillations)
1	0.53 Mwatts	0.5 Mtons	1060
2	1.3 Mwatts	1.0 Mtons	5200

* Assuming "one accelerator year" = 130 days



Cosmic ray flux at depth of 3M
 Detector = $0.2 \text{ muons}/m^2, \text{ day}$

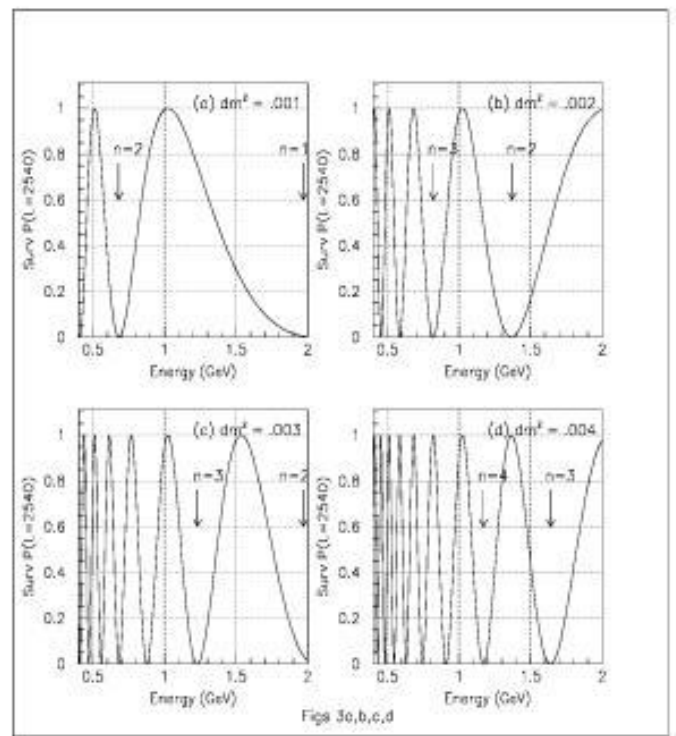
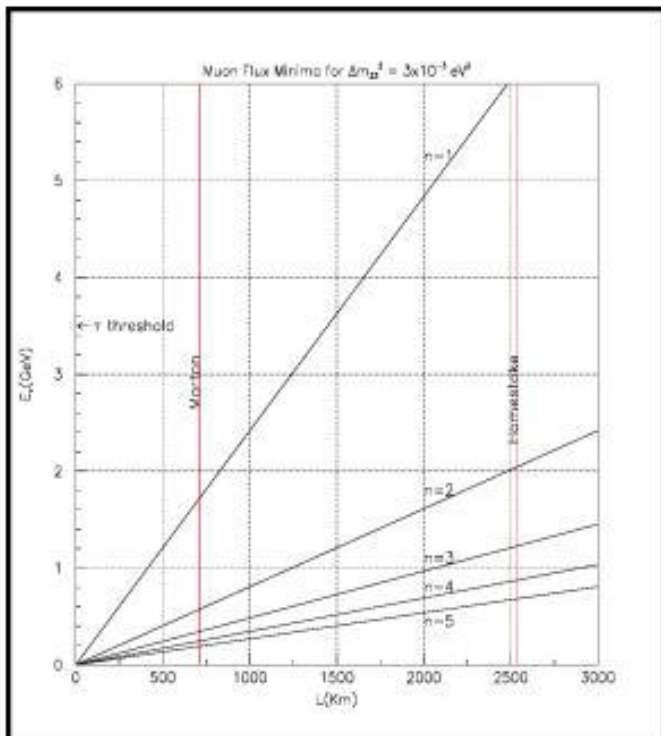
Each 100 kT module has an area
 of 2000 m^2 and thus $800 \text{ muons}/\text{day}$

Assuming a neutrino pulse width of
 one microsecond/sec gives

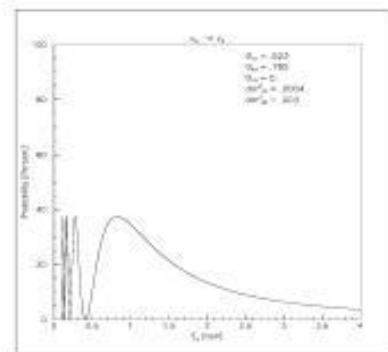
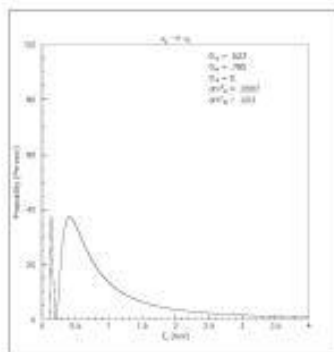
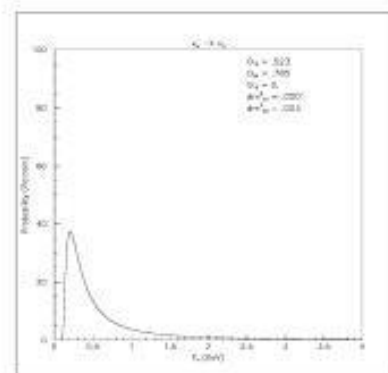
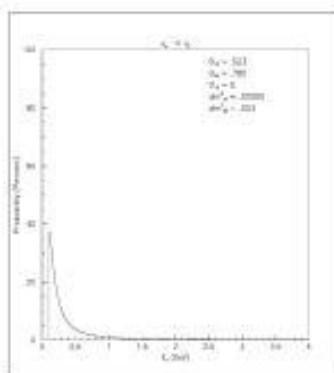
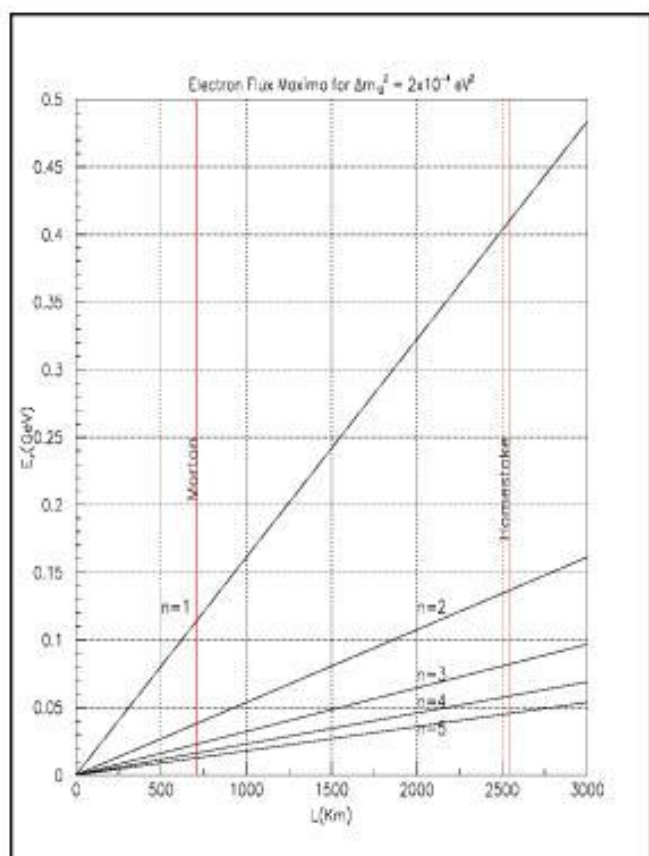
0.5 cosmic ray muons/year

in the 10 module Megaton detector
 during the AGS neutrino pulses

Neutrino Oscillations at 2540 km -muon neutrino disappearance



Neutrino Oscillations at 2540 km electron neutrino appearance



MEGATON MODULAR MULTI-PURPOSE NEUTRINO DETECTOR

✓ Estimated Costs For 1 Chamber (\$MM)		
⇒ Labor & Benefits		\$ 5.51
⇒ Mining & Construction		
★ Equipment Operation	\$ 1.30	
★ Supplies	\$ 4.51	
★ Precast Concrete Liner	\$ 3.25	
	Subtotal	\$ 9.06
⇒ Other (Outside Contractor)		\$ 0.12
⇒ 15% Contingency		\$ 2.20