



# NOvA Project Status

July 3, 2007

John Cooper

Ron Ray

Nancy Grossman



# EA Schedule (might slip a day or two)

---

- June 22 (Friday) provide to Project
  - **Ch 1 (Intro), Ch 2 (Purpose & Need) got it Monday 6/25,**
  - **Ch 3 (Proposed Action)**
  - **Ch 4 (Affected Environment) got it Wednesday 6/27**
    - This one depends on seeing updated EAW today,
    - **SEH & U of Minn promise it, got it on Friday 6/22**
- June 25 (Monday)
  - **Ch 5 (Potential Environmental Impacts)**
- June 26 (Tuesday)
  - **Ch 6 (Accident Analysis) got it Friday 6/29**  
Returned my comments on 6/29
- **None of the above have updated figures, concentrate on text**
- June 27 (Wednesday)
  - **Exec Summary, List of Permits, Glossary, References, List of Preparers**
  - **Cover, Table of Contents, Figures & Tables**



# EA Schedule (might slip a day or two)

- June 28 (Thursday)
  - Consolidated Document, hopefully ready to pass to DOE
  - Above does not include a line by line response to the 265 DOE comments
  - Followed by meeting with DOE NEPA Team after they read and provide comments?
- Schedule for URS's Larry Lockett
  - staying in San Antonio this week
    - Exchanged emails yesterday
  - We still hope to get Ch 1- 4 to Sally Arnold this week
  - Next week he is off part of the week
  - Next at Fermilab on July 18, hopes for DOE meeting then



# July

1	2	3	4	5	6	7
8	9 EQB deadline for 7/16	10	11 UMN Regents	12	13	14
15	16	17	18 Larry here	19	20	21
22	23 EQB deadline for 7/30	24	25	26	27	28
29	30 EAW publish, start 30 day clock	31	1	2	3	4



# Project Cost & Schedule Plan

from ~ June 11

- Fix errors by June 20
  - **Done, you saw details on June 22, reduced cost by \$ 2.45 M**
- Implement Cost Saving Ideas
  - **~ 45 ideas from L2s and Project Managers, will show next**
  - **We discussed these in our Technical Board on June 28, July 5**
  - Bill Freeman puts ideas approved by me into schedule starting on July 9
  - Hopefully implemented and escalated by July 17 – 19
- Next tune kilotons to match \$ 260 M
  - Version 1 by July 23-25
  - Version 2 (final) by July 30-31
- Ready for one-by-one L2 reviews Aug 6 – 17
- Followed by all day C&S review on August 21
  - Thought to be breakout sessions all day (no talks?)
  - with BOEs, Risks, EVMS method assignments,



# Cost Savings Overview

Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved
<b>Total</b>	<b>24,492.5</b>	but many are double counted	<b>9,006.0</b>



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
1.x					
	<b>Drop the IPND, just build an 8 plane object and quit</b>	580.0	Savings are likely small, perhaps zero in parts since parts are dominated by injection molding, but save assembly labor (at least 75% of 444 K\$) and work in the MINOS Service Bldg (245 K\$)	-	<b>Prototype remains an important task.</b>
			Could just test 8 planes in a testbeam and learn most of what we need on how the detector fits together		
			Dropping this test increases the risks that we won't find problems with neutrino event recognition until Ash River. Another object of the IPND is to do a long term test of the electronics, cooling, ... and an 8 plane test cannot duplicate the statistics of a 196 plane test running 24x7.		
			Since we intend to re-use 3 of the 4 modules, it just moves these costs downstream to the Near Detector. Except for the MINOS bldg. work.		
	<b>Drop the direct refrigeration effort on the IPND</b>	90.0	This is for 2 of the 4 IPND blocks. The C&S has 4 blocks cooled by water. IPND has 4 blocks total, but apparently 6 are being cooled.	?	<b>evaluating</b>
			No progress since the cooling review due to other draws on people's time.		
			Recall this method held the prospect of savings perhaps as much as \$ 1 M compared to a water system. But this is yet to be proved. A flexible quick disconnect was the major unsolved problem for direct refrigeration.		



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.0.					
	Move the Gap Kickers off project	6,000.0	Note our Director's Review suggested this one. Doesn't work unless there are buildings in which to do the work. Current plans slide buildings downstream two years, then the argument that the work is useful for others is less robust? Maybe the argument is more robust since clearly needed if any of the complex is to remain operational?	?	
			Don't expect an update on buildings until March, 2008.		
			This is one of the 5 systems + R&D (& it's the most sophisticated of the systems).		
			High risk since these are the very people pulled many ways by other accelerator duties.		
	Plug Horn 2 hole with T-Blocks	400.0	"modified" T-blocks, but cheaper than construction of a "dummy module" in the current plan.	400.0	
	Take credit for NuMI Target Hall chiller work already occurring in FY07	100.0	This is part of the tritium mitigation work funded by the Directorate.	100.0	



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.0.					
	Additional NuMI Cooling System upgrades are not known to be essential, ...	1,500.0	Could we drop them? Or reduce contingency? Or what?	?	evaluating
			Hard to make a plan without the studies to see what is needed & studies are part of the C&S task for this cooling. Previous NuMI descope removed		
			Will take more than a year to do the studies		
			Nancy / Elaine will try to develop a plan that takes some middle ground.		
	Further optimization of Kicker designs	500.0	Might have an answer on the timescale of August 1. The question is one of the number of bumpers. Might relax specs and then build only 1 of 3 as a risk mitigating backup.	?	evaluating
2.1.					
	Reduce HVAC to 10,000 cfm	107.5	This is based on Guarino's ANL work in NOVA-doc-1975 v2 where the limit is raised to from 5 to 10 ppm (<50 is required) Outgassing rate also seems MMA is trapped between our layers of PVC. Probably should check the calculation before changing plans? Two units, save 43 K on each + 25% contingency	-	



# Cost Saving Ideas, details

	<b>Suggestion</b>	<b>Estimated Savings (\$K incl. contingency)</b>	<b>Comments</b> <i>(blue text since 6/28 Tech Board mtg)</i>	<b>Project Manager Approved</b>	<b>PM Comments</b>
2.1.					
	<b>Combine the two MMA ventillation systems into one</b>	250.0	The glue machine is close to the edge of the Assembly Area and MMA is heavier than air. Can we duct the glue machine over the edge or through the concrete floor and use one 20,000 cfm system sucking from the bottom of the Assembly area?	<b>250.0</b>	
	<b>Reduce loading dock by one 24 ft bay</b>	200.0	The Assembly group in WBS 2.9 accepts this as a possibility but warn that it will make their job tougher. They would compensate some with an excess parts trailer parked at one roll-up door (for leftover pallets, ....). Still need the same number of truck bays.	<b>200.0</b>	<b>need trailer rental data</b>



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.1.					
	Reduce the Access Road to one lane	528.8	one lane is ~ 30% of the roadbed width, but likely only save 15-20 % since need some kind of signaling system as yet unestimated.	-	safety issue
			Report from Mark that SK had such a road. <a href="#">This was a 1 mile public paved road on the side of a mountain.</a>		
			But we are building a public road, not a private driveway. U of Minn will have an easement for the access road and will not own the land. Other owners will want access to their land on their terms.		
			The current logging road probably sees one round trip per week. We intend 10 truck round trips per week + 35 round trips for people in the workforce daily (140/wk).		
			The EAW has the above # of trips + 40 - 70 trips per day during construction. The EA has to treat this traffic as well. Both these documents are in their final revision. Changing plans now to a different type of road would require more work. We submit these documents in about 3 weeks.		others more motivated by this issue and the next line.
			We intend the Access Road to be a CD-3a request with an Advanced Technical Design. Changing the road design now runs counter to this effort and will cause a delay on regenerating 40 pages of drawings.		



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.1.					
	<b>Don't pave the Access Road</b>	740.0	Part of the \$ 740 K is for road markings and signage, so we wouldn't save it all.	-	<b>safety issue</b>
			Gravel roads are notoriously bumpy. They require intense maintenance that nobody ever does to keep the bumps under control. They are not designed for truck traffic. A quick web search shows some evidence that typical gravel roads in Minn are limited to 5 ton/axle. Overloading roads by a factor of 2 reduces road life by a factor of 4.		
			<u>6/29 information that we actually have to pave the road earlier in the project. The concrete roof planks will require a road rated for 9 tons per axle. Independent cost estimates of the building have pointed out this fact.</u>		
			A gravel road may require a redesign of the road. We would have to assess the design for curves and slopes for safety. Again this runs counter to our CD-3a request and existing EA work.		<b>others more motivated by this issue</b>
			We already worry about how to pack the final modules so that they will not suffer transportation damage and even spend money to recheck them all after arrival at Ash River. A gravel road increases this risk.		



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.1.					
	No shielding on the North end of the Assembly Area, leaves detector open to cosmic rays from the North	1,677.0	Mark & Leon: If the angles shielded are shallower than 45°, this would not be a problem. Shower shape tells us direction. Mark will need the month of July to do the full analysis.	1,677.0	
			As a risk mitigation, we could stipulate use of existing Fermilab blocks in an operating phase. There are many blocks at B0, C0, and D0 tied to the Collider program which will end before we need blocks.		Transporting Fermilab blocks estimated at ~ \$ 135 K.
			There is a similar suggestion to make cheaper shielding blocks with an estimated cost savings of ~ 600 K\$, but clearly NO shield at all is the cheapest.		
			May need a chipboard curtain wall at the edge of the Loading Dock after assembly to properly separate the fire protection areas. Need 1 hour fire barrier. Or a stud and sheetrock wall. Or use the block pivoter bookend as most of the wall and just trim out around the edges to the walls.		
			This may impact supernova searches, but such searches are not part of the base construction project.		Supernova proposal would have to consider need for shielding and cost for transport of blocks as a minimum.



# Cost Saving Ideas, details

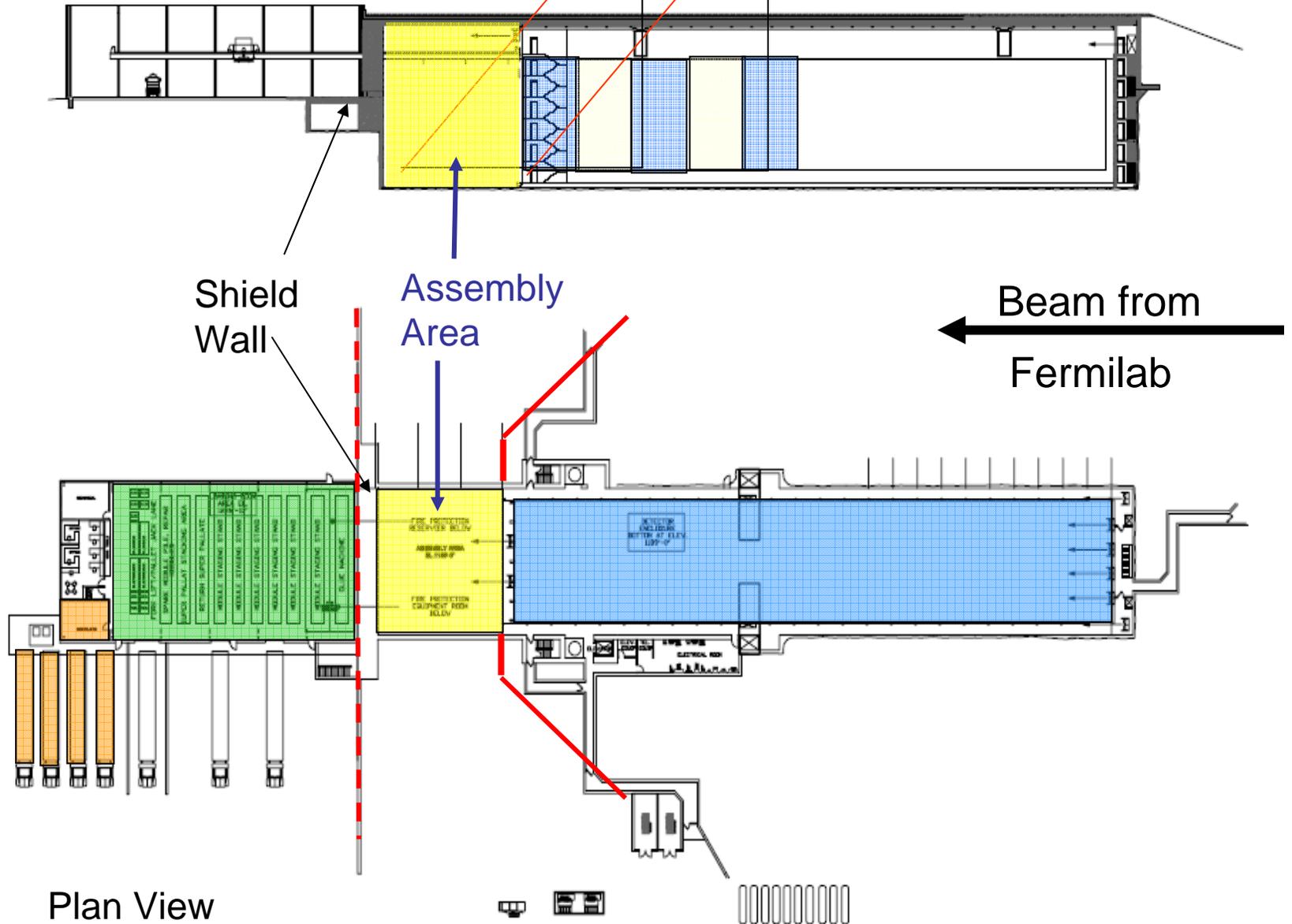
	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.1.					
	<b>No shielding over the Assembly Area either, use a Pre-engineered building in this area instead. Save shielding \$ and building construction \$.</b>	1,365.0	70 feet at 24 K\$/ ft replaced by pre-engineered building at ~ 120 \$/ sq ft.	<b>1,365.0</b>	
			For the 45° criterion, we appear to be safe for a <b>20 kt detector</b> .		
			Since it's 45° from the south we are worried about.		
			This facilitates installation of ventilation duct work, access passages.		
	<b>If reduce shielding over Assembly Area, can we also reduce the berms on the sides of the detector hall?</b>	unknown	Yes, again use the 45° criterion. Berms can be cut back from the north end of the building at 45°.	-	<b>Still evaluating</b>
			As a risk mitigation (or for supernova searches), make sure the side berms are 10 ft thick granite before they taper away.		



# Cosmic Ray Shield diagrams

Cross section

Each colored rectangle is ~ 2 kt



Plan View



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.1.					
	<b>Fewer Catwalks</b>	380.0	Currently 2714 K\$ for 7 levels.	<b>130.0</b>	
			Could we at least lose the bottom one? And 1/7 <sup>th</sup> of the cost? Note the actual levels need re-adjustment anyway to match manifold spacing.		
			Estimate on 6/29 notes still need catwalk supports, so only save 130 K\$ maximum.		
			Should we re-examine a different solution? E.g. leave the top catwalk, but replace the rest with a system that moves vertically like around the pivoter, but also translates horizontally? It was ruled out as not cost effective long ago, but under what conditions? Steve recalls questions about how such systems blocked the exit aisle when on the bottom level...		
	<b>Loosen Temp / Humidity requirements on the Loading Dock</b>	94.0	The delta T and delta RH requirements strongly drive the design. Savings not clear since this is now tied up with the MMA ventilation requirements. \$94K is perhaps a minimum.	?	<b>Assembly Group must evaluate the effect on the PVC of delta T and delta RH ranges. Time scale is more than two weeks.</b>
			At CD-1 the requirements were 60 °F for heating with propane fired unit heaters, 90 °F in summer (ventillation only), and NO humidity restrictions.		
			Could we use refrigerated trailers to acclimatize the modules? Maybe even on the whole trip from Factory #2 ?		



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.1.					
	Eliminate Elevator	217.0	Restricts loads to those that can be hand carried. May have repercussions on emergency removal of injured personnel May have ADA implications.	-	
	Jib Crane instead of 10 ton crane	266.3	quotes for both exist, (251-38) = 213 K\$ is the difference + 25% contingency Dave Ayres believes a jib crane was shown to be too slow for the assembly tasks. Such cranes are not powered for horizontal movements. Bill Miller says the problem with the jib crane is not speed, but that it would be a very non-standard jib. And therefore expensive, apparently more so than a 10 ton bridge crane -- the 38 K\$ estimate is just wrong.	-	
	Two Jib cranes to replace all bridge cranes?	592.5	Means one on the wall in the middle of the Assembly Area. Saves less because a 10 ton jib cost more (guess at 50% more) ==> (251-1.5*38) = 194K\$. Saves an additional 280 K\$ because now the crane rail support structure is not needed.	-	
	Replace 25 ton bridge crane with a 10 ton bridge crane	50.2	Again, wrong jib crane estimate quotes from Liftmaster in NOVA-doc-1915.	50.0	



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.1.					
	<b>Eliminate Barite, leave as future shielding upgrade if shown to be required</b>	1,253.0	Mark indicates this risky, since cosmic backgrounds go up a factor of 50. Mark would want to do the complete analysis.	<b>250.0</b>	
			We would have a risk mitigation in place since the roof would be designed to hold 12 inches of barite but would start with zero inches.		
			However, we can eliminate the barite over the Assembly Area with no penalty (except perhaps for supernovas)		do this one.
	<b>Analyze power bill with an eye to reductions in the estimate</b>	none	In the "errors fixed" version of the schedule, the full power bill has been properly transferred off-project to the Cooperative Agreement operations phase. So this suggestion is now moot.	-	
	<b>Reduce maintenance costs at Ash River</b>	none	In the "errors fixed" version of the schedule, all maintenance costs have been properly transferred off-project to the Cooperative Agreement operations phase. So this suggestion is now moot.	-	
	<b>Shorten the building one more time.</b>	900.0	Currently long enough for a 20 kt detector. Reduce to a length for an 18 kt detector. That's 30 feet shorter in the deep pit @ 24K\$/ft	?	<b>Still evaluating.</b>
			295 ft would go down to 265 ft. 18 kt takes 257 ft.		



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.3.	Reduce the fiber quantity.	1,040.0	The Director's Review had fiber for a 20 kt detector, justified as needed for spares since we do not yet understand breakage. Carl and Ron estimate a cost of 0.65 \$/m if we buy 16,200 km for 18 kt vs. \$0.63 / m if we buy 18,000 km for 20 kt. That's \$ 10.53 M vs. \$ 11.34 M, and ~ 4% spare for a detector @ 18 kt. The difference is 0.81 M\$ + 28% contingency = 1.04 M\$	1,040.0	
			Carl is estimating the price with minimal information. Ron has done a different extrapolation using 0.8mm and 0.7mm data. We probably will have to go back to Kuraray for a defensible quote/BOE.		
			This is like WBS 2.2 -- we scale to the final kt, but current thinking for fiber (long lead time single vendor) is to scale to some final maximum number of kt we might achieve. Could also change that philosophy, but then any upscope might cost an extra > 100% per meter. E.g., buying 18 kt now and 2 kt later implies a price increase of > 2,000 K\$ eliminating the amount saved above on the 2 kt.		
			Can we structure a contract so that we can get extra fiber at the base price of our main buy? Yes, Bob Cibic believes this can be done as long as the company gets notified of the option well before shutting down production (so they don't have to restart later). So, we might buy just enough for 16 kt (say ~ 13,500 km at \$0.69/m). This is \$ 9.3M + 2.6 M contingency vs. the \$ 11.5 M + 3.2 M contingency in the current C&S at \$.63/m for 18,000 km for 20 kt. Saves \$ 2.8 M, but allows no upscope. Then with the option for another 2-4 kt at the same \$0.69/m price we would know how to upscope and not have to pay higher price.... John Cooper, Ron Ray, Nancy Grossman		This part is left for the next step when we downsize the detector mass



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.3.					
	<b>Drastically reduce the QA effort on fiber</b>	1,041.3	MINOS survived by just sampling to check the Kuraray results, reduce our effort to 10% of the spools vs. all of them?	?	<b>Still evaluating</b>
			But we have clear evidence that Kuraray cannot maintain a standard quality in just the small amount of fiber we have seen to date. Variations at 16m are just way larger than the variations at 8 m seen by MINOS.		
			Our allocation of assembly random errors is dominated by the fiber errors. See Chapter 6 of the TDR.		
			We have already been criticized in reviews about our QA, how do we defend doing less at this stage? Maybe we can reduce the effort later and convert \$ to kt, but how to claim that now?		
			Carl will add a task to produce a QA device to be stationed at Kuraray. This will be identical to the MSU device.		
			Carl will think about a possible phased program of QA after looking at his BOE again.		



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.5.					
	<b>Reduce number of factories to ONE</b>	2,760.0	Ken has done a cost benefit analysis on multiple scenarios. The cheapest one (by ~ 113 K\$) is a single factory in Duluth, followed by a single factory in Minneapolis. Dropping the Fermilab factory saves 2,760 K\$, mostly in labor. Options of a single factory at Extrutech or at Ash River do not seem cost effective. Labor rates have now been checked	<b>2,760.0</b>	<b>See full Cost / Benefit analysis</b>
			A single factory will make us more vulnerable to a fire. This risk will have to be evaluated formally. Fire alarms get people out, fire protection saves the building but not the detector parts or assembly tools, so aggressive fire prevention is required or we could suffer a big delay. Ken will put this in his formal risk analysis.		
	<b>Counter suggestion to make sure we have two complete factories, each capable of all the work</b>	not a cost savings	The idea is that if the building completion is delayed (aren't they all?) then we may have to accelerate the assembly. This is more easily done with two factories. Also a plus of keeping the costs under control if there is a little competition.	-	



# Factory Cost / Benefit analysis

Factory Model Cost / Benefit Analysis								
	Rates Used (trans \$/mi, space \$/sq ft, work \$/hr)	Fermilab Wideband + Minnesota Warehouse	Fermilab Warehouse + Minnesota Warehouse	One factory at Minnesota	One factory at Duluth	One factory at Extrutech	One factory at Ash River	
Transportation to Factory 1	2.3 miles	195	195					
Workspace costs at Factory 1	7 sq ft		4,000					
Supervisor hours at Factory 1	89 hours	5,648	5,648					
Tech hours at Factory 1	62 hours	26,080	22,068					
Storage costs at Factory 1	7 sq ft		6,000					
Transportation to Factory 2	2.3 miles	385	385	318	371		508	
Workspace costs at Factory 2	7 sq ft	40,000	40,000	40,000	40,000			
Supervisor hours at Factory 2 (rates with off-campus overhead)	58 hours	5,648	5,648	5,648	5,648			
Oversight tech hours at Factory 2	42 hours	5,648	5,648	11,295	11,295			
Student Tech hours at Factory 2	17 hours	90,123	90,123	102,093	102,093			
Storage Costs at Factory 2	7 sq ft	25,000	25,000	25,000	25,000			
Supervisor hours at Ash River	42 hours						5,648	
Tech hours at Ash River (rate verified by Bill Miller)	24 hours						113,388	
Supervisor hours at Extrutech (rate from Rich Talaga)	65 hours					5,648		
Tech hours at Extrutech (rate from Rich Talaga)	40 hours					113,388		
Storage Costs at Extrutech (note only 50,000 of the 65,000 sq ft is available at Extrutech)	5 sq ft	25,000	25,000	25,000	25,000	65,000	25,000	
Build Factory	120 sq ft						50,000	
Transportation to Ash River	2.3 miles	272	272	272	140	509		
<b>Total Cost:</b>		<b>6,881,477</b>	<b>6,842,710</b>	<b>4,918,059</b>	<b>4,832,297</b>	<b>6,430,210</b>	<b>9,885,013</b>	
total transportaion miles:		852	852	590	511	509	508	
Labor cost in above:		4,216,546	3,967,779	2,537,555	2,537,555	2,958,528	2,958,528	
<b>42% contingency on labor:</b>		<b>1,770,949</b>	<b>1,666,467</b>	<b>1,065,773</b>	<b>1,065,773</b>	<b>1,242,582</b>	<b>1,242,582</b>	
<b>32% contingency on lease &amp; transport = (total-labor):</b>		<b>852,778</b>	<b>919,978</b>	<b>761,761</b>	<b>734,317</b>	<b>1,110,938</b>	<b>2,216,475</b>	
<b>Factory 1 setup charge:</b>		<b>100</b>	<b>314</b>					
<b>Factory 2 setup charge:</b>		<b>314</b>	<b>314</b>	<b>314</b>	<b>314</b>	<b>314</b>	<b>100</b>	
<b>Total w contingency:</b>		<b>9,505,618</b>	<b>9,429,783</b>	<b>6,745,907</b>	<b>6,632,701</b>	<b>8,784,045</b>	<b>13,344,170</b>	
<b>Delta from Director's Review:</b>			This is the closest number to the Director's Review, so compare others to this one	<b>(75,834)</b>	<b>(2,759,710)</b>	<b>(2,872,917)</b>	<b>(721,573)</b>	<b>3,838,552</b>
Delta from lowest estimate:		2,872,917	2,797,082	113,206	-	2,151,344	6,711,469	

ignore tools, since only one set no matter where they are located. Second order effect on the size of a "set".



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments <small>(blue text since 6/28 Tech Board mtg)</small>	Project Manager Approved	PM Comments
2.6.					
	Squeeze testing time for APDs	140.0	Increase the throughput of the testing machines. Also lower contingency from 100% to 50% since tests have already been done now.	140.0	
	Raise dark current threshold on APDs from 5 nA to 10 nA	828.0	Roger's interpretation of Hamamatsu cost increase memo. "20% of price increase due to yield factor by tolerance,..." 20% of increase is \$33 per APD + 57% contingency, so on 16,000 devices this is 828 K\$	?	Still evaluating
			John O says technical ramifications still need thought.		
			Dark current increase from 5 to 10 nA means ~ 6 p.e. of noise. This risk needs simulations which will take about 2 weeks. It may be possible to allow 20% of the devices to have dark currents in the range 5 - 10 nA to keep costs down (yield question) -- could use higher dark current devices on horizontal cells where noise is less critical.	?	



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.6.					
	Reduce number of APDs	334.0	The current Hamamatsu quote is for 16,000 devices. This is enough for 20 kt (42 blocks) + 2.4% spares. If we reduce this to what we need for 18 kt (38 blocks), we only need ~14,500. At the price in our schedule ( \$425 each + 57% contingency), this would save \$ 334 K. However we do not understand very well how this price changes with quantity. Hamamatsu told us the price increased by 10-15% when we dropped the quantity from 25,700 on 11/14/05 to 16,000 on 5/31/07. If increases another 10 - 15% when we drop to 18 kt, then savings is reduced to \$ 260 K.	260.0	
			We would need a new quote from Hamamatsu for any reduced number. BEST TO ASK ONLY ONCE.		
	Like with fiber above, buy for 16 kt and have an option for more at the 16 kt price	?	As in fiber above, Bob Cibic believes this can be done. It is harder with Hamamatsu because they can deliver all the APDs before we can decide if we can upscope. So the condition of "not shutting down the production line" can't be met. Well, actually it would be met perhaps by the time the building is done -- maybe that can be the option trigger in this case?	?	This part is left for the next step when we downsize the detector



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.7.	No items suggested		Have we really squeezed the software tasks to get scientists doing as much as possible?		
			Leon says he has filled 75% of his plea for help from last fall.		
			Gary notes that new Collaborators (e.g. Tennessee interested) could help here.		
2.8.	Use all 4 IPND modules in the Near Detector instead of just 3 of the 4.	175.0	Savings: One third of Near fiber = 23 K\$. One third of Near module M&S = 10 K\$. One third of Near module SWF = 120 K\$. One third of Near cradle structure = 22 K\$.	175.0	Will need to add contingency to the IPND R&D task however



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.9.					
	Shorter Loading Dock	already above	But will add a task to rent a trailer near the loading dock for excess packing materials.		Evaluating trailer cost.
	Need access tunnel from loading dock to catwalk / elevator	cost increase, not savings	difficult to do inside the granite berm, might be easier if the Assembly area is not shielded.... Dave Ayres suggests removing the labyrinth tunnel and installing an access tunnel which is more useful.		Easy to do with Assembly Area as pre-engineered building
	Need transportation costs to get shipping materials from Ash River	cost increase, not savings	Bill & Earl believe this was left out, Dave confirms.		
	Assembly Area needs to be ~ 20 feet longer	cost increase?	Drawings seem to indicate that a block pallet cannot be placed on the south end of the pivoter with the crane.	-	Still evaluating.
			Not a cost increase if we nibble on the 20 kt space to gain whatever is needed. OK as long as we don't go below 18 kt.		
	Reduce pressure testing time at Ash River	no change?	Reduction in time from 24 hours to 8 hours (Ken is the source of this smaller number) makes a shorter loading dock more palatable. Labor to set up and record results is presumably the same and only the testing time is changed.	-	



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments (blue text since 6/28 Tech Board mtg)	Project Manager Approved	PM Comments
2.9.					
	<b>Move Machine Shop outfitting to CA Operations phase</b>	49.0	There is only room for a very small Tech shop in the current design. M&S only in 2.9.2.2. BOE does not agree with "errors fixed" Cost & Schedule. Used "errors fixed" C&S number here.	<b>49.0</b>	
			Labor is covered in 2.9.4. BOE says labor is 20 hrs "Lab Manager" (who is on CA) + 160 hrs tech.		
	<b>Move Office Area outfitting to CA Operations phase</b>	67.0	M&S only in 2.9.2.6. BOE does not agree with "errors fixed" Cost & Schedule. Used "errors fixed" C&S number here.	<b>67.0</b>	
			Labor is covered in 2.9.4. BOE says labor is 20 hrs "Lab Manager" (who is on CA) + 80 hours tech.		
	<b>Move Safety Equipment to CA Operations phase</b>	93.0	M&S only in 2.9.2.7. BOE does not agree with "errors fixed" Cost & Schedule. Used "errors fixed" C&S number here.	<b>93.0</b>	
			Labor is covered in 2.9.4. BOE says labor is 20 hours "Lab Manager" who is on CA + 160 hours tech. Also talks about 4,124 hours total (time of assembly crew in training) and this does belong on 2.9.4.		
	<b>Transfer all Building Operations labor to</b>	unknown	Bill Miller is working on this one. We have to keep the partition very clear in each case or the BOEs will be too confused.		<b>Still evaluating</b>
			<i>It is believed that at least 1 FTE belongs off-project.</i>		



# Cost Saving Ideas, details

	Suggestion	Estimated Savings (\$K incl. contingency)	Comments <i>(blue text since 6/28 Tech Board mtg)</i>	Project Manager Approved	PM Comments
2.10.					
	Reduce Project Management Cost?	net of zero?	Will attempt to put in defensible peaks and valleys in ES&H and Project Engineering correlated with expected work loads year by year. Ramp down of scheduling effort is already in there. An expediter as suggested strongly by the reviewers is not in there.		



# Other items

---

- New Admin started July 2. Eta Johnson.
- Scheduling Support?
- Technical Writing Support
  - Added Bob Bernstein to get documents consistent
    - He will also help proof TDR
    - He will also pick up an expediting task
      - Meet with Bob Cibic weekly.
  - URS dropped their search
- Engineering
  - Later, not now.