Dear Mr. Davies:

Please find answers to your questions below. We have repeated your questions for completeness and clarity. The specific term *Cost DataBase,* used below several times, refers to the Excel sheet named 'Combined Rebaseline Cost Workbook' in the Excel Workbook file, found on DocuShare at the link Final Combined Rebaseline Cost Workbook PY5-PY8 Rev1.xlsx.

In general, documentation may be found under the DocuShare collection Independent Cost Estimate documents.

> Our answers will be block indented with a thick bold line to help readability.

1. NSF Master Staffing Plan, a costing template generally used for staffing estimates was provided to your team to be populated with this proposal estimates. If the data entry has been completed, please send us the fully populated file.

> A completed Master Staffing Plan template is located at 01 – Master Staffing Plan in the DocuShare directory with information for this cost review.

2. Please confirm that salaries proposed in the Rebaseline Cost Workbook and subsequently escalated, were based on salary levels of FY 2022 (October 2021 – September 2022).

> Salaries of existing personnel were based on actuals as of FY 2022 (early Spring 2022) and have been escalated beginning October 2022 and each year thereafter.

   a. If the salary levels proposed were based on salary range policy of UW-Madison, please provide the salary policy and highlight sections or bands that apply to specific Senior and Other Personnel.

> A few cases exist where this applies as these were unfilled positions at the time of cost estimation. Row 11 of the *Cost DataBase* represents labor resource for project financial management. There was an open position for Research Administrator (SC029) with salary range of $46,000 - $93,940. Row 12 is for project controls labor (scheduling, EVMS) and was advertised as a Project Manager II (AD016). All positions in the UW System along with salary range policy is documented at Title and Standard Job Description Library – Human Resources – UW–Madison (wisc.edu).

   b. If the request in Bullet 2a (above) is not applicable, then please provide a recent payroll summary report that shows salary (pay period salary and annual salary) of personnel in this proposal. Please redact any information that is deemed confidential and irrelevant to the purpose of this review (personal address and/or social security number).

> Payroll summaries for existing UW personnel are located at this link.

   c. For proposed personnel who are not employees of the university, please provide a recommended salary reference from the Bureau of Labor Statistics Standard Occupational Classification (BLS-SOC), that you could use as basis of estimate to justify their proposed rate: https://www.bls.gov/oes/current/oes_stru.htm

Postdoctoral labor at University of Alabama was estimated using that university's historical salary data for postdoctoral researchers, $28/hr, and is well under the BLS median for Physicist (19-2012).

3. Please confirm if the university's policies include a clause that allows for personnel in this proposal budget to be compensated beyond their base salary (overload pay). Highlight specific personnel who may be scheduled to receive such compensation beyond their base salary and send us a copy of the policy that allows for this practice.

UW policy UW-5031 covers overload appointments. There are no personnel currently planned to work in this situation.

4. Proposed Fringe rates of 17.38%, 29%, 31%, 32%, 35%, and 40%, applied to select personnel, could not be matched with the approved fringe rates in UW-Madison's NICRA. Please elaborate on these options elected in the proposal. Why were the NICRA rates not used?

These listed fringe rates are the negotiated fringe rates for the subaward institution where those personnel are employed. The institution is indicated in column C of the *Cost DataBase*. See a short summary of the various fringe and indirect rates at the collaborating institutions in the Rate Table_Rebaseline.xlsx file.

5. Similarly, indirect cost rate (IDCR) of 58.05% and 54.50% were applied to select employees, when the majority of others were applied rates from the NICRA, 53% for the majority of the data. Please explain the departure and why a different treatment was applied to Project Admins Cowen and Sullivan respectively.

See answer to question #4. Specifically, Cowen is at Penn State University (PSU) and Sullivan is at University of Maryland (UMD).

6. In the Upgrade Budget Justification, contingency reserve was estimated at $3,696,326. This amount is consistent with the gross total budget from NSF Form 1030 ($18,427,950.87) and total WBS elements, where total direct costs is recorded at $14,731,824.40 ($18,427,950.87 minus $3,696,326). However, the Rebaseline Cost Workbook appears to show a total contingency reserve of $2,286,509.99 (uncertainty amount of $1,835,084.48 + IDC of $451,425.51). Please explain the variance of $1,409,816.

The numbers quoted above are only "Estimate Uncertainty" (EU) part of the contingency. The complete EU is $1,835,084.48. This *includes* IDC of $294,774. However, in researching this question we found that the column S of the *Cost DataBase* was presented in a way that was misleading and could easily be interpreted as an additional indirect amount. This column was corrected and the spreadsheet re-uploaded. It had no impact on the overall budget or 1030's – it was an obsolete column that we forgot to delete.

The full contingency is the "Estimate Uncertainty" + the impact of the "discrete risks". The discrete risk contingency amount is a total of $1,861,241 and is documented in the project's Risk Management Plan. This total is spread out evenly over the first three years of the rebaselined project, so a total of $620,414 in PY5, PY6, and PY7. This is shown in the pivot table tabs for each project year in the cost workbook.

For example, in the tab "PY5 Pivots" you see the following table: (EU stands for "Estimate Uncertainty").

Sum of EU Direct PY5	Sum of EU Ind PY5	Discrete Risks Direct	Discrete Risks Ind	Discrete Risks Total	Total Contingency	Total Direct	Total Indirect
572,007.85	108,575.79	521,437.27	98,976.73	620,414.00	1,300,997.64	1,093,445.12	207,552.52

A summary of contingencies for all years is shown below:

	Estimate Uncertainty (EU)		Discrete Risk			Total Contingency	
	Direct	Indirect	Total	Direct	Indirect	Direct	Indirect
PY5	$ 572,008	$ 108,576	$ 620,414	$ 521,437	$ 98,977	$ 1,093,445	$ 207,553
PY6	$ 397,022	$ 82,643	$ 620,414	$ 513,521	$ 106,893	$ 910,543	$ 189,536
PY7	$ 346,221	$ 71,744	$ 620,414	$ 513,920	$ 106,494	$ 860,141	$ 178,238
PY8	$ 225,060	$ 31,811	$ -	$ -	$ -	$ 225,060	$ 31,811
Total	$ 1,540,311	$ 294,774	$ 1,861,242	$ 1,548,878	$ 2,364	$ 3,089,189	$ 607,138
Base + Contingency		**$ 1,835,084**					**$ 3,696,326**

7. It appears the bulk of capital equipment and labor proposed at a total of $6,278,909 will be used in WBS 1.2. Kindly provide a matrix that itemizes each equipment to be procured in this regard, the corresponding cost, with a cross-reference to the specific vendor quote or open market price list that was elicited as basis of the estimate(s). If past performance or experience was the basis for a rough order of magnitude (ROM estimate) on any equipment piece, then please provide relevant data from a similarly situated program to support the proposal estimate. A spreadsheet format is preferred for your matrix presentation please.

We have updated the documentation to include the spreadsheets used in cost estimating and all vendor quotes. These are backup documents to the Basis of Estimate documents. The Basis of Estimate documents are done at the WBS L3 level, and spreadsheets with links to quotes are linked (where available) to the spreadsheets. When expert opinion is used, it is noted in the spreadsheet and in the individual Basis of Estimate. This additional information is located in the DocuShare container "Basis of Estimate/WBS 1.2/1.2 Estimating Documents": (https://docushare.icecube.wisc.edu/dsweb/View/Collection-16520).
A read-me document explains how to go from BOE to the quote.

   a. It is understood that capitalized labor is associated with a surcharge or user fee for the use of UW-Madison's specialized service facility (SSF). Please provide insight into the SSF, how the rate(s) is developed or negotiated, what is the frequency of over/under-recovery reconciliation. Of interest, is PY8 in which capital equipment for $2,000 was scheduled to be acquired while capitalized labor was estimated at $1,392,095.20. Is there a correlation between the two? Please explain how $1,392,095.20 was arrived at with all supporting documentation that apply. Please provide the same for PY5, PY6, and PY7.

PSL as an SSF, follows University of Wisconsin - Madison guidelines on rate setting, including annual updating and review of rates by the Office of the Vice Chancellor for Research. The rates currently being charged to the project are PSL's internal rates which are set at or below the cost of providing the product or service.

These rates are calculated based on PSL operational expenses and include staff salary and fringe benefit costs. Also included are internal PSL indirect expenses such as; phone bills, training expenses, building maintenance, custodial services, office supplies, and general administrative expenses. Year end balances are included in the annual rate calculation update and reviewed by the Office of the Vice Chancellor for Research. University indirect cost is not included in the rates charged to the Upgrade project.

There is no correlation between the capital equipment and capitalized labor in PY8. The very modest capital equipment cost is due to the fact that essentially all of the capital equipment required for successful execution of the project must be purchased and shipped south in prior years leading up to the final drill season. The capitalized labor in PY8 is the amount required for onsite work at Pole for drilling and installation effort as part of the upgrade to the IceCube detector, a combined team size of over 40 people. The details of the PY8 labor estimate can be seen in the Basis of Estimate documents.

During PY5-PY7 the labor portion to upgrade the hot water drill systems is proportionally much less than the equipment upgrades.

8. It appears composite rates of $3,200 per trip for international trips and 1,800 per trip for domestic trips, were developed and used as basis for a total of $361,000 in the travel budget. Please describe the components of these two composite rates and the assumptions used to develop them. And explain how $361,000 was arrived at. On the other hand, you may also elaborate on WIPAC (who is WIPAC? - why use WIPAC rates? – How were WIPAC rates vetted?) and show us data to prove that its composite rates were used in similarly situated projects of the federal government.

WIPAC is the Wisconsin IceCube Particle Astrophysics Center, part of the University of Wisconsin, Madison. We used historical data from travel by IceCube collaborators to arrive at an average cost / trip for international, domestic, and South Pole deployment costs. This analysis is documented in the DocuShare D_04_IC_Upgrade_TravelAnalysis.pdf. Note that for all travel, we use the per diem and hotel costs according to the guidelines from the State Department.

The total number of trips needed in each area of the project, and the reasoning behind it, is documented in the BOEs.

9. From the Other Direct Costs (ODCs) section of the budget, please illustrate the cost of materials and supplies, a total of $264,548 in a spreadsheet and describe how this estimate was determined and provide bases of estimate that supports each line-item (invoices, catalog price lists, specific vendor quotes, or rough orders of magnitude (ROM) that are based on previous or recent experience). Please note that ROM estimates that are based on recent experience are better supported with data showing relevant historical costs.

M&S is documented by WBS L3. Each BOE at L3 lists the M&S (if applicable) and the estimating method from the GAO best practices (see our Key Assumptions document in the docushare area (D_03_IC_Upgrade_KeyAssumptions.pdf) for more information). We use the categories (A=Analogy, C=Engineering Buildup, D=Expert Opinion, E=Extrapolation from Actuals, F=Parametric, L=Learning Curves). How the estimates were arrived at are documented in the relevant Basis of Estimate, and the GAO category is documented both in the Basis of Estimate and in the *Cost DataBase.* The reasoning behind the GAO category used is documented in the Basis of Estimate.

   a. Please provide individual subaward budgets and Subaward Commitment Forms that the four subaward candidates have concurred with.

See subaward agreements in Answers to First Round of Questions (wisc.edu). The *Cost DataBase* represents the comprehensive budget, including subawards.

   b. Please provide a sample risk assessment that has been used or will be used to evaluate the eligibility of the subaward candidates proposed

See risk assessments in Answers to First Round of Questions (wisc.edu).

   c. Provide UW-Madison's policies and procedures on Subawards

See UW-4019.

10. Please outline all exclusions that were applied annually from the IDC direct cost distribution base that ultimately led to total indirect cost of $2,968,913.

See AAD7628 F&A Account Code Tree.pdf.