

**Office of Project Assessment  
Office of Science**

**COVID-19 Project Impact Worksheet**

<b>Overview Information</b>	
Date of Report	08/02/2021
Project Name	Proton Power Upgrade
Laboratory/Project Location	ORNL
SC Program Office	BES
Federal Project Director	Wendy Cain
Project Director/Project Manager	John Galambos/ Mark Champion

<b>Project Status (June 21)</b>		
Project Type	Line Item / Major Item of Equipment (MIE)	
CD-1	Planned: Q3 FY17	Actual: Apr 4, 2018
CD-3A	Planned: Q2 FY19	Actual: Oct 5, 2018
CD-3B	Planned: Q4 FY19	Actual: Sep 3, 2019
CD-2	Planned: Q1 FY21	Actual: Oct 6, 2020
CD-3	Planned: Q1 FY21	Actual: Oct 6, 2020
CD-4	Planned: Q4 FY28	Actual:
TPC Percent Complete	Planned: 57%	Actual: 55%
TPC Cost to Date	\$119.0 M	
TPC Committed to Date	\$39.0 M	
TPC	\$271.6M	
TEC	\$257.8 M	
OPC	\$13.8 M	
Contingency - Cost	\$54.7 M	~56% work to go
Contingency - Schedule	42 months	~98% work to go

<b>COVID-19 Cost and Schedule Impacts</b>				
Annual standing army cost (March 2021 to March 2022) <sup>1</sup>		\$12M/Year		
Estimated number of FTE (March 2021 to March 2022) <sup>2</sup>		48		
Escalation (weighted average of labor and material rates from March 2021 to March 2022) <sup>3</sup>		Materials: 2.4% Labor: Avg.: 3.7%		
		Cost Impact		
		High Impact	Most Likely Impact	Low Impact
TPC	\$	\$36M	\$16M	\$0M
TEC	\$	\$36M	\$16M	\$0M
OPC	\$	\$	\$	\$
		Schedule Impact (in months)		
		High Impact	Most Likely Impact	Low Impact
CD-4 (early finish)	2Q FY 2025	36	12	0

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<sup>1</sup> The annual standing army cost or current staff charged to the project (including any support contractors) from March 2021 to March 2022. This includes cost that is fully burdened or loaded. Use actual numbers when available.

<sup>2</sup> The number of estimated FTEs from March 2021 to March 2022. The FTEs should correspond to the standing army cost provided. Use actual numbers when available.

<sup>3</sup> The escalation rates (labor and material—weighted average) the project use and any expected changes from March 2021 to March 2022. **Current Project Stage / Most Recent Critical Decision:**

**If the most recent critical decision was CD-1 or CD-2,** are remote capabilities sufficient to keep project reasonably on schedule? Provide an overview of activities.

N/A, CD-2/3 received in October 2020.

**For projects beyond CD-3/CD-3(x) ONLY, provide the following:**

- What are the current site conditions?

*The SNS facility is still operating in a phase-1 return to work mode. Essential visitors are allowed at ORNL and domestic travel is being approved as needed. SNS operation and maintenance is continuing and PPU onsite activities (see below) are allowed onsite. A transition to close to a full onsite presence by August 1 is planned.*

- Identify any potential Safeguards and Security and/or Environmental, Health and Safety concerns:

*Social distancing and masks are required for unvaccinated staff, otherwise COVID restrictions are lifted for vaccinated staff. About 80% of ORNL staff are vaccinated.*

- What type of work continues to be performed, identify whether remote, or onsite ?

*All necessary onsite work is now allowed.*

- What type of work has been stopped or delayed, the nature of the delay.

*We are seeing some vendor delivery impacts.*

- Are the delays beyond the control of the contractors or vendors in performing the work scope?

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*Yes. Some vendors have notified us they have been impacted and delivery will be delayed.*

- Can the impacts be readily quantified (cost/schedule impacts)?

*To date, identified vendor delays do not yet affect the planned power ramp-up start and early project finish, but further delivery delays may occur. The quantitative assessment (see the last page of this document) of potential impacts does not indicate delays on major milestones. This spreadsheet assessment is updated monthly.*

- What are the potential impacts to the contract (possible REAs/draws on contingency)?
  - Are any delays resulting from supply chain disruption?  
*Superconducting cavities delivery from the vendor in Germany were delayed ~3 months, and this delay will delay cryomodule production by a similar amount. Some cryomodule components (vacuum vessel components) are delayed but should not affect the power rampup start. RF equipment (klystrons, circulators and transmitters) is delayed 3-12 weeks and LLRF is delayed up to 20 weeks. The target systems gas circulation compressor is delayed 8 weeks. At present no major milestones are jeopardized.*

- Are overseas vendors being impacted?  
*Superconducting cavity delivery was delayed ~3 months.*

- Has the contractor demobilized?

*No*

- If project is in stand-by / shut-down status, provide a summary of what will be required to restart activities.

*PPU is not in shutdown/standby*

- Any additional impacts to the DOE/SC mission not considered above?

*No*

*A list of COVID related impacts on PPU vendor deliveries is listed below. (updated)*

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Level 2 WBS	Item Description	Vendor	Status	Status Date (date of vendor contact)	Planned frequency of vendor contact (e.g., weekly, monthly)	Expected Delay due to COVID-19 (relative to initial planned receipt date)
<b>P.2 Superconducting Linac Systems</b>						
	cryomodule vacuum vessels	Anderson Dahlen	First delivery received on 4/13. All due to complete by November 2021. No issues due to COVID-19.	7/30/21	biweekly	None
	helium vessels	Joseph Oat	Twenty-nine units have been received. Last unit requires subcomponent, stiffening cone, currently in machining. Vendor visited to inspect items. Expected ship date in mid-July.	7/30/21	biweekly	None
	supply end can	Meyer Tool	Three supply end cans have been received. First unit returned to fix dimensional issue. As of now, no COVID-19 delays. Some minor schedule delays due to technical issues.	7/30/21	biweekly	None
	return end can	Meyer Tool	First return end can shipment shipped from vendor on 6/25/2021. As of now, no COVID-19 delays. Recent schedule delays due to technical issues related to final leak checking.	7/30/21	biweekly	None
<b>P.3 Radio-Frequency Systems</b>						
	SCL klystrons	Communications and Power Industries	Work delayed due to COVID-19 and a cyberattack	7/19/21	biweekly	3 weeks
	NCL klystrons	Communications and Power Industries	Work delayed due to COVID-19 and a cyberattack	7/19/21	biweekly	8 weeks
	SCL circulators	Ferrite Microwave	Work delayed due to COVID-19 and a company merger	7/16/21	weekly	6 to 8 weeks
	RF transmitters	L3Harris	Work delayed due to COVID-19	7/16/21	biweekly	12 weeks
	SCL modulators	Alpha-Omega	Work delayed due to COVID-19	7/20/21	biweekly	7 weeks
	Transformers/SCR	DynaPower	In progress with some delays due to COVID-19	7/20/21	biweekly	6 weeks
	LLRF support	Lawrence Berkeley National Laboratory	Work delayed due to COVID-19	7/19/21	weekly	8-12 weeks
	MicroTCA carrier card, FCM-II, and HPM-II	Vadatech	Work delayed due to COVID-19	7/28/21	weekly	20 weeks
	LLRF rack splitters	MiniCircuits	Work delayed due to COVID-19	7/28/21	weekly	16 weeks
<b>P.4 Ring Systems</b>						
	Injection region magnets	Fermilab	Materials procurements underway.	7/30/21	biweekly	None
<b>P.5 First Target Station Systems</b>						
	PPU Test Target 1 - Mercury Vessel	Metalex	in progress / on track; limitations on vendor visits at this time	7/27/21	weekly	None
	PPU Test Target 1 - Water-Cooled Shroud	Metalex	in progress / on track; limitations on vendor visits at this time	7/27/21	weekly	None
	PPU Test Target 2	Metalex	in progress / on track; limitations on vendor visits at this time	7/27/21	weekly	None
	PPU Producton Target 1	Metalex	in progress / on track; limitations on vendor visits at this time	7/27/21	weekly	None
	PPU Producton Target 2	Metalex	in progress / on track; limitations on vendor visits at this time	7/27/21	weekly	None
	PPU Producton Target 3	Metalex	in progress / on track; limitations on vendor visits at this time	7/27/21	weekly	None
<b>P.6 Conventional Facilities</b>						
	klystron gallery construction	FM Sylvan	Construction complete. Contract closed out.	7/30/21	weekly	5 Weeks