

sPHENIX Review Status

Review Date	Review	Review type	Agenda	Reviewers	Recommendations or Action Items	Status
11/4/19	Inner HCAL	ALD	https://indico.bnl.gov/event/7064/	Flemming Videbæk*, Howard Gordon, Alessandro Tricoli	The details of the population of the tiles into the modules should be finalized with the condition that it will not take away resources from work on outer HCAL or other detector components. Present plans to BNL management by January 13, 2020.	2021.04.01 The IHCAL project is under way, tiles are on order.
11/26/19	Cradle/Base	PRR	https://indico.bnl.gov/event/7107/	J. Bowers, C. Folz, J. Haggerty, C. Pearson, J. Tuozzolo, J. Mills	<ol style="list-style-type: none"> 1. Electronic Racks Platforms and support utilities - Are the temporary openings in the platform decking considered a fall hazard? How do we protect workers from accidentally falling into an opening as cables are being installed? How do we protect personnel that may be on step ladders while working on the platforms? Address these issues with a plan on how to protect personnel. (AI) 2. Examine seismic loads as part of the overall analysis to ensure that the system or components of the system are not overstressed. Refer to the current IBC, which is adopted by New York State as the applicable standard, or DOE-STD-1020-2002 "Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities." (While the original PHENIX magnets and rail systems were designed to a minimum nominal safety factor of 3.0, seismic safety factors were only required to be greater than 1.0) (AI) 3. The tracks will need reinforcing or replacement as the computed safety factors are unacceptable. The proposed plan should show a cohesive approach to developing and transferring loads from the detector, through the rollers and/or jack system into the concrete floor. This must be resolved prior to the start of procurement of the 	2020.02.25 The procurement was allowed to proceed and bids were opened 2/14/2020. The remaining recommendations and action items have to do with construction and analysis of cradle and base, and the modifications to the rails. 2020.07.20 The cradle/base was ordered and is being manufactured.
12/17/19	TPC GEM	FDR/PRR	https://indico.bnl.gov/event/7182/	John Haggerty, Glenn Young, Jim Mills, Russ Feder, Mike Anerella, Dick Majka, Rich Ruggiero, Bob Azmoun, Craig Woody, John Kuczewski, Bill Lenz	<ol style="list-style-type: none"> 1. The drawing packages for the GEM frames and strongbacks should be completed and checked. An assembly drawing of the strongback, pad plane, GEM's and frames should be developed for form, fit and function. <ol style="list-style-type: none"> a. The pad plane design should be completed and checked against the frame and strongback drawings. b. A Statement of Work will need to be provided for each procurement package. 2. Consider producing a pad plane prototype for testing the compatibility of the Front End Electronics boards and the development of the cooling system for them. 3. Tests of prototype GEM modules assembled into a wagon wheel are needed to ensure that there are no problems at the edges of the GEM's when inserted in the wagon wheel. This recommendation is meant to address questions that arose about the GEM tails; here are some specific suggestions: <ol style="list-style-type: none"> a. Consider adding removable potting material between GEM tails and structure to preclude voltages developing in the gas between them. b. Consider routing exiting R3 GEM tail on opposite sides at different radii to eliminate interference and voltage issues. 	2020.02.25 A number of tests were recommended at the review, which has been discussed in subsequent TPC and TPC engineering meetings. The tests have not shown any problems so far at the edges of the GEM's. A plan for potting the GEM tails has been developed. The SOW and drawing packages are complete or near complete, but final design and checking are still in progress. Gerber files for the pad plane are nearing completion; the board is not routed, but that is in progress. The TPC group is working to make a sector of prototype electronics. Orders for the strongbacks have been placed, pad plane and GEM orders to be released soon. Recommendations and action items have been reviewed in the weekly TPC regularly since the review. 2020.07.20 The
12/17/19	TPC GEM Factory Readiness	PRR	https://indico.bnl.gov/event/7211/	John Haggerty, Glenn Young, Jim Mills, Russ Feder, Bob Azmoun, Chuck Gortakowski, Lori Steigler	<ol style="list-style-type: none"> 1. Production and test procedures should be modified to reflect the sPHENIX production and archived and controlled in the sPHENIX Vault or docDB. 2. Ensure that electrical equipment is inspected and is in compliance with current electrical regulations. 	2020.02.25 The WSU factory is well organized and well run; the recommendations are to make sure that the factories document their adherence to sPHENIX project safety standards.
1/16/20	Carriage Rack Safety System	PDR	https://indico.bnl.gov/event/7453/	John Haggerty, Glenn Young, Jim Mills, Russ Feder, Bob Azmoun, Chuck Gortakowski, Lori Steigler	<ul style="list-style-type: none"> • Need to add local crash button specifications and circuitry to presentation. - J Vasquez. • Need to add local rest button specifications and circuitry to presentation - J Vasquez. • Safety Rack System should be on a UPS. J. Haggerty. • Scheme for light indicators - J Vasquez. 	2020.02.25 J. Vasquez will proceed with the design and prototyping, after consulting the ESRC (1/28/2020).

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1/22/20	Beam Pipe	PRR	https://indico.bnl.gov/event/7379/	Russ Feder, Ed O'Brien, Camelia Mironov, John Haggerty, and Glenn Young (phone) from sPHENIX, Wolfram Fischer, Joe Tuzollo, Mike Mapes, Chuyu Liu, Sumanta Nayak, and Angelika Drees	1. Drawings for the beam pipe should be completed, checked, and archived in compliance with sPHENIX and CAD procedures. 2. Fabrication of the modified beam pipe should begin as soon as possible after the drawings are checked and archived.	2020.02.25 A serious issue was found in the discussion by the committee after the report. The aperture was found to be marginal at injection of p+Au; a modified design with the 40 mm section extending only to ±2.2 m is being developed. The MVTX and MBD groups have been consulted on the ramifications of this. 2020.07.20: The beam pipe modification project is in the final stages of procurement and will be shipped to Materion soon.
1/28/20	Carriage Rack Interlocks	ESRC	https://indico.bnl.gov/event/7525/	Ed O'Brien, Joel Vasquez, John Haggerty, Mike Gaffney, Joe Tuozollo, Andrei Poblaguev, Melvin van Essendelft, Joe Levesque, Lee Hammons, Frank Craner, Ray Fiiller, Pat Sullivan, Pete Cimigliaro, Peter Hamblin, Mike Sivertz (recording)	There were two issues of significance raised during the review. 1) Will working on the racks require LOTO? Or will the E-Stop be sufficient for safety? In discussion with Jon Sandberg following the meeting, he informed us that E-Stop is not sufficient for safety. LOTO of the 208V will be required. Or the racks can be manufactured so that the 208V is inaccessible to anyone working on the racks. It has not been decided which option to choose for this yet. 2) It is necessary to perform arc flash calculations for the rack power. Joel will work with Jon Sandberg, PK Feng and the vendors to do the calculations.	2020.02.25 J. Vasquez is beginning the design and prototyping. An Interim or Final Design Review will be scheduled when more data are available.
1/29/20	MVTV Mechanics/CRU	FDR	https://indico.bnl.gov/event/7165/	John Haggerty, Russ Feder, Glenn Young, Rob Pisani, Dan Cacace, Rich Ruggiero, Chris Pontieri, Joe Silber, Leo Greiner, Sumanta Nayak	1. Before proceeding to finalizing design and drawings: a. Finalize discussions with CAD on whether the 40 mm aperture restriction to ±5.6 m is acceptable for all collision species. 2. When the specifications for the composite structures is complete, expected to be in March 2020, confirm feasibility with vendors and/or outside experts soon afterward. Define the specific performance, QA, and dimensional tests that are required. Some balance will be needed between overly tight versus practical and testable specs. The main risk is to schedule, if the specs prove too difficult for vendors to achieve, or too laborious to test. 3. Before final construction: a. Complete Interface Control Documents. b. Complete plans for interlocks and alarms.	2020.02.25 The MVTV group has done considerable engineering work to make sure that installation of the MVTV can be accomplished with a 50 mm diameter beam pipe at ±2.2 m. In the meantime, engineering and design continue on the prototype composite structures. sPHENIX engineers are working closely with the MVTV team on installation tools and integration with the beam pipe.
2/4/20	Pins/Pucks/Dogbones	PRR	https://indico.bnl.gov/event/7546/	John Haggerty, Russ Feder, Rich Ruggiero, John Lajoie, Chris Pontieri	1. Prepare and post the SOW. 2. Procure at least two extra sectors of skins. 3. Inspect bolts for counterfeit markings on delivery.	2020.02.25 The procurement of the pucks, pins, and dogbones is under way.
2/5/20	HCAL Sector 7-32 Electronics	PRR	https://indico.bnl.gov/event/7585/	John Haggerty, Stefan Bathe, John Lajoie	1. In the next two weeks, add to the PRR slides some missing information: a. An introductory slide showing clearly the scope of the production. b. Include the interface boards on slide 3. c. Include a link to quality assurance documents developed for the preproduction sectors. d. Include a link to the electronic design documents. 2. In the next month, document and record the gain and dynamic range of the calorimeter and electronics. 3. Before beginning production, consult the sPHENIX Quality Assurance Coordinator and the sPHENIX Safety Coordinator.	2020.02.25 The documentation has been modified, and production will commence.
3/6/20	Calorimeter Bias Supplies	PRR	https://indico.bnl.gov/event/7786/	Haggerty, Woody, Stoll, Lajoie, Boose	1. Purchase of the Wiener bias supplies should proceed.	2020.02.25 This has been a paper review so far, which waits for final specifications from Wiener. 2020.03.06 Updated data sheet from Wiener was provided.
2/7/20	DAM	PRR	https://indico.bnl.gov/event/7524/	John Haggerty, Glenn Young, Kai Chen, Joe Mead, Steve Boose, and Takao Sakaguchi	1. Proceed with the preproduction boards. 2. Test DMA transfers at full speed for all 10 boards.	2020.07.20 Preproduction boards were delivered just before COVID-19, basic tests successful, high speed stress tests begun as access to site becomes available.

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NOTE THAT SUBSEQUENT REVIEWS WERE CONDUCTED DURING COVID-19 TELEWORKING AND SOCIAL DISTANCING CONDITIONS						
3/24/20	IHCAL Sectors/IHCAL End Rings	FDR	https://indico.bnl.gov/event/8029/	M.Anerella, C.Folz, C.Gortakowski, J.Haggerty, J.Hock, J.Mills, L.Stiegler, J. Tuozzolo	<ol style="list-style-type: none"> 1. A peer review of the stress and deflection analysis of the iHCal structural system should be performed. 2. A magnetic analysis, determining forces on the iHCal structure (including sectors and end rings) generated from eddy currents due to a magnet quench, should be performed and analyzed. 3. Solution to the high stress situation in the bracket needs to be resolved prior to procurement of the sectors. 4. An analysis of the thermal issues of each sector needs to be done and documented. 5. Develop a Statement of Work for both the sector design package and end rings. 	2020.07.20 All recommendations from the FDR have been closed except for the thermal analysis. See noted from the 6/10/20 PRR.
3/25/20	IHCAL Tile	FDR/PRR	https://indico.bnl.gov/event/8139/	John Haggerty, Glenn Young, Jim Mills, Craig Woody, Sean Stoll, Chuck Gortakowski, Lori Stiegler	<ol style="list-style-type: none"> 1.The procurement of the IHCAL tiles should proceed after the SOW and Q/A documents have been produced and reviewed. 2.The pilot production and testing of a few tiles of all 12 types is very important, and test results should be reviewed by the IHCAL team before approving the full production. 3.The IHCAL team should work with the vendor on a production schedule which will satisfy the needs of the IHCAL assembly at BNL. 	2020.07.26 To address the Review Committees comments on aging effects to due to stress on the fibers, studies of aged by GSU were presented to the HCal group. No aging effects were observed. However, to avoid potential issues due to bends with diameters smaller than the manufacturer recommendation, the inner HCal drawings were modified increasing the smallest bends from a radius of 4.0 cm to 4.5 cm. Light yield and uniformity measurements were added to the Indico agenda page as requested. SOW and Q/A documents have updated for the inner HCal and were approved in the contract between BNL and GSU. Pilot production tiles are part of the schedule and will be reviewed by the HCal group according to the recommendations. The vendor expects to have the inner tile production complete within six from starting production in September which satisfies the assembly schedule for the inner HCal
4/8/2020 6/5/2020	EMCaI Sector 13-64 Electronics	PRR	https://indico.bnl.gov/event/8269/ https://indico.bnl.gov/event/8504/	John Haggerty, Glenn Young, Craig Woody, Sean Stoll	<ol style="list-style-type: none"> 1.Production of the electronics for sectors 13-64 should proceed without changes from electronics for sectors 1-12. 2.Quantities should be carefully evaluated by the calorimeter electronics group in concert with the EMCAL group to account for yield. 	2020.07.20 Quantities were checked by the EMCAL group and most orders have been placed.
4/9/20	Magnet Cryo System	ESRC	https://indico.bnl.gov/event/8128/	Angelika Drees, Brian van Kuik, Carl Schultheiss, Mike Gaffney, John Haggerty, Joe Levesque, Karl Kusche, Kin Yip, Paul Orfin, Peter Hamblen, Roberto Than, Thomas Tallerico, Joe Tuozzolo, Charlie Folz, Bill Christie, Pat Sullivan, Mike Kretchman, Glenn Young, Lenny Campione, Jim Mills, Paul Sampson, Mel Van Essendelft, Achim Franz, Frank Craner, Mike Sivertz (recording).	See Minutes and Resolutions. Document on agenda page.	2020.07.20 Components of the magnet cryo system have been ordered and have begun to be delivered.
4/16/20	TPC R3 Padplane	FDR/PRR	https://indico.bnl.gov/event/8307/	John Haggerty, Craig Woody, Bob Azmoun, Eric Mannel, Glenn Young	<ol style="list-style-type: none"> 1)The fabrication notes attached to the drawings should be checked and vetted by an outside expert. 2)The Q/A criteria should be checked according to sPHENIX Q/A procedures even though the procurement is through Stony Brook University to provide an additional level of oversight. Chuck Gortakowski, the sPHENIX Q/A Coordinator can be consulted. 3)A drawing or schematic of the grounding plan should be provided and checked. 	2020.07.20 The expected vendor declined to bid, however a second vendor was identified, and the boards have been delivered to SBU, tested, and found to satisfy Q/A requirements.
4/20/20	TPC Preproduction FEE & PCB	FDR/PRR	https://indico.bnl.gov/event/8332/	John Haggerty, Glenn Young, Eric Mannel, Jack Fried, Tom Hemmick	<ol style="list-style-type: none"> 1.Separate the digital ground plane from the low level front end input signals. 2.Add a small area of exposed ground. 3.Archive human-readable documentation in docDB and full set of design files in Vault. 	2020.07.20 The suggested design modifications were made, and preproduction PC boards have been produced.

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4/27/20	sPHENIX Carriage Positioning Systems	FDR	https://indico.bnl.gov/event/8344/	John Haggerty, Glenn Young, Russ Feder, Jim Mills, Richie Ruggiero, Carter Biggs, Lori Steigler, Chuck Gortakowski, Charlie Folz, Joe Tuozzolo	<p>To be completed prior to the x-y Table Contract award:</p> <ol style="list-style-type: none"> 1.Create a model and distribution control drawing that shows all equipment, from the floor to nominal beam centerline (rails, x-y tables, jack assembly, cradle/base, OHCal, and superconducting coil in order to verify dimensionally that the detector will fit, be able to be placed at the nominal beam intersection position, and function as designed (limits, alignment tolerance, etc.). Circulate for review. 2.Review and document bolt loads and stresses. <p>To be completed prior to the Hydraulic Drive and Controls System Contract award:</p> <ol style="list-style-type: none"> 3.The systems designed to move and position the carriage on the beamline should be reviewed by the CAD Experimental Safety Review Committee with advisors from the laboratory Pressure Safety Committee to review the hydraulic systems. 4.Install a pressure by-pass on the hydraulics system design. 5.A detector hydraulic positioning system failure mode analysis 	2020.07.20 Major simplifications of the carriage positioning system took place after the review.
4/27/20	SAMPA V5 Prototype Test Results	IDR	https://indico.bnl.gov/event/8619/	John Haggerty, Glenn Young, Tom Hemmick, Takao Sakaguchi	We believe that the results presented are sufficiently comprehensive and detailed so that the project should proceed to a Production Readiness Review without further review.	2020.07.20 SAMPA V5 carried out a PRR on 5/27/20.
5/15/20	sPHENIX Beam Pipe Followup	PRR	https://indico.bnl.gov/event/8496/	Russ Feder, Ed O'Brien, Camelia Mironov, John Haggerty, and Glenn Young (phone) from sPHENIX, Wolfram Fischer, Joe Tuzollo, Mike Mapes, Chuyu Liu, Sumanta Nayak, and Angelika Drees	Proceed to fabrication.	2020.07.20 The design of the beam pipe was altered slightly with the addition of a tapered "nozzle" which increases the aperture available for p+A at injection, as recognized at the PRR. The beam pipe order is under way.
5/27/20	SAMPA V5	PRR	https://indico.bnl.gov/event/8571/	sPHENIX management (Ed O'Brien, Glenn Young, and John Haggerty), TPC management (Takao Sakaguchi, John Kuczewki, and Joe Mead), and Chuck Britton and Ken Read, outside experts with particular expertise working with the SAMPA ASIC.	<ol style="list-style-type: none"> 1.The TPC electronic design group should work closely with the Lund group to determine a testing protocol that fully satisfy the detector requirements without unnecessarily disqualifying chips and lowering the yield. <ol style="list-style-type: none"> a.Collect, tabulate, and post the allowable ranges for the SAMPA individual channel values (not averages) for all acceptance criteria: pedestal, noise, gain, cross talk, peaking time, etc. 2.The performance of the robotic testing with 80 ns peaking time should be improved (via appropriate shielding or isolation of the noise from the robotic motor) to avoid the potential risk of assembling FEE boards with outlier SAMPA channels, while still maintaining an acceptable delivered yield from Lund consistent with the planned yield. 3.Segregate the preproduction SAMPA V5 chips from final tested chips which will hopefully be able to have significantly stricter noise criteria imposed. 4.A future review of testing of the prototype FEE boards should address issues of voltage regulation, quality assurance of the BGA parts, and tracking of SAMPA ASIC's. 5.Proceed to manufacture the full complement of SAMPA V5 chips 	2020.07.20 The SAMPA V5 has been manufactured, and tests have not shown any new problems. Production testing has begun at Lund University based on tests developed for SAMPA V4.

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6/10/20	Inner HCal	PRR	https://indico.bnl.gov/event/8682/	<ul style="list-style-type: none"> John Haggerty, Glenn Young, Jim Mills, Russ Feder, John LaJoie, sPHENIX management Dan Cacace, Rich Ruggiero, sPHENIX engineering Lori Stielgler, sPHENIX safety Chuck Gortakowski, sPHENIX Q/A Emily Mastronardi, sPHENIX PPM liaison Joe Tuzzolo, CAD (unable to attend live due to connection problems) 	<ol style="list-style-type: none"> Review, approve and release all drawings and place under configuration control prior to beginning the procurement process. Develop a resource loaded schedule that demonstrates being able to complete assembly of sectors in support of the overall sPHENIX schedule with adequate float. Examine installation into the aperture of the detector. Confirm availability of all resources; people, equipment, space, funding, etc. Revise the SOW to explicitly state the requirement to protect against damage during handling and shipment; details regarding lifting, support points, etc. The SOW needs to be approved and released, and placed under revision control, prior to sending to PPM. Further investigation into the cooling requirements and necessary solution needs to be done and reviewed accordingly. This work should be done expeditiously but is not needed for procurement of the mechanical components of the Inner HCal. 	As of 07.27.2020: Inner HCal sector and end ring drawings have been checked and placed in Vault under configuration control. The iHCal engineering team is working with John LaJoie, the L2 manager, to execute the procurement through Iowa State. A SOW was presented at the PRR which is based on the Outet HCal SOW and other procurement documents. In parallel we are working on the final design of water cooling for the iHCal...but the iHCal sectors have all the features needed to install these water pipes later,
6/15/20	Magnet End Doors	PRR	https://indico.bnl.gov/event/8714/	<ul style="list-style-type: none"> John Haggerty, Glenn Young, Jim Mills, Russ Feder, sPHENIX management Dan Cacace, Rich Ruggiero, sPHENIX engineering Lori Stielgler, sPHENIX safety Chuck Gortakowski, sPHENIX Q/A Emily Mastronardi, sPHENIX PPM liaison Joe Tuzzolo, CAD (unable to attend live due to connection problems) 	<ol style="list-style-type: none"> Complete engineering analysis and document weld stresses and/or bolted joint stresses under different loading scenarios; i.e. lifting, storing, anticipated transport conditions, installation, and partial/complete open positions. Ensure that stresses are below design limits. Submit results to chairman for distribution and archiving on INDICO. Analysis of the doors under seismic loading and in the closed position has been performed and shown to be acceptable (slide 8). Analyze and document conditions under seismic loading when the doors are open or if left in a partially installed condition before all necessary support brackets are installed. Include results for all bracket attachments and hardware (post fabrication contract award requirement). The analysis of the doors under magnetic and gravity loading has been done (slide 7) and shown to be suitable in a presentation slide from this review. Provide a full portfolio of these results; including design requirements (anticipated forces, safety factors, and material specifications), magnetic calculations and/or correspondence with the sPHENIX magnet analyst, any significant stress and deflection analysis results, and any additional calculations related to brackets and 	
6/17/20	AC and DC Power Distribution	PDR	https://indico.bnl.gov/event/8638/	<ul style="list-style-type: none"> John Haggerty, Glenn Young, Eric Mannel, Steve Boose, Joel Vasquez, Peter Hamblen, Ivan Kotov, Takao Sakaguchi, Klaus Dehmelt, Bob Azmoun, Yuan Mei, Jo Schambach, and Ming Liu 	<ol style="list-style-type: none"> The preliminary design of DC power distribution is sufficiently mature for the MVTX, TPC, calorimeters, and MBD are sufficiently advanced to present to the ESRC in July. The design of the INTT DC power distribution should be reviewed before the ESRC review. The design of the AC power distribution and interlocks is sufficiently mature to be reviewed by the ESRC. It is important to settle on penetrations through the concrete reinforcement of the tracks. 	2020.07.20 The design was presented to the ESRC on 7/14/20. Proposed penetrations in the concrete are now being reviewed by Burns&McDonnell.
6/19/20	Cryo Support Deck	PDR	https://indico.bnl.gov/event/8762/	<ul style="list-style-type: none"> R. Feder (Chairman, sPHENIX Engineering) C. Folz (CA-D Engineering) M. Gaffney (CA-D Engineering, Safety) J. Haggerty (sPHENIX Project Management, Physics) J. Hock (CA-D Engineering) P. Orfin (CA-D Cryo Engineering) L. Stiegler (sPHENIX Safety) G Young (sPHENIX Project Manager) 	<p>The following recommendations need to be addressed in the final design phase</p> <ol style="list-style-type: none"> Complete the design and hold a FDR for the cryogenics desk as soon as possible. This preferably is by mid to late July 2020. Finalize the analysis of the cryo deck, document the analysis in a report and have the analysis checked by a knowledgeable independent engineer. The report should include a clear description of the applied loads and allowable stress and deflection criteria. Finalize all drawings for the FDR. The drawing package should include elevation views of the 1008 IR west wall that show where they deck and deck anchors are installed with sections showing anchor details. At the FDR present a formal accounting of interfaces. ICDs with the cryo systems and with sPHENIX should be complete. 	2020.07.20 An FDR has been scheduled for 7/31/20

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7/14/20	TPC Transport Cart Final Design Review	FDR	https://indico.bnl.gov/event/8864/	<ul style="list-style-type: none"> •John Haggerty, Glenn Young (sPHENIX management) •Jim Mills, Russ Feder, Dan Cacace (sPHENIX engineering) •Tom Hemmick (TPC L2 manager) •Chuck Gortakowski (sPHENIX Q/A) •Lori Stiegler (sPHENIX ES&H) •John Hock (CAD) 	1.Complete the design and analysis based on an anticipated TPC assembly weight of at least 2500 lbs and reconvene the Final Design Review. a.The FDR could be combined with a Production Readiness Review. b.The notes from Jim Mills, Russ Feder, and Dan Cacace provide a guide to completing the FDR.	2020.07.20 Modest modifications to the design required by a new estimate of the weight of the TPC are under way.
7/15/20	ESRC Review of sPHENIX AC and DC Power Distribution	ESRC	https://indico.bnl.gov/event/8864/	Alexis Ross Tulio, Andrei Poblaguev, Bob Lambiase, Dennis Donaldson, Eric Mannel, Pei Kuan Feng, Mike Gaffney, Ivan Kotov, Jason Cheung, Jeremy Freund, Jo Schambach, Joel Vasquez, John Haggerty, Jon Sandberg, Joe Levesque, Klaus Dehmelt, Karl Kusche, Michael Charumaneeroj, Ming Liu, Peter Cirnigliaro, Peter Hamblen, Rachid Nouicer, Rich Biscardi, Pablo J Rosas, Sean Stoll, Steve Boose, Takao Sakaguchi, Bill Christie, John Kuczewski, Lee Hammons, Lenny Campione, Frank Craner, Yuan Mei, Mickey Chiu, Robert Pisani, Grazyna Odyniec, Paul Sampson, Ed O'Brien, Mike Sivertz (recording)	See ESRC Checklist on Indico site.	2020.07.20 The design of the AC and DC power distribution can go forward using the unput from the ESRC.
7/28/20	Associate Laboratory Director's Annual Cost & Schedule Review of the sPHENIX MIE	ALD	https://indico.bnl.gov/event/8960/	Tom Cormier, John Parsons, Paul Grannis, Myron Campbell, Rainer Bartoldus, Ken Read, Vivian O'Dell, James Niehoff, Craig Brackett, Ron Ray, Vincent Riot	See review report.	
7/31/20	sPHENIX Cryo-Equipment Deck FDR	FDR	https://indico.bnl.gov/event/8937/	<ul style="list-style-type: none"> R. Feder (Chairman, sPHENIX Engineering) C. Folz (CA-D Engineering) M. Gaffney (CA-D Engineering, Safety) J. Haggerty (sPHENIX Project Management, Physics) J. Hock (CA-D Engineering) P. Orfin (CA-D Cryo Engineering) L. Stiegler (sPHENIX Safety) G Young (sPHENIX Project Manager) 	The following recommendations need to be addressed in the final design phase 1.Complete the design and hold a FDR for the cryogenics desk as soon as possible. This preferably is by mid to late July 2020. 2.Finalize the analysis of the cryo deck, document the analysis in a report and have the analysis checked by a knowledgeable independent engineer. The report should include a clear description of the applied loads and allowable stress and deflection criteria. 3.Finalize all drawings for the FDR. The drawing package should include elevation views of the 1008 IR west wall that show where they deck and deck anchors are installed with sections showing anchor details. 4.At the FDR present a formal accounting of interfaces. ICDs with the cryo systems and with sPHENIX should be complete.	2021.03.30 Procurement and installation complete.

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7/31/20	EMCAL Block/Module/Sector Production Readiness Review	PRR	https://indico.bnl.gov/event/9010/	<ul style="list-style-type: none"> John Haggerty (chair), Glenn Young (sPHENIX Management) John Lajoie (ISU), Huan Huang (UCLA), Chris Cullen (C-AD) (outside experts) Craig Woody (L2 manager), Caroline Riedl, Eric Thorrsland, Anne Sickles, Sean Stoll, Dan Cacace (sPHENIX EMCAL project) Chuck Gortakowski (BNL Q/A) Lori Stiegler (BNL ES&H) 	<ol style="list-style-type: none"> Continue production of blocks, modules, and sectors. Conduct a follow-up review before September 15, 2020 to assess experience and testing of additional sectors now under construction. Conduct a production readiness review of Fudan production facility for high rapidity blocks after one sector worth of high eta blocks are received and tested at UIUC/BNL well before installation into sectors 13-64. Consider testing or purchasing mechanical components of the sector meeting magnetic and mechanical requirements. Document the testing procedures for blocks, modules, and sectors. This review was not a cost and schedule review, but the project clearly has an aggressive production schedule which cannot be allowed to compromise the quality of the sectors, so sPHENIX and BNL management must reassess the workforces necessary to complete the project in time for installation, particularly in light of working conditions during the COVID-19 	2021.03.30 Block production is fully under way at UIUC and Fudan.
8/11/20	Procurement Readiness Review - LN2 System	PRR	https://indico.bnl.gov/event/9146/	R. Feder, C. Gortakowski, E. Mastronardi, R. Ruggiero, G. Young	A separate Vendor Qualification Criteria document will need to be created. This document provides the minimum qualifications necessary for a vendor to be considered an acceptable fabrication contractor for this scope of work. The document will be part of the bid package and completed as part of the bid response package provided by each bidder. The Qualification Criteria document from the potential low bidder will be evaluated by the PPM Contract Specialist and Technical Representative and will require their approval prior to contract award.	2021.03.30. LN2 system components have been procured.
8/17/20	DAQ Computing FDR/PRR	FDR/PRR	https://indico.bnl.gov/event/9144/	<ul style="list-style-type: none"> Glenn Young and John Haggerty, sPHENIX Project Management John Kuczewki, Eric Mannel, Joel Vasquez, sPHENIX electrical and electronic engineering Chris Pinkenburg and Jan Bernauer, sPHENIX computing Alex Zaytsev and Chris Hollowell, RACF Brian Streckenbach, C-AD 	<ol style="list-style-type: none"> Make certain the buffer box quotation includes the fileserver computer. Prepare a SOW and requirements, review it with sPHENIX PM and PPM. Commence the purchase of two racks of EBDC/SEB machines and one prototype buffer box with 1.4 Pbyte of disk. 	2021.03.30 First articles of computing systems (SEB, EBDC, BB) have been procured and tested.
8/25/20	TPC Gas and Cooling Preliminary Design Review	PDR	https://indico.bnl.gov/event/9156/	<ul style="list-style-type: none"> Russ Feder (Chair), rfeder@bnl.gov – BNL, sPHENIX engineering and integration John Haggerty (secretary), haggerty@bnl.gov – BNL, sPHENIX physics and detectors Glenn Young, glennyong82251@gmail.com – BNL, sPHENIX Project Manager Speece-Moyer, Nathaniel nspeecemo@bnl.gov Alexei Lebedev (BNL STAR) alebedev@bnl.gov Invited but only able to review documents offline: <ul style="list-style-type: none"> Bob Soja soja@bnl.gov Biggs, John C biggs@bnl.gov Streckenbach, Brian bstreckenbach@bnl.gov Peter Kravtsov pkravt@gmail.com 	<ol style="list-style-type: none"> Proceed with tests of the cooling system with prototype TPC FEE boards. The design of a platform for chillers in the sPHENIX IR should begin as part of the Infrastructure and Facility Upgrade. Enlist the support of the group that developed much of the control and monitoring hardware and software for the PHENIX and STAR gas systems. For the TPC Gas System FDR provide a complete assessment of what original PHENIX gas system components can be re-used, what needs to be repaired and what parts need to be ordered new. Provide a complete BOM and revised basis of estimate. 	2021.03.30 Testing of the cooling system is ongoing. The PLC system for TPC gas is being designed.

sPHENIX Review Status

Review Date	Review	Review ty	Agenda	Reviewers	Recommendations or Action Items	Status
9/14/20	sPHENIX Review of Cradle Undercarriage Support	FDR	https://indico.bnl.gov/event/9327/	John Haggerty, Glenn Young, Russ Feder, Jim Mills, Richie Ruggiero, Carter Biggs, Lori Steigler, Chuck Gortakowski, Charlie Folz, Joe Tuozzolo	<p>To be completed prior to the x-y Table Contract award:</p> <ol style="list-style-type: none"> 1.Create a model and distribution control drawing that shows all equipment, from the floor to nominal beam centerline (rails, x-y tables, jack assembly, cradle/base, OHCal, and superconducting coil in order to verify dimensionally that the detector will fit, be able to be placed at the nominal beam intersection position, and function as designed (limits, alignment tolerance, etc.). Circulate for review. 2.Review and document bolt loads and stresses. <p>To be completed prior to the Hydraulic Drive and Controls System Contract award:</p> <ol style="list-style-type: none"> 1.The systems designed to move and position the carriage on the beamline should be reviewed by the CAD Experimental Safety Review Committee with advisors from the laboratory Pressure Safety Committee to review the hydraulic systems. 3.Install a pressure by-pass on the hydraulics system design. 	2021.03.30 The review rresulted in a simpler and cheaperr support system.
11/18/20	sPHENIX Large Support Rings and Magnet Supports FDR	FDR	https://indico.bnl.gov/event/8823/	<ul style="list-style-type: none"> •A. Franz (sPHENIX) •G. Gortakowski (Planning, Performance, and Quality Management) •J. Haggerty (sPHENIX) •J. Hock (C-AD) •J. Lajoie (sPHENIX) •G. Mahler (C-AD) •J. Mills (Chairman, sPHENIX) 	<ol style="list-style-type: none"> 1.Perform a magnetic assessment of the different material options for the LER (this has been completed prior to the issue of these notes). Decide on the appropriate material and geometry for the LER and complete the analysis and design. Present results summary at the Procurement Readiness Review. 2.Do a full step-by-step mockup or simulation of the end ring installation and clocking procedure to make sure that you have adequate clearance to "clock" the ring into place. Clocking by shortening a support strap suggests you will also need a translation. 3.Perform and document an independent stress analysis of the LER. If the basis of the design was done by R. Feder, then a secondary analysis by D. Cacace as a check should be acceptable. 	2021.03.30 Bids for the LSR will be opened shortly.
12/15/20	MVTX Production Readiness Review	PRR	https://indico.bnl.gov/event/10088/	John Haggerty, Russell Feder, Glenn Young, Jim Mills, Dan Cacace, Chris Pontieri, Joe Silber, Leo Greiner	<ol style="list-style-type: none"> 1. Drawings and models of the Cylindrical Support Structure, End Wheels, and Service Barrel should be finalized and archived at BNL (pdf's were available in Dropbox for the review). The SOW should be attached. <ol style="list-style-type: none"> a. Procurement of those parts should begin. 2. The design of the x-wing needs additional checking against the many other interferences in the area to make certain there are no conflicts with cables, and the TPC and INTT support structures. 3. The installation, fixturing, and assembly plan is well thought out for this stage of the project. The assembly fixture design and the assembly procedure documentation should be finalized with LBNL before fabrication. 	2021.03.30 The MVTX construction is under way.
12/16/20	TPC Cooling FDR/PRR	FDR/PRR	https://indico.bnl.gov/event/10325/	<ul style="list-style-type: none"> •Russell Feder (Chair) – BNL sPHENIX engineering and integration •John Haggerty – BNL sPHENIX physics and detectors •Jim Mills – BNL sPHENIX Project Engineer •Chuck Gortakowski – sPHENIX Quality Assurance •Lori Stiegler – sPHENIX Safety •Steve Bellavia – BNL Senior Mechanical Engineer •Eric Manel – sPHENIX Calorimeter Electronics L2 Manager •Mike Lenz – sPHENIX Senior Technician 	<ol style="list-style-type: none"> 1.The TPC team had a complete set of final drawings for the PRR but did not have other procurement documentation or plans to present. Prior to starting any procurement or fabrication work a complete set of SOWs and/or technical specs (what ever is needed) should be sent to the PRR panel for review and approval. 2.The Chillydne Cooling Distribution Unit (CDU) should be ordered soon but the panel recommends that this happens after a technical and safety review of the complete array of cooling systems that we plan to install in 1008 so that all the other cooling equipment could be ordered as well in the coming months. 	2021.03.30 Parts for the TPC cooling system have been ordered and integration testing will begin as soon as theh "slice test" prototype can be assembled.

SPHENIX Review Status

Review Date	Review	Review type	Agenda	Reviewers	Recommendations or Action Items	Status
12/22/20	iHCAL, EMCAL and TPC Installation Engineering Review	Installation	https://indico.bnl.gov/event/10132/	C. Folz, M. Gaffney, C. Gortakowski, J. Haggerty, T. Hemmick, J. Hock, A. Korol, J. Lajoie, G. Mahler, S. Stiegler, S. Stoll, F. Toldo, M. VanEssendelft, C. Woody, J. Mills	See report on Indico.	2021.03.30
1/12/21	iHCAL Tile PRR	PRR	https://indico.bnl.gov/event/10467/	Craig Woody, Sean Stoll, Rich Ruggiero, Rosi Reed, Achim Franz, and Chuck Gortakowski	1. Complete tests of the pilot production. 2. The SOW for the tiles should include a section covering quality assurance records and documentation. 3. Proceed with procurement of the tiles for the iHCAL.	2021.03.30 The contract for iHCAL tiles is in place and tiles are being delivered to GSU for testing.
1/13/21	EMCAL/HCAL Signal Cable FDR/PRR	FDR/PRR	https://indico.bnl.gov/event/10329/	John Haggerty, Glenn Young, Steve Boose, Joel Vasquez, Cheng-Yi Chi, Lori Stiegler, and Chuck Gortakowski	1. A mockup of the cable routing inside the digitizer rack should be used to estimate the length of cable needed from the entry point of the track to the ADC front panel. 2. A tester for acceptance testing of production cables should be designed and built. 3. Cables should be delivered with durable unique labels at each end. 4. The sPHENIX Safety and Quality Assurance officers should be consulted about the exact cables that will be procured as part of the award of the contract.	2021.03.30 The cable lengths have been finalized and the procurement of the cables has begun.
1/25/21	sPHENIX Large Support Rings and Magnet Supports PRR	PRR	https://indico.bnl.gov/event/10563/	M. Anerella, P. Bernath, A. Franz, M. Gaffney, C. Gortakowski, J. Haggerty, J. Hock, J. Lajoie, G. Mahler, J. Mills, L. Stiegler, S. Stoll, M. VanEssendelft, C. Woody, G. Young	See joint report for these two reviews and followup on any of the Indico pages.	2021.03.30 The procurement of the LSR and magnet supports has begun.
1/25/21	PRR EMCAL Installation Tooling	PRR	https://indico.bnl.gov/event/10696/			
2/9/21	sPHENIX Large Support Rings and Magnet Supports PRR - Follow-up	PRR	https://indico.bnl.gov/event/10785/			
2/8/21	MBD Electronics Final Design Review	FDR	https://indico.bnl.gov/event/10690/	John Haggerty, Glenn Young, Paul O'Connor, Eric Mannel, and Steve Boose	1. A bench test of the electronics with a signal from an MBD PMT should be carried out before proceeding to a Production Readiness Review. Ideally the test would measure the timing resolution between two MBD PMT's driven by the MBD laser at a few different PMT gains.	2021.03.30 A chain test of the MBD electronics is planned in summer.
3/1/21	Local Level 1 Electronics Final Design Review	FDR	https://indico.bnl.gov/event/10900/	John Haggerty, Glenn Young, Jamie Nagle, John Lajoie, Mickey Chiu, Martin Purschke, Eric Mannel, and Joe Mead	1. Additional tests of the present LL1 board should be planned and carried out before June, 2021. 2. Changes in the LL1 board should be finalized as soon as possible, so that the next round of prototype boards can be ready for testing in summer, 2021. The next round of testing should be aimed at a test that can verify the operation of the MBD LL1 by taking advantage of the existing laser system and the actual MBD detector which can be operated on the bench in 1008. 3. The full layout of the LL1 system should be made, showing fibers, crates, boards, interconnects, power, and interfaces to calorimeter electronics and GL1/GTM electronics. 4. The protocol and data sent to the GL1/GTM should be specified and documented before September, 2021.	2021.03.30 Additional testing recommended by the review is under way at Nevis.
3/2/21	Final Design of the INTT Ladder and Production Readiness Review (PRR)	FDR/PRR	https://indico.bnl.gov/event/10800/	<ul style="list-style-type: none"> • Russell Feder (Chair) – BNL sPHENIX engineering and integration • Jason Bessuille – MIT Bates MVTX engineering • David Lynn – BNL ATLAS Detector • John Haggerty - BNL sPHENIX physics and detectors expert • Rich Ruggiero - BNL sPHENIX engineering and integration • Walter Sondheim – LANL MVTX engineering 	The INTT schedule needs to be thoroughly reviewed, updated, and integrated into the sPHENIX project plan. Production of the staves and ladders should proceed in parallel with this important management work. The panel asks for an updated INTT plan that is in-line with overall sPHENIX plans by May 1st.	2021.03.30 INTT ladders are under construction.

sPHENIX Review Status

Review Date	Review	Review type	Agenda	Reviewers	Recommendations or Action Items	Status
3/15/21	ESRC Review of sPHENIX cradle/carriage/OHCAL/solenoid installation	ESRC	https://indico.bnl.gov/event/10745/	Russell Feder, Aaron Allen, Frank Craner, Brian Brenton, Carter Biggs, Chris Pontieri, Dan Cacace, Frank Toldo, Mike Gaffney, Jim Mills, John Freund, John Haggerty, John Scheblein, Karl Kusche, Bill Christie, Kin Yip, Joe Levesque, Andrei Poblaguev, Ray Fiiller, Ruggiero, Pete Cirnigliaro, Jermaine, Glenn Young, Paul Sampson, John Hock, Stefan Bathe, John Lajoie, Mike Sivertz (recording)	<ol style="list-style-type: none"> 1. Rollers will need to be locked or blocked whenever any lifts are being performed. 2. Recommend you use slings without spreader bar. Spreader bar adds instability, plus it saves you the weight. If independent weight verification and a certified scale are used during the lift, the lift may be classified as a Pre-Engineered Lift if no other criteria have been met (up to 95% of the crane's rating). This is the requirement from Lifting Safety Subject area. 3. Does anyone have to get near the top 10 sectors at the end of installation? Chris: Electronics needs to be installed. Still in the process to determining whether a work platform will be required, or a boom lift will be adequate. 4. Make sure you take account of the overhead electric lines when transporting from 912 to 1008. (Attachment 1) Most hazardous portion of the route is the 13.8 kV lines on the entrance to the ring. There is a required 10 ft clearance from the power lines at that point. The snorkel being up increases your height beyond "normal" heights. 	2021.03.30 No major problems were identified in the plans for cradle/carriage/OHCAL/solenoid installation.
3/19/21	TPC Line Laser PRR	PRR	https://indico.bnl.gov/event/11084/	John Haggerty, Glenn Young, Ross Corliss, Takao Sakaguchi, Dan Cacace, and Rob Pisani	<ol style="list-style-type: none"> 1. Before the procurement, post to the review Indico page answers to the following: <ol style="list-style-type: none"> a. Consult Chuck Gortakowski on Q/A issues for the laser procurement. b. Ask for preliminary approval from the C-AD Experiment Safety Review Committee for use of the laser in sPHENIX. c. Contact the vendor for information that would help to assess to radiation tolerance of the electronic components. 2. Begin the procurement of the lasers for the line laser calibration. 3. Complete and review the design of the full TPC line laser calibration system, but procurement of the remaining 7 lasers can proceed while that work is in progress. 	2021.03.30 Procurement of the full complement of line lasers has begun.