

March 2020 Variance Reports

MIE

WBS 1.02A

Reporting Period: March 2020

TPC

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Current:	94,991	84,316	925	-10,675	-11%	83,391	99%	0.89	91.15
Cumulative:	1,635,269	1,466,136	1,374,559	-169,133	-10%	91,577	6%	0.90	1.07

BAC

At Complete: 4,169,636

Threshold(s) Exceeded: Cumulative Schedule

Explanation of Variance/Description of Problem:

WBS 1.2.1.2 – TPC Mechanics – Procure TPC v2 Field Cage Parts – High Voltage Testing of the v1 field cage shows high voltage capability at specification, obviating the need to build v2 version of various components. This leads to a +\$82K of SV. WBS 1.2.5.3 TPC FEE - SAMPA 80 nsec – The SAMPA v5 engineering run chips were shipped for testing only by late February. This leads to -\$133K of SV. WBS 1.2.7 TPC Support System - Laser – a cost saving design of the laser distribution was developed delaying purchase of mirror bundle/support components. This leads to -\$17K of SV. WBS 1.2.7 TPC Support System – Gas System – An evaluation to ascertain which existing parts from the PHENIX HBD gas system has delayed purchase of identical parts until the inventory is complete. This leads to -\$29k of SV.

Impact:

WBS 1.2.1.2 – TPC Mechanics – Procure TPC v2 Field Cage Parts – None. WBS 1.2.5.3 TPC FEE - SAMPA 80 nsec – This brings the FEE system near critical path requiring corrective action in the FEE validation procedure and presumed TPC assembly procedure. WBS 1.2.7 TPC Support System - Laser – None. The laser system has more than 100 days float. WBS 1.2.7 TPC Support System – Gas System – None, the gas system has more than 100 days of float.

Corrective Action:

WBS 1.2.1.2 – TPC Mechanics – Procure TPC v2 Field Cage Parts – None, the task is now unnecessary. WBS 1.2.5.3 TPC FEE - SAMPA 80 nsec – Initial validation of the FEE card design will be performed using existing V4 SAMPA chips. Final validation time with V5 chips is then reduced from 100 to 40 days. Production FEE cards will be installed on the TPC as they become ready, parallelizing testing and installation operations. These two steps move the item far from the critical path. WBS 1.2.7 TPC Support System - Laser – None. The laser system has more than 100 days float. WBS 1.2.7 TPC Support System – Gas System – None, the gas system has more than 100 days of float.

Prepared:	Prepared By:	Approved:	Approved By:
4/20/2020	Rajendra Rao Gutta [25580]	4/21/2020	Edward O'Brien [18368]

WBS 1.04A

Reporting Period: March 2020

HCal

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Current:	129,959	0	4,561	-129,959	-100%	-4,561	0%	0.00	0.00
Cumulative:	1,679,980	1,422,058	1,469,153	-257,922	-15%	-47,095	-3%	0.85	0.97

BAC

At Complete: 4,031,972

Threshold(s) Exceeded: Cumulative Schedule

Explanation of Variance/Description of Problem:

WBS 1.4 S206200 Procure Outer HCAL Lifting Fixtures & Supports - Delivery Acceptance was completed early, leading to \$46k in positive schedule variance. WBS 1.4 S205100 Procure Outer HCAL Splice Plates - Delivery Acceptance is running behind schedule, leading to a negative schedule variance of \$303k.

Impact:

WBS 1.4 S205100 Procure Outer HCAL Splice Plates - no impact. The splice plates, pucks and pins are only needed when OHCal assembly starts, in May 2021. No other item's production depends upon having these plates

Corrective Action:

WBS 1.4 S205100 Procure Outer HCAL Splice Plates - the design and procurement reviews for these splice plates are complete. Bids have been received by vendors and the contract between BNL and ISU is imminent. It is expected the splice plates will be delivered by the vendor by November 2020, about 6 months before they are needed.

Prepared:

4/21/2020

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Approved:

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[18368]

WBS 1.05A

Reporting Period: March 2020

Calorimeter Electronics

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Current:	1,405	32,816	65,958	31,412	2,236%	-33,141	-101%	23.36	0.50
Cumulative:	2,201,410	1,884,808	1,933,985	-316,603	-14%	-49,177	-3%	0.86	0.97
BAC									
At Complete:	5,373,219								

Threshold(s) Exceeded: Cumulative Schedule

Explanation of Variance/Description of Problem:

Explanation WBS 1.5.1 SiPMs – Testing of the SiPMs completed earlier and at a faster rate than planned. This causes +\$4.4K of SV. WBS 1.5.2 Calorimeter Electronics – EMCal SiPM Boards, Sectors 1-12. The order for the SiPM boards has not been completed. This leads to a -\$24.6K SV. WBS 1.5.2 Calorimeter Electronics – EMCal Preamp Testing. The testing of the EMCal preamps has not been completed. This leads to a -\$1.5K SV. WBS 1.5.2 Calorimeter Electronics - Test Pulse Board. The re-design of the test pulse board has not been completed. This leads to -\$4.8K SV. WBS 1.5.2 Calorimeter Electronics – EMCal Internal Signal Cables - The Internal signal/test/Comm/LV/Bias cables for EMCal sectors 1-12 have not all arrived. This leads to -\$47.9K SV. WBS 1.5.2 Calorimeter Electronics - EMCal External Signal Cables - The External LV/Bias/Signal/Comm/Test cables for EMCal sectors 1-12 have not all arrived. This leads to -\$59.8K SV. WBS 1.5.2 Calorimeter Electronics - EMCal LV - The Low Voltage power systems for EMCal sectors 1-12 have not all arrived. This leads to -\$15.8K SV. WBS 1.5.2 Calorimeter Electronics - EMCal Bias system – The Bias system for EMCal sectors 1-12 have not all arrived. This leads to -\$43.3K SV. WBS 1.5.3 Calorimeter Digitizer System (Boards) – Not all of the printed circuit boards on order for the 7 Crate system have arrived. This leads to a -\$32.6K SV. WBS 1.5.3 Calorimeter Digitizer System (Assembly and Test) – The assembly and testing of the 7-Crate Digitizer system has not started. This leads to a -\$90.9K SV.

Impact:

Impact WBS 1.5.1 SiPMs - None. Work is completed. WBS 1.5.2 Calorimeter Electronics – EMCal SiPM Boards, Sectors 1-12 – None. The boards for the first sector have been received and tested with 100% yield. The order for the balance of the boards has been placed and is waiting the delivery of the printed circuit boards which is part of the assembly order. The assembly house as indicated a delivery date in early May before they are required for assembly. WBS 1.5.2 Calorimeter Electronics – EMCal Preamp Testing –

None. The preamp boards for Sector 1 have been delivered to the EMCal group and the Lehigh University group has received the balance of the boards for testing. The projected testing rate is 1 sector of boards per week. The next batch of tested boards will be delivered to BNL in advance of when they will be needed for installation. WBS 1.5.2 Calorimeter Electronics - Test Pulse Board – None. Redesign of the Test Pulse Board has started with a scheduled completion date of late May 2020. Several prototype boards have been assembled and can be used for test stands. The production boards are not required until the EMCal and HCal digitizer racks are assembled. WBS 1.5.2 Calorimeter Electronics - EMCal Internal Signal Cables – The first 25% of the interior signal cables have been delivered with a > 98% acceptance. This is sufficient to assemble 3 sectors of the EMCal. Some 10 days float relative to the critical path remain as of early January. These cables are internal to a sector and must be installed prior to closing and testing a sector. WBS 1.5.2 Calorimeter Electronics - EMCal External Signal Cables - None. These cables are planned to be ordered with the rest of the EMCal sector 1-12 equipment, as noted, but are not needed for installation until late 2021. Adequate cables sets exist at BNL to allow testing of all production EMCal sectors, as these cables are external to the sector's mechanical structure and thus can be re-used with any EMCal sector for testing. WBS 1.5.2 Calorimeter Electronics - EMCal LV - None. Existing LV supplies will be used to test all production EMCal sectors. Production LV systems are not required until installation into the assembly hall starts. WBS 1.5.3 Calorimeter Digitizer System (Boards) – None. Not all of the printed circuit boards for the 7-crate pre-production have arrived. Orders have been placed with a completion of delivery of all boards by May 1, 2020. This does not affect other MIE work, because an adequate number of prototype calorimeter digitizers are at BNL and meet all specifications, and thus are in use to support all calorimeter detector production and testing. There are some 130 days of float in the Calorimeter Digitizer effort relative to the MIE critical path. WBS 1.5.3 Calorimeter Digitizer System (Assembly and Testing)- The boards cannot be assembled for the 7-crate pre-production prototype of the calorimeter digitizers until the boards arrive. This does not affect other MIE w

Corrective Action:

Corrective Action WBS 1.5.1 SiPMs - None. Work is completed WBS 1.5.2 Calorimeter Electronics - EMCal Internal Signal Cables- The needed parts and cables are ordered and starting to arrive. The first 25% of the cables have been delivered and the assembly house is maintaining a delivery schedule to provide enough cables in advance of installation. Will continue to closely monitor the vendors delivery schedule. WBS 1.5.2 Calorimeter Electronics - EMCal External Signal Cables – Work is in progress with the sPHENIX Integration and Installation Team to finalize cable routing and rack locations in the sPHENIX detector. This information is required to purchase the external cables. This order will be placed with the signal cables required for the EMCal sectors 13-64. WBS 1.5.2 Calorimeter Electronics - EMCal LV – The final design of the EMCal LV distribution system is scheduled to be completed in the summer of 2020. The power supplies and distribution system will be ordered with the components needed for EMCal Sectors 13-64. WBS 1.5.3 Calorimeter Digitizer System (Boards) - Boards are on order with a scheduled delivery date. Will follow up with board manufactures to make sure there are no delays in delivery. WBS 1.5.3 Calorimeter Digitizer System (Assembly and Test) – Prepare documentation and assembly kits so that the boards can be sent out for assembly as soon as they arrive and are inspected.

Prepared:	Prepared By:	Approved:	Approved By:
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WBS 1.06A
DAQ & Trigger

Reporting Period: March 2020

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV in %	SPI	CPI
Current:	196,861	196,861	45,776	0	0%	151,085	77%	1.00	4.30
Cumulative:	222,833	222,833	91,635	0	0%	131,199	59%	1.00	2.43

BAC

At Complete: 1,240,177

Threshold(s) Exceeded: Cumulative Cost

Explanation of Variance/Description of Problem:

The Local Level 1 (WBS 1622) is being designed and built by Nevis Labs. The V1 prototype has been received on schedule. Just as the assembled boards were received, Nevis Labs issued a work-from-home order, which resulted in a virtual shutdown of the administrative processes. The corresponding invoices for the Local Level 1 have not been received.

Impact:

There is no impact. The funds allocated for this part of the project have not been invoiced and cannot be costed.

Corrective Action:

None. We need to wait until the virtual shutdown due to the Covid-19 pandemic ends to receive the invoices.

Prepared:

4/21/2020

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Approved:

4/23/2020

Approved By:

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[18368]

1008 Infrastructure and Facility Upgrade

WBS 2.01

Reporting Period: 3/1/2020 - 3/31/2020

Infrastructure/Facility Management (Irina Sourikova [22419])

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV %	SPI	CPI
Current:	83,845	62,253	47,534	21,591	-26%	14,720	24%	0.74	1.31
Cumulative:	1,415,201	1,415,201	1,216,989	0	0%	198,212	14%	1.00	1.16
BAC									
At Complete:	3,618,708								

Threshold(s) Exceeded: Cumulative Cost

Explanation of Variance/Description of Problem:

WBS 2.1. The amount of labor needed to manage the project peaked around the October 2019 Director's Review and is slowly decreasing as the project matures. The level of effort needed to manage the project will decrease until it reaches a lower steady state value later this year.

Impact:

Positive impact. Less project management charges to the 1008 I&F Upgrade accounts result in saving to the project and a positive cost performance.

Corrective Action:

No corrective action needed at this time.

Reporting Period: 3/1/2020 - 3/31/2020

SC Magnet (Kin Yip [22397])

	BCWS	BCWP	ACWP	SV in \$	SV in %	CV in \$	CV %	SPI	CPI
Current:	176,718	52,043	26,677	- 124,674	-71%	25,367	49%	0.29	1.95
Cumulative:	1,459,178	1,019,440	975,722	- 439,737	-30%	43,718	4%	0.70	1.04
BAC									
At Complete:	5,502,255								

Threshold(s) Exceeded: Cumulative Schedule

Explanation of Variance/Description of Problem:

Five items contributed to this SV. 1. Mainly five pegpoints on the contract for the helium cryogenics were not complete. These include two for the process line spool pieces - one for the approval of the intermediate design and the other for the submission of the final design (total of -\$84K), and three for the interconnect spools - one for the approval of the preliminary design, one for the approval of the intermediate design and another one for the submission of the final design (total of about -\$150K), causing -\$235K of SV. 2. The detailed layout and drawing packages for the LN2 transfer system were only 2/3 complete, and piping supports drawings packages were not quite complete, thus materials and cable tray supports were not procured, due to the need to coordinate detailed design with the platforms on the carriage/cradle, leading to almost -\$40K of SV. 3. The weld maps for the GN2 vent line and the warm piping tie-in to the Bldg.1010B compressor were not complete, leading to -\$47K of SV. The weld maps for the GN2 vent line and the current leads of warm piping were not complete, leading to -\$39K of SV. The procurements of reliefs and warm valves were not complete, leading to -\$17K of SV. 4. The design for the AC/DC power distribution was not complete, nor was procurement of second half of the parts for magnet AC power distribution, leading to a total of -\$43K of SV. The PSU documentation was completed, leading to positive \$26K of SV. There is thus a net -\$17K of SV in this area. 5. Mapping probe mounts were not built and probes were not procured for the magnet mapping, leading to -\$41K of SV.

Impact:

The intermediate design report for the process line spools should be complete by the end of April by the vendor. The preliminary design report for the helium interconnection spools will start in late April. All these lead to the delivery of the process line spools in July. This will not impede the contract for the helium interface. The locations for piping supports and cable trays are under design in another WBS (2.4.2) as part of the overall design for the platform area and are progressing. The design work on the LN2 system was partly suspended to advance the BNL review of the Helium system, which is closer to the critical path. The two weld maps are part of design packages, both having about 300d float, thus will not impede other cryogenics work. The AC/DC power distribution parts are being procured early, >300d float, to be available well ahead of schedule, thus there is no impact on other schedule areas. The magnet mapping concept has been re-evaluated based on review committee device and a decision taken to use an existing mapper operated by a group external to BNL. This eliminates the need for preparing a custom mapper. The new plan will be reflected in the baseline WBS using a PCR.

Corrective Action:

The intermediate design report for the process line spools from the vendor is expected to be complete by April. Then the final design report for the process line spools will start at the vendor. Since RHIC will run

in the summer (this year) due to coronavirus delay, the earliest day that the Cryogenics group can install those spools is in September and so delivery of the process line spools in July is OK. The design of the carriage platforms is proceeding, and allowances have been made for the location of the piping supports and cable trays needed for the Superconducting magnet. This will require much of FY2020 to complete but will still be done well ahead of when equipment must be mounted. A new contract designer has been added and is at work to collect all service routing information and develop an overall map, design and procurement package for routing and support of services. The two weld maps are in preparation and are expected by April 2020, preserving over 300d float. The engineering effort in support of this is well advanced. The first half of the AC power distribution parts are in hand and the second half being ordered. The design is underway. An external group possessing a suitable mapper has been contacted and agreed to perform the mapping. Arrangements are being developed for this. Other groups with experience mapping large magnets are also being contacted.

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4/21/2020

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Date:

4/23/2020