

# **sPHENIX Director's Review Overview of the Infrastructure and Facilities Upgrade**

**August 2-4, 2017**

**BNL**

# The Three Parts of sPHENIX

**MIE Cost range is \$29-35M**

**Upgrade Support is ~\$20M**

**Infrastructure/Facility Upgrade ~\$20M**

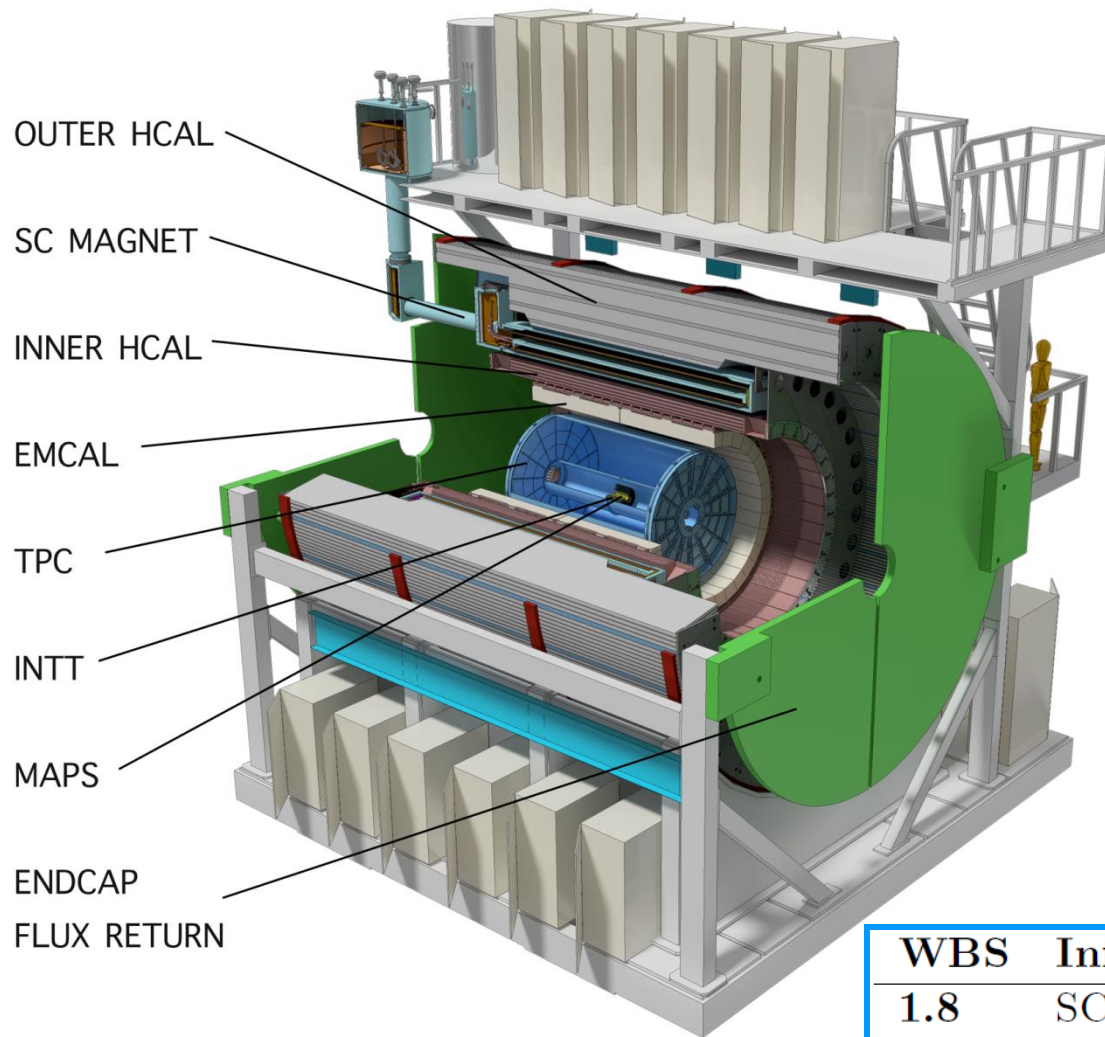
**DOE funded & Managed**

**BNL Funded & Managed**

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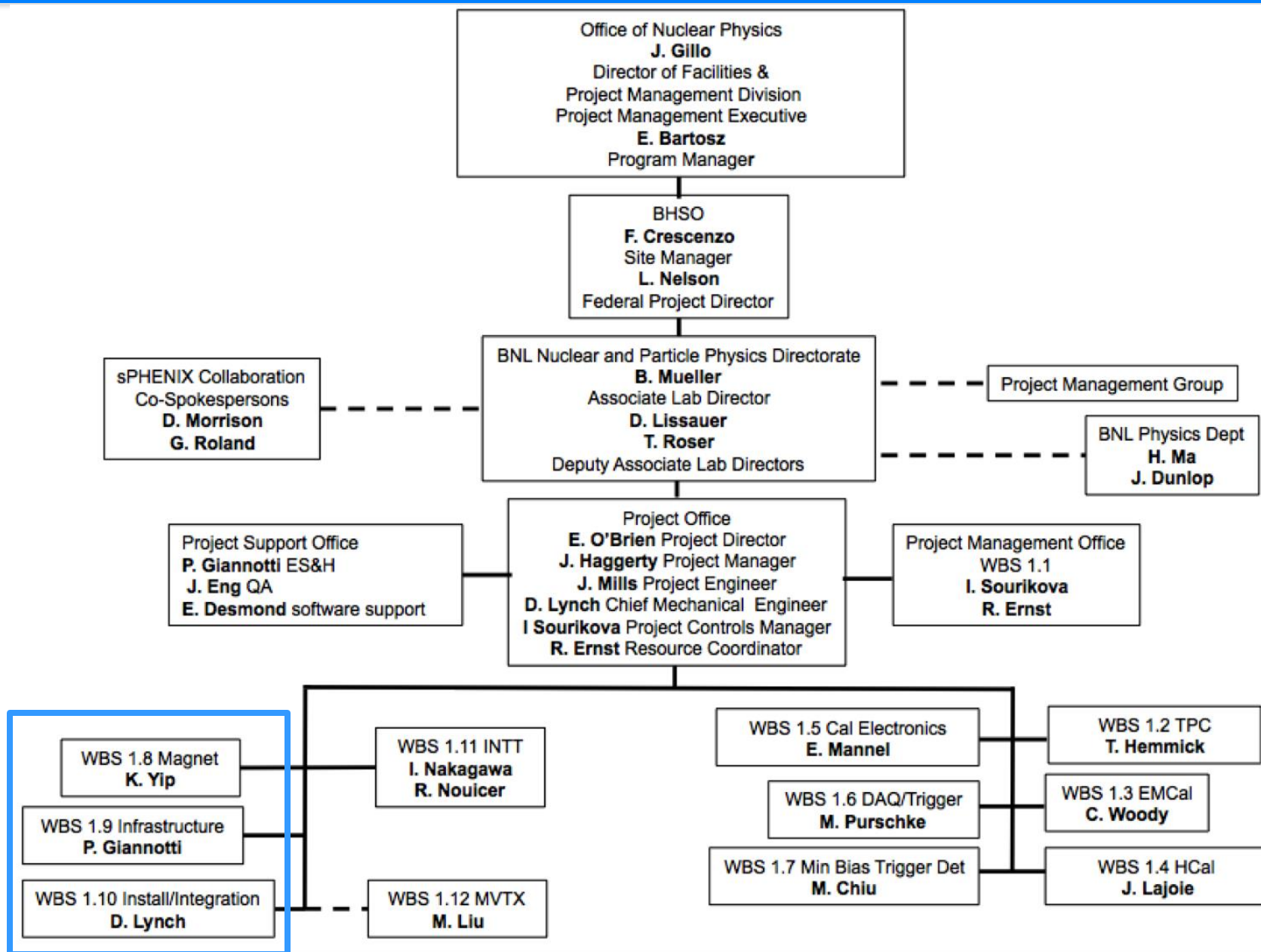
- A. sPHENIX MIE Upgrade** covering the detector (Project Management, TPC, EMCal, HCal, Calorimeter Electronics, DAQ/Trigger, Min Bias Detector). Dominated by M&S costs. The MIE carries labor for Project Management and ~\$1M in paid University labor for building things.
- B. Upgrade Support** is 100% BNL labor that supports the sPHENIX MIE upgrade. Primarily the Phys Dept. PHENIX/sPHENIX technical support group augmented by CAD, Magnet Div and Instrumentation Div.
- C. Infrastructure and Facility Upgrade** of the 1008 complex . Combination of M&S and Labor. Purpose is the upgrade of 1008 to modern standards. Enables cryo operations in 1008 and provides a facility optimized for the operation of a modern detector.

# Infrastructure and Facility Upgrade



WBS	Infrastructure & Facility Upgrade
1.8	SC-Magnet
1.9	Infrastructure
1.10	Installation-Integration

# Project Organization



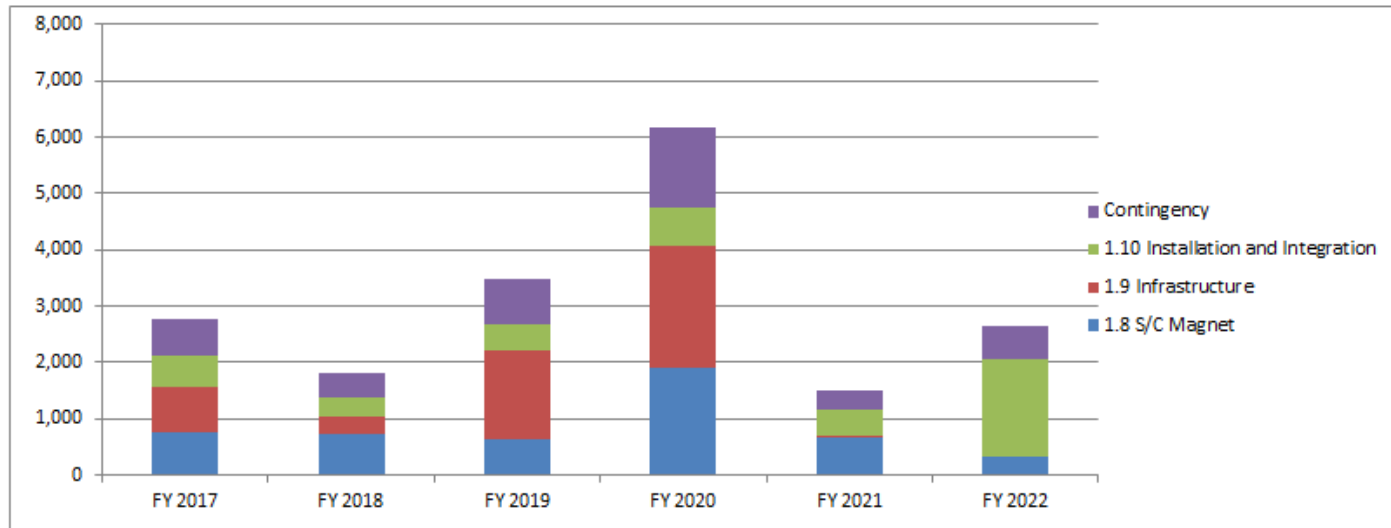
# Scope of Work

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- SC-Magnet
  - Providing cryogenics for SC operations from RHIC into 1008 IR
  - Transportation of magnet from 912 to 1008 and assembly in 1008
  - Power supplies and controls including quench protection
  - Field measurements
- Infrastructure
  - Carriage, racks and platforms, access, pole tips, off-detector structure and alignment features
  - Mods to existing systems, gas, cooling, safety including ODH, water systems, HVAC, AC power
  - Modest modifications to infrastructure of control room, rack room, gas pad.
- Installation and Integration
  - Infrastructure Installation
  - Detector subsystem installation

# Infrastructure and Facility Upgrade

Baseline Scenario - Facility Upgrades (Labor and Non-labor)  
AY k\$'s - with Extraordinary Construction Overhead Application



Baseline Scenario  
AY k\$'s - with Extraordinary Construction Overhead Application

WBS	SYSTEM	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total
1.8 S/C Magnet		771	727	623	1,890	660	340	5,011
1.9 Infrastructure		781	301	1,586	2,178	50	0	4,896
1.10 Installation and Integration		572	360	468	685	451	1,704	4,240
Baseline Total		2,124	1,388	2,677	4,753	1,161	2,044	14,147
Contingency		637	416	803	1,426	348	613	4,244
MIE Total		2,761	1,804	3,480	6,179	1,509	2,657	18,391

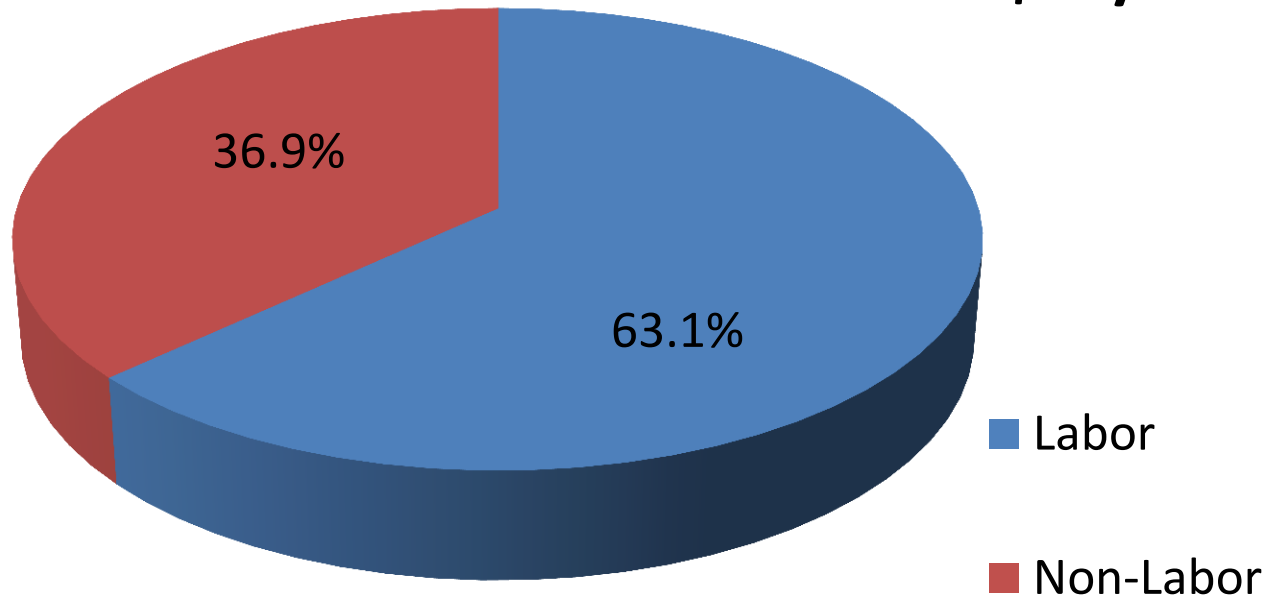
  

WBS	SYSTEM	Baseline	Contingency	Total
1.8 Magnet		5,011	1,503	6,514
1.9 Infrastructure		4,896	1,469	6,365
1.10 Installation and Integration		4,240	1,272	5,512
Facility Upgrade Totals		14,147	4,244	18,391

# Basis of Funding

## Infrastructure & Facility Upgrade

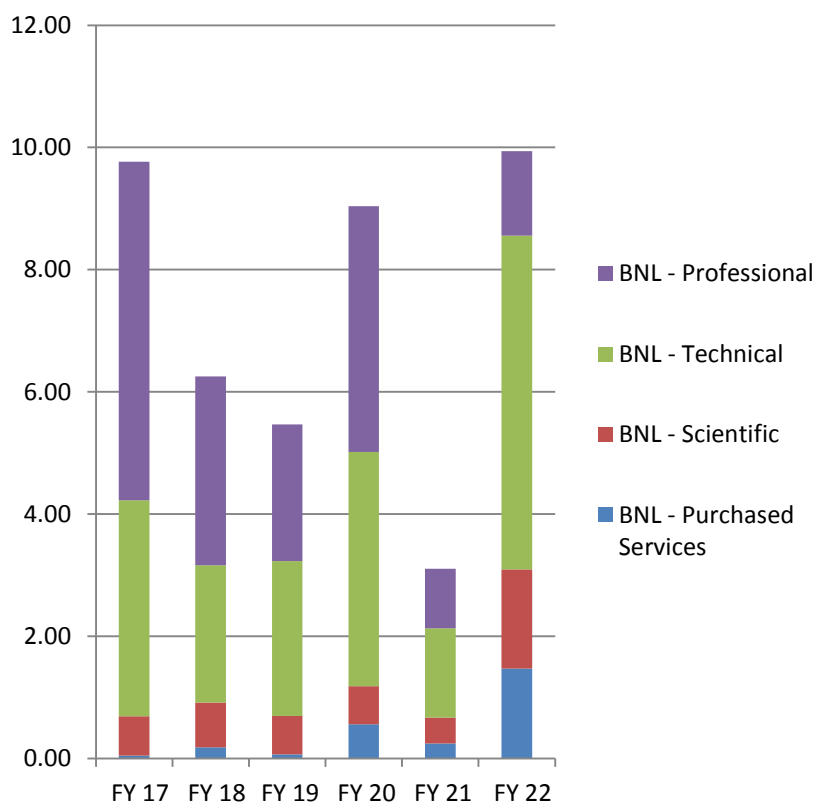
**18.4 AY M\$ w/Contingency**



WBS	SYSTEM	Baseline	Contingency	Total	AY k\$
1.8	Magnet	5,011	1503	6,514	
1.9	Infrastructure	4,896	1469	6,365	
1.10	Installation and Integration	4,240	1272	5,512	
Facility Upgrade Totals		14,147	4244	18,391	

# Labor SC-Magnet, Infrastructure, Installation & Integration

## FTE's WBS 1.8 through 1.10



## FTE's by BNL Organizations

WBS Level	WBS Description	Org Sort	Code	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22			
1.8	S/C Magnet	BNL	CA-D	2.66	1.88	1.05	2.22	0.90	0.87			
			Scientific	0.38	0.59	0.61	0.58	0.42	0.11			
			Technical	0.22	0.00	0.05	0.67	0.20	0.57			
			Professional	2.06	1.29	0.39	0.97	0.27	0.20			
			F&O	0.05	0.00	0.07	0.13	0.02	0.00			
			Purchased Services	0.05	0.00	0.07	0.13	0.02	0.00			
			Magnet Div	0.06	0.43	0.00	0.00	0.00	0.32			
			Technical	0.00	0.36	0.00	0.00	0.00	0.32			
			Professional	0.06	0.07	0.00	0.00	0.00	0.00			
			Physics	0.91	0.79	0.14	0.63	0.09	0.30			
			Scientific	0.00	0.12	0.00	0.04	0.00	0.01			
			Technical	0.53	0.53	0.00	0.26	0.00	0.05			
			Professional	0.38	0.14	0.14	0.33	0.09	0.24			
			BNL Sum	3.67	3.11	1.25	2.98	1.01	1.49			
			1.9	Infrastructure	BNL	CA-D	0.04	0.00	0.00	0.02	0.00	0.00
Technical	0.02	0.00				0.00	0.02	0.00	0.00			
Professional	0.02	0.00				0.00	0.00	0.00	0.00			
F&O	0.00	0.00				0.00	0.02	0.00	0.00			
Purchased Services	0.00	0.00				0.00	0.02	0.00	0.00			
Magnet Div	0.00	0.01				0.01	0.00	0.00	0.00			
Professional	0.00	0.01				0.01	0.00	0.00	0.00			
Physics	3.52	1.43				3.40	3.26	0.19	0.00			
Scientific	0.19	0.02				0.02	0.00	0.00	0.00			
Technical	1.62	0.57				2.34	1.67	0.00	0.00			
Professional	1.71	0.83				1.04	1.58	0.19	0.00			
BNL Sum	3.56	1.43				3.41	3.30	0.19	0.00			
1.10	Installation and Integration	BNL				CA-D	0.07	0.06	0.00	0.14	0.02	0.51
						Technical	0.07	0.06	0.00	0.14	0.02	0.51
						F&O	0.00	0.18	0.00	0.41	0.23	1.47
			Purchased Services	0.00	0.18	0.00	0.41	0.23	1.47			
			Magnet Div	0.00	0.00	0.00	0.00	0.00	0.05			
			Technical	0.00	0.00	0.00	0.00	0.00	0.05			
			Physics	2.47	1.47	0.81	2.21	1.66	6.43			
			Scientific	0.07	0.01	0.00	0.00	0.00	1.50			
			Technical	1.07	0.72	0.15	1.08	1.24	3.98			
			Professional	1.32	0.74	0.66	1.14	0.42	0.95			
			BNL Sum	2.54	1.71	0.81	2.76	1.90	8.45			
			Grand Total									



# Features of the Infrastructure & Facility Upgrade

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- Managed by the sPHENIX Management team
- The RLS, BOE docs, WBS structure of Infrastructure & Facility 1.8-1.10 is implemented the same as the MIE WBS 1.1-1.7. All will be migrated to P6.
- All work expected to be performed by BNL with the exception of the cryo tie-in which likely will be an outside vendor
- SC-Magnet work is 95% CAD and Magnet Division
- Infrastructure work is 50/50 Physics/CAD
- Installation and Integration 90% Physics with the remainder CAD
- We will establish Memoranda of Agreement between Physics Dept., CAD, and SMD governing the responsibilities and assignment of resources.
- Planning and Design has been going on for the last 3 years. Much of the work will be managed and coordinated by the same practices followed during the 16 years of PHENIX Ops.
- Work will be performed within well-established protocols for:
  - **Safety (CAD and BNL safety reviews)**
  - **Work Planning (Many years of experience with Work Control Coordination)**
  - **Configuration Control and written procedures ( Long established policies)**
- This work **does not** have to wait for CD-1 to begin. It is not governed by 413.3b

# Summary

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- Detailed plans exists for the Infrastructure and Facilities upgrade WBS 1.8-1.10.
- This work will be managed by BNL and is not subject to 413.3b rules.
- Engineering design work has started on Magnet Cryo design and Integration/Installation design. Most of the work for the next 12 months is design.
- We have identified the majority of the people to do the engineering and design work but resource availability may be challenging due to resource sharing between high-priority projects. Need resource-commitment agreements between BNL Departments.