MALORY J. FAUST . MECHANICAL OPTION . SENIOR THESIS . 2006 - 2007

HTTP://www.arche.psu.edu/thesis/eportfolio/2007/portfolios/MJF285/building-stats.htm



ARCHITECTURE: SMITHGROUP, INC.

4 STORIES, 399,099 SF

TERRACED INTO THE SIDE OF MOUNT PONY IN CULPEPER, VA CONSISTS OF 3 PRIMARY BUILDINGS:

COLLECTIONS BUILDING - RENOVATED BUILDING PROVIDING STORAGE FOR NON-NITRATE MEDIA AND LOW TEMPERATURE VAULTS

CONSERVATION BUILDING - MEDIA RESTORATION LABS AND PUBLIC MEDIA VIEWING SPACES

NITRATE VAULTS - STORAGE FOR NITRATE BASED MEDIA

MECHANICAL: VANDERWEIL ENGINEERS, LLP

COOLING: CHILLED WATER IS PROVIDED IN 3 STAGES: 42 F WATER IS PROVIDED BY (2) 450 TON CHILLERS SERVING BUILDING LOADS AND (2) 175 TON CHILLERS PROVIDING 30 F WATER TO RECOOLING COILS AROUND THE BUILDING. FINALLY THE LOW TEMPERATURE VAULTS ARE SUPPLIED 10 F WATER FROM (1) 30 TON CHILLER. ALL HEAT REJECTION IS ACCOMMADATED BY 4 OPEN CELL COOLING TOWERS.

HEATING: (2) OIL FIRED STEAM BOILERS SUPPLY STEAM TO BOTH AHU DESSICANT WHEELS AND SECOND STAGE HEAT REACTIVATION. LOW PRESSURE STEAM IS CONVERTED INTO HEATING HOT WATER.



ELECTRICAL: VANDERWEIL ENGINEERS, LLP

VIRGINIA POWER WILL SUPPLY 13.2 KV TO 480Y/277 TRANSFORMERS ON SITE AND THEN DISTRIBUTED THROUGH OUT THE BUILDING.

THE DIESEL ENGINE GENERATOR SYSTEM WILL SERVE LIFE SAFETY SYSTEMS AS WELL AS CHILLERS, COOLING TOWERS, PUMPS, BOILERS, VENTILATION SYSTEMS, AND CONTROLS.

ALL WIRING IN THE NITRATE VAULTS AND LABS WILL BE EXPLOSION PROOF.

STRUCTURAL: CAGLEY AND ASSOCIATES

PRIMARILY A CAST IN PLACE CONCRETE SYSTEM DESIGNED TO ACCAMODATE LIVE LOADS UP TO 800 PSF. EXISTING STRUCTURE IS REINFORCED BY WIDE FLANGE STEEL BEAMS AND A REDUCTION OF EXISTING SPANS BY 50%.

NITRATE VAULTS ARE DESIGNED FOR EXPLOSION WITH EXPLOSIONA SHAFTS AND VENTS ON ENDS OF THE BUILDING.





CONSTRUCTION: DPR CONSTRUCTION, INC.

24 MONTH CONSTRUCTION SCHEDULE TO BE COMPLETED IN FEBRUARY 2007

TOTAL CONSTRUCTION COST: \$120,000,000
DESIGN - BID - BUILD