



THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY FY 2021 SITE SUSTAINABILITY PLAN

December 2020

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Executive Summary

The Thomas Jefferson National Accelerator Facility (TJNAF), located in Newport News, Virginia, is a laboratory operated by Jefferson Science Associates, LLC, for the Department of Energy's (DOE) Office of Science (SC). The primary mission of the laboratory is to explore the fundamental nature of confined states of quarks and gluons, including the nucleons that comprise the mass of the visible universe. TJNAF also is a world-leader in the development of the superconducting radio-frequency (SRF) technology utilized for the Continuous Electron Beam Accelerator Facility (CEBAF). This technology is the basis for an increasing array of applications at TJNAF, other DOE labs, and in the international scientific community. The expertise developed in building and operating CEBAF and its experimental equipment has facilitated an upgrade that doubled the maximum beam energy (to 12 GeV (billion electron volts)) and provided a unique facility for nuclear physics research that will ensure continued world leadership in this field for decades. TJNAF's current core capabilities are: Nuclear Physics; Accelerator Science and Technology; and Large Scale User Facilities/Advanced Instrumentation.

The TJNAF complex consists of 69 DOE-owned buildings comprising 882,990 square feet (SF) of office, shop, technical, and storage space. JSA leases an additional 37,643 SF of office and shop space from the Commonwealth of Virginia in the Support Services Center (SSC) and 11,097 SF of office and lab space from the City of Newport News in the Applied Research Center (ARC). JSA also leases 17,549 SF of storage space in two offsite storage warehouses within 12 miles of TJNAF. This infrastructure provides office and workspace for approximately 760 JSA contractor, JSA, and federal government employees along with a transient population of 1,600 users and visiting scientists.

TJNAF remains strongly committed to supporting and achieving the targets in the DOE Strategic Sustainability Performance Plan (SSPP). Evidence of this commitment is demonstrated in the significant progress already made in achieving many of the interim goals established. TJNAF remains on target to meet or exceed interim and long term sustainability goals for most identified categories. Sustainability goals are integrated into the Environmental Management System (EMS) in accordance with DOE O 436.1.

Understandably, expansion of the scientific mission at TJNAF has led to significant increases in high energy mission specific facility (HEMSF) electricity and thermal energy (cooling tower water) requirements to support CEBAF accelerator operations when compared with data from established baseline years. While achievement of reduction goals for purchased electricity and potable water represent a significant challenge at TJNAF, multiple reduction strategies have been identified and are under consideration for implementation.

The executive summary table below summarizes current performance status, planned actions and contribution, and overall risk of non-attainment.

Prior DOE Goal	Current Performance Status	Planned Actions & Contribution	Overall Risk of Non-Attainment
Energy Management			
30% energy intensity (Btu per gross square foot) reduction in goal-subject buildings by FY 2015 from a FY 2003 baseline and 1.0% YOY thereafter.	-25.4% (green)	Improve energy use intensity by 2% annually	Low
EISA Section 432 continuous (4-year cycle) energy and water evaluations.	Compliant	Continue meeting auditing requirements	Low
Meter all individual buildings for electricity, natural gas, steam, and water, where cost-effective and appropriate.	27% fully metered 60% partially metered 13% not metered	Eliminate "not metered" status and convert "partially metered" to "fully metered" by 10%-15% annually	Low
Water Management			
20% potable water intensity (Gal per gross square foot) reduction by FY 2015 from a FY 2007 baseline and 0.5% YOY thereafter.	+22.1% (red)	Implement a storm water reuse project to reduce potable water consumption by 50 million gallons annually	High
Non-potable freshwater consumption (Gal) reduction of industrial, landscaping, and agricultural (ILA). YOY reduction; no set target.	Data combined with potable water (see previous row)	Data combined with potable water (see previous row)	Data combined with potable water (see previous row)
Waste Management			
Reduce at least 50% of non-hazardous solid waste, excluding construction and demolition debris, sent to treatment and disposal facilities.	69.6% (green)	Continue to seek new materials to divert and improve existing processes	Low
Reduce construction and demolition materials and debris sent to treatment and disposal facilities. YOY reduction; no set target.	83.5% (green)	Continue to seek new materials to divert and improve existing processes	Low

Prior DOE Goal	Current Performance Status	Planned Actions & Contribution	Overall Risk of Non-Attainment
Fleet Management			
20% reduction in annual petroleum consumption by FY 2015 relative to a FY 2005 baseline and 2.0 % YOY thereafter.		Continue to encourage use of alternative fuel and improvements to driving behavior to reduce fuel use	Low
10% increase in annual alternative fuel consumption by FY 2015 relative to a FY 2005 baseline; maintain 10% increase thereafter.		Continue to encourage use of alternative fuel and improvements to driving behavior to reduce fuel use	Low
75% of light duty vehicle acquisitions must consist of alternative fuel vehicles (AFV).		Alternative fuel vehicles are always acquired when available	Low
Clean & Renewable Energy			
"Renewable Electric Energy" requires that renewable electric energy account for not less than 7.5% of a total agency electric consumption by FY 2013 and each year thereafter.	24% (yellow)	Investigate opportunities to obtain onsite renewable energy and continue purchasing RECs in the interim	Medium
Continue to increase non-electric thermal usage. YOY increase; no set target but an indicator in the OMB scorecard.	30% (green)	Investigate opportunities for geothermal or solar thermal applications on new construction	Low
Green Buildings			
At least 15% (by count) of owned existing buildings to be compliant with the revised Guiding Principles for Sustainable Buildings by FY 2021, with annual progress thereafter.	10% (yellow)	<p>Confirm and document compliance for newly constructed and renovated buildings</p> <p>Compliance with the Guiding Principles is included as a goal for all major renovation projects where reasonable</p>	Low

Prior DOE Goal	Current Performance Status	Planned Actions & Contribution	Overall Risk of Non-Attainment
Acquisition & Procurement			
Promote sustainable acquisition and procurement to the maximum extent practicable, ensuring BioPreferred and biobased provisions and clauses are included in all applicable contracts.	100% (green)	FAR clauses regarding sustainability are included in 100% of appropriate acquisition contracts	Low
Measures, Funding, & Training			
Site set annual targets for sustainability investment with appropriated funds and/or financed contracts for implementation.	No targets currently established	Annual targets with appropriated funds to be established and implemented in FY22 and beyond	Low
Electronic Stewardship			
End of Life: 100% of used electronics are reused or recycled using environmentally sound disposition options each year.	100% (green)	Maintain existing process	Low
Data Center Efficiency: Establish a power usage effectiveness target for new and existing data centers; discuss efforts to meet targets.	1.3 PUE established and achieved	Continue to improve efficiency of power and cooling equipment in current and any future data center expansion projects	Low
Organizational Resilience			
Discuss overall integration of climate resilience in emergency response, workforce, and operations procedures and protocols.	Last assessment completed in 2014; improvements to infrastructure and operations have significantly reduced risk of flooding and power outages in key facilities	Complete a new Climate Vulnerability Assessment and integrate findings into future emergency response operations and infrastructure capital plans	Low
Multiple Categories			

Prior DOE Goal	Current Performance Status	Planned Actions & Contribution	Overall Risk of Non-Attainment
YOY scope 1 & 2 GHG emissions reduction from a FY 2008 baseline.	-32.3% (green); represents FY19 data	Achieve increased reductions of 2-5% annually	Medium
YOY scope 3 GHG emissions reduction from a FY 2008 baseline.	-45.4 (green); represents FY19 data	Develop a commuter assistance website to increase awareness and continue to promote alternative commuting options	Medium

Mission Changes

While there are no expected changes in scientific mission at the Laboratory in the next five to ten years, TJNAF does have a current capital project which will significantly impact the infrastructure portfolio. The CEBAF Renovation and Expansion (CRE) project includes the following scope:

- Elimination of three leased facilities: Support Service Center (34,739 SF), Facilities Maintenance Shop (2,904 SF), and Applied Research Center (11,097 SF)
- Renovation of CEBAF Center (127,511 SF) and construction of a moderate expansion (22,000 SF)
- Acquisition and renovation of the Applied Research Center (121,241 SF)

Renovation work will result in CEBAF Center and the Applied Research Center (ARC) achieving compliance with High Performance Sustainable Building (HPSB) Guiding Principles.



Energy Management

Performance Status

Energy Usage and Intensity:

TJNAF energy utilization intensity (EUI) baseline was established in FY15 at 89,778 Btu/GSF for goal subject buildings. Performance in FY20 was measured at only 66,958 Btu/GSF which constitutes a 25% reduction from the baseline.

Efforts to achieve energy usage and intensity reductions are not strictly limited to goal subject buildings, however. Several energy conservation measures (ECMs) related to lighting upgrades have been identified and TJNAF has implemented this in a progressive manner through retrofits whenever practical. For example, 33 of 55 1,000 watt high intensity discharge (HID) lights in the experimental halls were retrofitted to 300 watt light emitting diode (LED) lights. Due to operational requirements, these lights run continuously (24/7), so there is a significant reduction in energy expected.

EISA Section 432 Benchmarking and Evaluations:

A comprehensive set of energy and water audits were conducted during the development of a UESC feasibility study in FY16. Annual audits have been completed to supplement those performed under the feasibility study and to maintain compliance with the EISA S432 requirements. Benchmarking is currently being performed internally using a combination of utility bills and metered data from manual readings as well as an energy dashboard.

Plans and Projected Performance

In FY21, TJNAF plans to complete the replacement of HID lighting with LED in the experimental halls. Plans are also underway to finalize selection of a suitable LED replacement for 960 T-12 light fixtures in the accelerator tunnel.

TJNAF will also continue annual energy and water audits to comply with EISA S432 requirements in FY21 and subsequent years. These efforts are not anticipated to be negatively impacted by the COVID-19 pandemic. The Laboratory is also evaluating Portfolio Manager to replace internal benchmarking tools and processes.

Sustainability upgrades for the CEBAF Center and Applied Research Center (ARC) buildings are already included in the scope of the CEBAF Renovation and Expansion (CRE) project and are expected to make further significant reductions to EUI in the next five years.

Water Management

Performance Status

TJNAF has an extensive inventory of water meters which are closely monitored and used for monthly reporting and utility billing purposes. FY20 potable water consumption decreased by approximately 4.7 million gallons (or 6%) from FY19, however, this still represents a 22% increase from the FY07 baseline. Approximately 58 million gallons of potable water (nearly 80% of total potable water consumption) was required for evaporative cooling of High Energy Mission Specific Facility (HEMSF) operations. Consequently, achievement of any significant reduction in water intensity remains one of the most significant challenges for TJNAF sustainability goals.

Multiple water reduction and alternative water source strategies have been evaluated during the past several years. One identified strategy was successfully completed in FY19. The project reduced potable water consumption by 4 million gallons in FY20 by using ultra-pure water (UPW) waste which was previously discharged from the Test Lab building to sanitation and diverting this to a nearby cooling tower for use as a make-up water supply source.

Plans and Projected Performance

Water intensity reduction plans are designed to provide alternative water sources to primarily satisfy thermal energy (cooling tower water) requirements. A storm water reuse project is currently integrated into the Lab's Campus Plan and capital investment strategy which will provide 50 million gallons of water from a nearby storm water pond source. Construction is anticipated within the next three years.

Waste Management

Performance Status

TJNAF aggressively recycles non-hazardous solid waste. Of the 209 tons of non-hazardous solid waste produced in FY20, approximately 70% (145.4 tons) of building and office waste, paper and metal were recycled and/or diverted from landfill deposit. Verification of recycled material quantities is reported by the recycling service center, and recorded by Jefferson Lab.

Approximately 5.9 tons of non-hazardous waste in FY20 was diverted to the local Hampton – NASA steam plant for incineration.

Construction activity at TJNAF in FY20 produced approximately 34.5 tons of construction and demolition materials and debris. Approximately 84% (28.8 tons) was recycled/diverted from landfill deposit.

Plans and Projected Performance

Overall municipal solid waste is expected to increase with the acquisition of the ARC building. Construction and demolition materials debris is also projected to increase over the next several fiscal years relative to FY20 as significant major renovation and construction activities are conducted. TJNAF will continue existing processes to recycle non-hazardous waste to continue to exceed the 50% waste diversion from landfill goal. Further, TJNAF will continue to participate in a waste-to-energy program.

Fleet Management

Performance Status

TJNAF annual petroleum consumption decreased to 1,517 gallons in FY19, approximately 54% below the FY05 baseline. Annual alternative fuel consumption increased by approximately 105% as the Laboratory continued to make use of 1,105 gallons of E-85 fuel.

TJNAF conducts annual reviews and comparisons of Lab needs and vehicles available for lease through GSA. In FY20, five electric vehicles were traded in and replaced with like vehicles, but otherwise the fleet inventory remained essentially unchanged. Over 70% of the TJNAF leased fleet are low GHG vehicles and agency vehicles are predominately electric vehicles. Industrial fleet vehicles operate on diesel, propane or electric. Alternative fuel vehicles (AFVs) are being extensively used with the exception of some diesel heavy duty pickups that meet the load capabilities required for operations.

Plans and Projected Performance

TJNAF has no major initiatives or changes to missions relating to this category. Passenger fleet inventory remains well managed and is limited to only what is necessary. As vehicles are scheduled for replacement, existing vehicles are replaced with AFVs, zero emission or hybrids whenever appropriate. TJNAF will continue to investigate opportunities for electric vehicles which meet medium duty pickup needs and industrial fleet vehicles which consume diesel will be replaced by biodiesel capable vehicles when the cost of repairs exceed the long term value of replacement. Electric vehicle charging stations have been evaluated and discussed for budget and infrastructure planning.

Clean & Renewable Energy

Performance Status

TJNAF has and continues to invest and implement clean and renewable energy technologies. Several existing facilities utilize geothermal heat pump systems which produce and consume approximately 5,306 MMBTU/Yr of thermal energy. Additionally, 24% of TJNAF total electric energy (188,803 MWh's) consumption in FY20 was accounted for with renewable energy through the purchase of an equivalent amount (40,000 MWh's) of renewable energy certificates.

In FY16, an assessment was completed which evaluated the total opportunity to install photovoltaic systems at TJNAF including ground mount, rooftop and canopy options. Based on feedback two preferred locations were selected based on future plans for the site, payback potential and visibility to campus visitors:

- 613.8 KW (dc) or 500 KW (ac) facility north of the North LINAC (Building #01)
- 6.2 KW 9dc) or 5 KW (ac) demonstration system located at the main entrance of TJNAF adjacent to the Technology Engineering and Development building (Building #55)

In addition to making progress towards Federal renewable goals, TJNAF would benefit from increased energy resiliency and security by utilizing photovoltaic technology to produce electricity.

Plans and Projected Performance

TJNAF will continue to comply with the renewable energy requirements for interim goal years and the 30% by FY 25 goal by implementing renewable electric energy generation projects and/or purchasing renewable energy certificates equivalent to the goal levels. Expanded opportunities for solar are being considered with an alternate location currently under consideration which would be capable of supporting a 6MW solar array.

Sustainable Buildings

Performance Status

TJNAF currently has two facilities (10% by building count; 26.47% by gross square feet) which are documented as fully compliant with High Performance Sustainable Building (HPSB) Guiding Principles.

In FY12, the Technology and Engineering Development (TED) Building was completed. This 74,000 GSF office, laboratory, and high bay facility earned LEED Gold certification and includes many energy, water efficiency, and other sustainable features including:

- Geothermal heat pump system provides 80% of HVAC requirements
- Grey water reuse system delivers 100% of sanitation water
- Solar thermal/domestic water heating system
- 44% potable water reduction/low flow plumbing fixtures



In FY13, renovation and expansion of the Test Lab building was completed. The project included renovation of 95,000 GSF of office, laboratory, and high bay space as well as a 43,600 GSF laboratory addition. The Test Lab also earned LEED Gold certification and therefore complies with HPSB Guiding Principles.



Plans and Projected Performance

In FY17, construction of a new office and laboratory facility (Environmental, Safety, & Health Building) was completed and occupied. This 12,000 GSF building was designed to comply with all HPSB Guiding Principles. Energy and water efficient sustainable features include LED lighting, solar tube daylight harvesting, and a highly efficient variable refrigerant flow (VRF) system for heating and cooling. This building was designed and constructed to consume 35.4% less energy than the ASHRAE 90.1 - 2007 baseline which exceeds the HPSB requirements of 30%.



In FY20, renovation of the 10,152 GSF Cryogenics Engineering Office (Building 89) was completed and occupied. This 10,152 GSF building was also designed to comply with all HPSB Guiding Principles.

Recently completed projects are scheduled for benchmarking in Portfolio Manager in FY21 to confirm compliance with the Guiding Principles. Future new construction projects and major renovation projects will be designed to achieve compliance with HPSB Guiding Principles. As these projects are completed, each affected facility will also be benchmarked in Portfolio Manager to ensure compliance.

Acquisition & Procurement

Performance Status

TJNAF actively promotes sustainable acquisition and procurement to the maximum extent possible. FAR clauses regarding sustainability are included in 100% of appropriate acquisition contracts. The Laboratory strives to purchase parts and services that comply with GreenBuy standards and TJNAF has been awarded the GreenBuy Award by the Department of Energy for the third consecutive year. By conducting regular and consistent staff education courses, posting awareness notices, and identifying vendors and products that are environmentally friendly, TJNAF was able to exceed DOE requirements in FY21.

Plans and Projected Performance

In upcoming fiscal years, no change in mission or other factors are expected to have a significant impact in meeting goals for this category. TJNAF plans to continue existing practices to achieve results that meet or exceed requirements.

Measures, Funding, & Training

Performance Status

TJNAF has invested significantly for many years in achievement or progress regarding various sustainability goals. Funding was obtained through the sustainable design of two construction/major renovation LEED Gold facilities (TED Building and Test Lab). Participation in an ongoing demand response program primarily provided funding for a sitewide metering system and potential enhancements to the system are currently being evaluated. All new construction and renovation projects include sustainability features designed to continually progress all applicable facilities to achieve compliance with the HPSB Guiding Principles.

From FY14 thru FY17, TJNAF pursued a Utility Energy Services Contract (UESC) program to finance energy and water efficiency projects and continue progress towards achieving its sustainability goals. A feasibility study identified numerous energy conservation measure (ECM) projects including a campus wide (interior and exterior) lighting upgrade, central chilled water plant efficiency improvements, and water reduction (domestic water/low flow fixtures) in administrative facilities and an industrial water capture and reuse application. Although TJNAF has been unsuccessful in advancing the entire UESC program to full implementation, the Laboratory has implemented some of the ECMs such as lighting upgrades in several facilities and the ultra-pure water (UPW) waste reclaim project.

Plans and Projected Performance

TJNAF is still seeking to incorporate additional ECMs identified by the UESC feasibility study as well as recent EISA S432 energy and water audits as funding opportunities are identified. In FY21, TJNAF plans to complete additional replacement of pressure dependent control (PDC) valves on chilled water systems with pressure independent control (PIC) valves. Installation of a waterside economizer in the central utility plant (CUP) as well as numerous lighting retrofits and plumbing fixture replacements are included on future capital investment plans. When implemented, the identified projects will contribute especially to achieving the energy utilization intensity goal (25% reduction by FY25 from a FY15 baseline), water intensity reduction, and the HPSB Guiding Principle compliance goal.

Travel & Commute

Performance Status

Business Travel Strategies:

Specific initiatives have not been established to reduce ground or air travel for the purpose of reducing scope 3 GHG emissions. Corporate travel policy does, however, encourage efficiency in business travel. Business travel may be undertaken only when alternative methods, such as videoconferencing, are not available. To assist in this effort, most conference rooms at TJNAF are equipped with video and collaboration equipment.

Commute Strategies:

Staff commuting emissions are the largest controllable contributor to scope 3 GHG emissions. Current estimates for employee commuting GHG emissions is relatively low at only 854.21 mtCO₂e. This figure takes into account, however, the limited presence of staff onsite since April 2020 due to the COVID-19 pandemic. Due to limited participation in voluntary surveys, commuter data is obtained by validation of employee home address zip code and periodic field observations.

Since limited public transportation alternatives are available in the area, achieving reduction goals primarily relies upon implementation of a successful staff commuting emissions reduction program. The following steps have been taken as part of this effort:

- Since FY13, preferred parking spaces around the site have been strategically designated for carpooling and low emission vehicles
- In FY19, an alternate work schedule (AWS) policy was implemented. JSA now offers a 4/10 schedule and a 9/80 schedule as options to a standard workweek. These options reduce the total number of days driven to and from work by the workforce.
- Communication tools such as newsletters, Earth Day events, and EMS objectives encourage TJNAF personnel to improve commuting habits and use alternatives to single-passenger vehicles.

Plans and Projected Performance

Efforts will continue to educate employees about their carbon footprint and maintain results that meet or exceed requirements in this category. The following efficiency measures will be undertaken:

- In FY21, JSA plans to approve a telework policy which will continue to contribute towards scope 3 GHG reduction goals.
- Investigate options for the installation of electric vehicle charging stations for fleet and workplace reimbursable charging.

- Encourage TJNAF participation in regional transportation planning, recognition of existing community transportation infrastructure, or incorporation of such efforts into site policy and guidance documents.

Fugitives & Refrigerants

Performance Status

A variety of activities and operations at TJNAF use greenhouse gases for different purposes. The majority of fugitive GHG emissions in FY20 were due to refrigerant leaks or other corrective maintenance in facility HVAC system equipment. TJNAF reported usage of 108 lbs of R-22 and 400 lbs of R-422B. These emissions, however, are still minimal and represent a significant reduction from the FY08 baseline.

Sulfur hexafluoride (SF6) is used at TJNAF in several facilities to suppress arcing in high-voltage DC electron sources. Pressures in these systems are closely monitored and preventative maintenance tasks are conducted to mitigate the risk of leakage or an unexpected release. No new program requirements are expected to increase the use of SF6 and no alternatives are currently being considered or tested. Inventory is closely monitored and controlled. Of the 374 lbs on site in FY20, only 1 lb was lost due to o-ring leakage.

When high voltage systems need to be opened for maintenance, two methods of capture and storage are used. The Low Energy Recirculator Facility (LERF) utilizes a custom built recovery system which earned an environmental excellence award from the Commonwealth of Virginia in 2011. The system includes a remote cesiator – a purification and dehydration component. As a result, the gas is not only safely captured, but it can be conserved and reused rather than being replaced by new product. The second method of capture utilizes newer DILO mini series mobile service carts.

Plans and Projected Performance

In upcoming fiscal years, TJNAF has no major initiatives or changes to mission relating to this category. TJNAF plans to continue existing practices to achieve results that meet or exceed requirements.

Electronic Stewardship

Performance Status

Acquisition Strategies:

TJNAF purchase requisition and approval processes ensure that eligible electronics procurements are environmentally sustainable whenever possible. In FY20, approximately 95% of eligible products were compliant with EPEAT (bronze, silver, or gold) registration requirements.

Operations Strategies:

TJNAF utilizes a central power management system for 100% of desktop computers, laptops, and monitors that can hibernate without impacting Laboratory mission operations. Printing operations are also managed for maximum efficiency. Default queue settings for printers are set for duplex printing in black and white. Users must explicitly select simplex or color printing. Additionally, power management settings on printers and copiers are set to sleep mode when idle for a prescribed time period.

End of Life Strategies:

Property Management standard procedures ensure that 100% of all excess ADP equipment is screened for first screened for potential reuse whenever possible. When reuse is not possible, however, 100% of disposals are sent to an accredited recycle organization.

Data Center Strategies:

In FY17, TJNAF completed a major data center consolidation and renovation project that included a significant central chiller plant upgrade and continuous power usage effectiveness (PUE) monitoring energy dashboard. This project included consolidation of a tier III data center operating at a PUE of 2.44 and renovation and reconfiguration of a tier I data center operating at a PUE of 1.70. As a result of the combined high performance and core computing data centers, a new average PUE of 1.30 was achieved. Data center operational efficiency achievements were recognized in FY18 with a Federal Energy and Water Management Award in the data center category.



Plans and Projected Performance

In FY21, an additional row of hot aisle containment is expected to be constructed in the data center to support expansion of scientific computing equipment. Projected PUE of the data center remains set at 1.30.

In upcoming fiscal years, TJNAF has no major initiatives or changes to mission relating to this category. TJNAF plans to continue existing practices to achieve results that meet or exceed requirements.

Resilience

Performance Status

Resilience Strategies:

TJNAF is committed to the development of a resilient and secure energy program. A comprehensive technical and financial solution to meet energy, water and security requirements was completed through a value engineering study in FY13. Project objectives included the following:

- Meet critical electrical load requirements (12 MW) of the Central Helium Liquefier (CHL) plant with secure, resilient energy that is more efficient and produces less carbon
- Reduce potable water requirements by 60%
- Increase security footprint and emergency response coordination

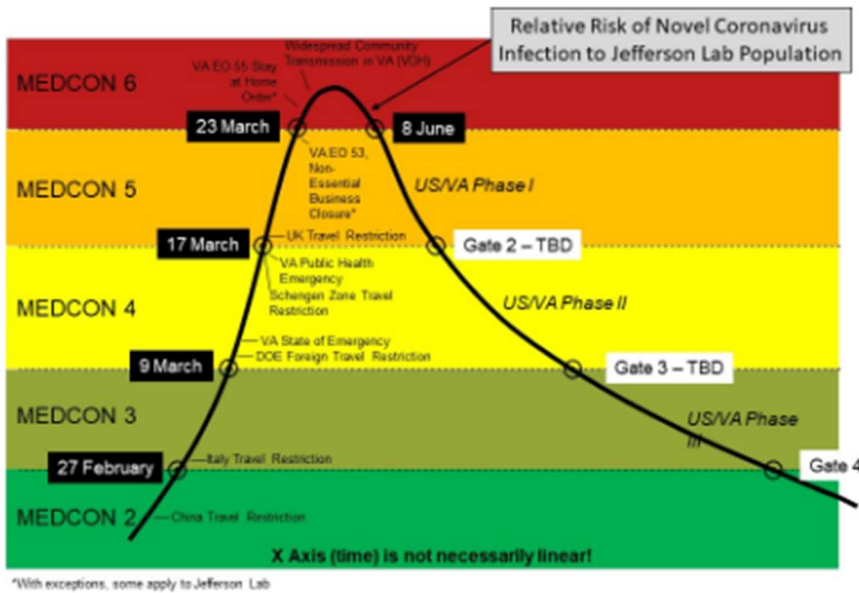
Primarily, site flooding from coastal hurricanes and major rain events represent the most significant forms of climate impact to the TJNAF site. Although located in the coastal mid-Atlantic/Hampton roads area, in close proximity to several areas more vulnerable to climate change based sea level rise, the site elevation (34 feet above mean sea level), rising sea levels represent a minimal direct threat to TJNAF. Damage mitigation strategies, such as tunnel ramp flood gates, have already been implemented and other storm water related infrastructure improvements are currently under consideration.



Coronavirus Pandemic:

Site operations at TJNAF have been negatively impacted by the coronavirus pandemic. On March 17, 2020, TJNAF entered Medical Condition (MEDCON) Level 5 and the majority of staff were immediately transitioned to remote working conditions. On March 23, 2020, the Commonwealth of Virginia issued Executive Order 53 which called for a closure of non-essential businesses and TJNAF entered MEDCON 6 and subsequently

initiated a controlled shutdown of accelerator operations which lasted until June 8, 2020 when TJNAF downgraded back to MEDCON 5. Following approximately two months of preparations, accelerator operations were resumed just in time to complete a brief six-week physics experimental run before entering a scheduled accelerator maintenance period.



In response to the pandemic, TJNAF has developed and is following a Resumption of On-Site Operations Plan. This plan describes additional hazard controls necessary to resume on-site operations due to the risk of COVID-19 infection. This plan supplements the TJNAF Worker Pandemic Protection and Response Plan of March 13, 2017. This supplemental plan is necessary to address the unique nature of the COVID-19 hazard and the expectation that an elevated health risk will continue for an extended period, perhaps up to two years. Both the TJNAF Worker Pandemic Protection and Response Plan and this supplementary plan are components of the TJNAF Worker Safety and Health Program.

Plans and Projected Performance

TJNAF continues to advance several resilience-related infrastructure projects. A storm water reuse project is currently integrated into the Lab's Campus Plan and capital investment strategy which will provide 50 million gallons of water from a nearby storm water pond source. Construction is anticipated within the next three years. A separate project to provide 18 MW of natural gas turbine generators to the accelerator site and an additional 6 MW on the campus is under consideration as well and will likely be incorporated as part of the FY21 Annual Lab Plan documentation.

TJNAF will continue to follow the Resumption of On-Site Operations Plan in FY21 and will incorporate any additional lessons learned regarding pandemic response into future resilience strategies.

Appendix - List of Uploaded Documents

Energy Management

Dashboard Workbook_Metering Upload Template_TJNAF.xlsx

Acquisition & Procurement

Dashboard Workbook_Biobased Products_TJNAF.xlsx

Dashboard Workbook_Sustainable Acquisition Contracts_TJNAF.xlsx