



# National Bio- and Agro-Defense Facility Construction Plan Update

*April 11, 2016*

Fiscal Year 2016 Report to Congress



Homeland  
Security

*Science and Technology Directorate*

# Message from the Under Secretary for Science and Technology

April 11, 2016

I am pleased to submit the following report, "National Bio- and Agro-Defense Facility Construction Plan Update," which has been prepared by the Science and Technology Directorate (S&T).

This report was prepared pursuant to language in Senate Report 114-68 accompanying the *Fiscal Year (FY) 2016 Department of Homeland Security Appropriations Act* (P.L. 114-113).

Pursuant to congressional requirements, this report is being provided to the following Members of Congress:



The Honorable John R. Carter  
Chairman, House Appropriations Subcommittee on Homeland Security

The Honorable Lucille Roybal-Allard  
Ranking Member, House Appropriations Subcommittee on Homeland Security

The Honorable John Hoeven  
Chairman, Senate Appropriations Subcommittee on Homeland Security

The Honorable Jeanne Shaheen  
Ranking Member, Senate Appropriations Subcommittee on Homeland Security

Inquiries related to this report may be directed to me at (202) 254-6033 or to the Department's Deputy Under Secretary for Management and Chief Financial Officer, Chip Fulghum, at (202) 447-5751.

Sincerely,

A handwritten signature in black ink, appearing to read "R. Brothers".

Dr. Reginald Brothers  
Under Secretary for Science and Technology  
U.S. Department of Homeland Security

# Executive Summary

This report was prepared pursuant to language in Senate Report 114-68 accompanying the *FY 2016 Department of Homeland Security Appropriations Act* (P.L. 114-113).

The National Bio- and Agro-Defense Facility (NBAF) will be a state-of-the-art biocontainment facility for the study of foreign animal, emerging, and zoonotic (transmitted from animals to humans) diseases that threaten U.S. animal agriculture and public health. NBAF will provide our Nation with critical capabilities to conduct research, develop vaccines and other countermeasures, and train veterinarians to protect and strengthen our Nation's farmers, food supply, public health, and rural economy.

For 60 years, the Plum Island Animal Disease Center (PIADC) has served our Nation as the primary facility to conduct this work. However, PIADC is at the end of its lifecycle, is too small, and needs to be replaced to meet national research requirements and to ensure the timely development of countermeasures in the event of an outbreak. Strategically, NBAF will provide new and expanded capabilities, specifically large animal biosafety level-4 laboratories, which will allow for the study of high-consequence zoonotic diseases affecting large livestock. Currently, no laboratory in the United States has this capability.

S&T established an NBAF acquisition cost baseline of \$1.25 billion in August 2014. The acquisition cost includes all costs from site selection to constructing and commissioning the facility. The acquisition cost does not include transitioning operations from PIADC to NBAF or decommissioning and closing all PIADC facilities.

The NBAF acquisition is funded through federal appropriations as well as through gift funds provided by the State of Kansas. As part of its NBAF site offer, the State of Kansas and the City of Manhattan offered a total of \$312 million for site improvements and construction activities.

DHS requested and received \$300 million in FY 2015 appropriations to complete construction of the main laboratory facility. With receipt of this funding, \$638.25 million in previous year appropriations, and the final installment of gift funding from the State of Kansas, the acquisition program was fully funded to the cost baseline of \$1.25 billion. Per the acquisition program baseline schedule, the main laboratory facility construction contract modification was awarded in May 2015. Central utility plant construction was completed in October 2015. Construction of the main laboratory facility is progressing on schedule, with excavation, utility work, and foundation installation activities underway in 2015.



# National Bio- and Agro-Defense Facility Construction Plan Update

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# I. Legislative Language

This report was prepared pursuant to language in Senate Report 114-68 accompanying the *Fiscal Year (FY) 2016 Department of Homeland Security (DHS) Appropriations Act* (P.L. 114-113).

Senate Report 114-68 states:

S&T shall submit to the Committee a detailed update of NBAF construction progress and a schedule not later than 30 days after the date of enactment of this Act.

## II. Background

The U.S. agriculture industry comprises a critical infrastructure that contributes more than \$1 trillion to the U.S. economy every year, approximately one-sixth of the gross domestic product. One of every eight Americans is employed in the agricultural sector, which includes farmlands, feedlots, processing plants, warehouses, research facilities, factories for food preparation and packaging, and the national and global distribution network. The economic impact of an agricultural biological threat—deliberate or natural—could include direct loss of livestock and assets, losses in upstream and downstream markets such as crop prices, lost export markets, significant price effects, and a reduction in economic growth caused by reallocation of resources. Secondary and tertiary effects could include long-term environmental problems (e.g., consequences of disposing of killed animals) and social and political impacts such as reduced confidence in government, reduced confidence in food safety, and economic and social disruption resulting from fear of tainted food, etc.

### A. Threats to U.S. Agriculture

Several presidential directives and congressional mandates assign agricultural defense responsibilities to both DHS and the U.S. Department of Agriculture (USDA). Any animal disease outbreak posing a nationally significant impact on U.S. agriculture is within DHS's Homeland Security Presidential Directive (HSPD) 9 coordination responsibilities, regardless of whether the cause is agro-terrorism or natural disease. The response actions might differ according to whether an outbreak was intentional or natural, but, in both cases, DHS would be responsible for coordinating the national response if the event were of sufficient scale and impact. This is consistent with DHS's leadership role in a variety of emergencies such as Deepwater Horizon or the 2009 H5N1 influenza pandemic.

The creation of a robust research and development capability to support agro-defense has been the intention of many acts of Congress and presidential directives. The Homeland Security Act of 2002 transferred the Plum Island Animal Disease Center (PIADC) to DHS from USDA while maintaining the USDA research and diagnostic programs. In 2004, HSPD-9 tasked the Secretaries of Agriculture and Homeland Security to “develop a plan to provide safe, secure, and state-of-the-art agriculture biocontainment laboratories that research and develop diagnostic capabilities for foreign animal and zoonotic diseases.” In January 2006, DHS announced that, to meet its obligation under HSPD-9, it would construct and operate a new facility, the National Bio- and Agro-Defense Facility (NBAF). A key action from this HSPD was the DHS and USDA development of a joint agro-defense strategy and site-selection criteria for locating NBAF. HSPD-9 also directed the heads of federal departments and agencies, including the Secretaries of

Homeland Security and Agriculture, to “accelerate and expand development of current and new countermeasures against the intentional introduction or natural occurrence of catastrophic animal, plant, and zoonotic diseases” with coordination by the Secretary of Homeland Security.

Multiple studies and reports have recommended the construction of a facility with state-of-the-art large animal biosafety level 4 (ABSL-4) laboratories wherein the full spectrum of research and development activities can take place. Most recently, the July 2012 National Academy of Sciences (NAS) report, “Meeting Critical Laboratory Needs for Animal Agriculture: Examination of Three Options,” notes that “there is a critical national need for laboratory capacity with modern BSL-3Ag [Biosafety Level 3 Agriculture] and ABSL-4 large-animal capabilities.” One of the primary conclusions of this report states that, “as part of the national infrastructure for protecting animal and public health, there is an imperative to build ABSL-4 large-animal space in the United States.”

## B. NBAF Capabilities

The specific capability delivered by a U.S. BSL-3Ag/ABSL-4 laboratory dedicated to animal agriculture is the ability to conduct safely research on foreign animal, emerging, and zoonotic (i.e., transmitted from animals to humans) diseases, including the development of vaccines, antivirals, and diagnostic capabilities for those pathogens where no human vaccines or treatments are available. Studies have shown that the majority of new and emerging human diseases come from animals. To address this threat, it is essential that the United States has the capacity to develop countermeasures for these diseases and to reduce human exposure. Additionally, providing early detection of the agents in animals enables faster development of specific animal vaccines and best protects the human population. If built, NBAF would provide this capability as the only U.S. ABSL-4 with space dedicated to large livestock.

The United States currently relies on cooperative agreements with its allies in Canada and Australia to provide the necessary research capacity to understand and mitigate threats should an outbreak of a livestock pathogen occur that requires ABSL-4 livestock research space. However, as the 2012 NAS report notes, “the primary responsibility of those laboratories is to address their own national government and domestic needs.” Relying on foreign laboratories likely would result in some delay in pursuing U.S. interests because they are occupied with research pertaining to local concerns and have limited surge capacity to accommodate unexpected workloads. For example, the small Canadian ABSL-4 laboratory is able to accommodate only a single cow, while NBAF will have space for up to 12 cows in its ABSL-4 laboratory. Because of select agent regulations, it is cumbersome to transport samples of potentially lethal pathogens out of the country, which could further delay investigations abroad. Without ABSL-4 laboratory space, the United States will not be able to accept samples from countries that may be experiencing

a significant zoonotic disease outbreak that could put the U.S. animal and human populations at risk.

The proposed plans for NBAF provide additional capabilities that could add significantly to the facility's overall impact on the country's ability to prevent, protect against, or mitigate outbreaks of animal disease, whether intentional or due to natural causes. These capabilities include a Biotechnology Development Module co-located with laboratory facilities. This module, plus the nearby presence of commercial animal pharmaceutical and biopharmaceutical firms, will increase the speed with which new diagnostic tests, vaccines, and medicines are developed, tested, and put into use. The NBAF plan also includes a dedicated training necropsy space designed to transmit to remote locations. This space will provide training to the Nation's veterinarians for the identification of foreign animal diseases.

An important benefit of the proposed NBAF is its co-location with a major school of veterinary medicine and proximity to animal pharmaceutical industry infrastructure. Proximity to animal research activity and investigators, hence the ability to leverage ongoing research, was an important selection criterion in choosing the NBAF site. An extensive, 3-year full and open competition that included a thorough risk assessment, environmental impact assessment, and security assessment resulted in the selection of a site on the Kansas State University campus. Sharing a campus with large schools of agriculture, food science, and veterinary medicine will increase NBAF's capacity to train the next generation of veterinarians and animal disease experts in the recognition of and response to foreign animal diseases.

### C. Facility Description

NBAF will be a strategic national asset, providing modern laboratory space for DHS and USDA to carry out their unique and congruent missions. The key functions of the NBAF laboratory space include basic research, sample receipt testing and diagnosis, veterinarian training, countermeasures and vaccine candidate development, and vaccine efficacy trials. NBAF will consist of a main laboratory facility and a central utility plant (CUP). Other supporting outbuildings include a transshipping facility and wastewater treatment plant.

The scope of the NBAF design was carefully analyzed and sized to meet DHS and USDA program requirements. The final design represents extensive efforts to "right-size" the laboratory, above and beyond typical efforts to determine square footage needs, including consulting with operators of existing ABSL-4 laboratories in other nations. Extensive, iterative design reviews were held to confirm the NBAF size and scope by identifying laboratory spaces and animal holding rooms that can be shared by the two agencies, thus eliminating duplicate spaces; applying a hotel design concept, thus maximizing the use of shared space between DHS and USDA research programs; benchmarking tours of other

recently completed biocontainment labs to incorporate efficiencies in design; hosting an international peer review of prominent researchers and facility operators to evaluate overall efficiency, throughput, room sizes, and flexibility to handle emerging zoonotic diseases; and a mockup to ensure that space clearances are appropriate for equipment and research processes unique to each space type. DHS also applied lessons learned from operating PIADC to the NBAF design.

NBAF is designed, and will be constructed, to meet or exceed modern biocontainment design principles and standards. Redundant safety and containment features will be provided for critical life safety systems, including supply and exhaust air filtration, breathing air systems, decontamination systems, exhaust fans, and emergency and/or uninterrupted power supply. All recommendations identified in prior risk assessments were incorporated into the NBAF design.

#### D. NBAF Program Accomplishments

In 2006, DHS began a competitive site-selection process to identify and evaluate potential candidate sites for NBAF, including PIADC. Following an extensive 3-year site-selection process that included a thorough mission criteria assessment, health and safety assessment, threat and risk assessment, and environmental impact assessment, Manhattan, Kansas, was selected as the NBAF location in 2009.

In 2009, site-specific design for NBAF began, and a construction manager was selected to provide constructability reviews and cost-estimation expertise throughout the design process. In coordination with the design effort, DHS conducted multiple studies of risk quantification, including the site-specific risk assessment (SSRA) issued in October 2010 and the updated SSRA issued in February 2012. The risk assessments were conducted to identify mitigation strategies for the design and operation of NBAF.

In 2012, at the request of DHS, NAS convened a committee of experts to conduct a scientific assessment of the requirements for a large-animal foreign and emerging disease research and diagnostic laboratory in the United States. In July 2012, NAS released the report, "Meeting Critical Laboratory Needs for Animal Agriculture: Examination of Three Options." This report affirmed the need for an ABSL-4 and noted that PIADC is well past its prime, is expensive to maintain, and is isolated from academic and other research and development centers (which affects attracting high-level scientists), and that reliance on foreign laboratories (and their priorities in times of need) could leave the United States vulnerable.

Previously existing infrastructure on the site was relocated, and site-preparation activities, such as grading and utility work, were completed in August 2012 so that construction activities could commence. The contract modification for constructing the NBAF CUP was awarded in February 2013.

In August 2014, the NBAF acquisition reached an important milestone as DHS approved Acquisition Decision Event (ADE)-2B to begin laboratory construction as part of the Department’s acquisition review and approval process. DHS formally established the baseline cost for the NBAF acquisition at \$1.25 billion.

In FY 2015, NBAF received the final \$300 million in appropriations from Congress and the final installment of gift funding from the State of Kansas, fully funding the NBAF acquisition. In May 2015, DHS awarded the contract modification for construction of the main laboratory portion of the project. DHS held a groundbreaking for the main laboratory that was attended by the Secretary of Homeland Security, Secretary of Agriculture, Governor of Kansas, members of the Kansas Congressional Delegation, DHS Science and Technology Directorate (S&T) leadership, and numerous local and regional community and business leaders.

A major construction milestone was completed in October 2015 because the \$80 million CUP was completed on schedule and under budget. Construction of the main laboratory facility is progressing on schedule, with excavation, utility work, and foundation installation activities underway in 2015. Four tower cranes are in place to begin installing the massive concrete structure in 2016.

**Table 1: NBAF Program Accomplishments to Date**

<b>Milestone/Accomplishment</b>	<b>Date</b>
Began Site-Selection Process	January 2006
Issued Final Environmental Impact Statement (including general Threat and Risk Assessment)	December 2008
Issued Record of Decision Documenting Manhattan, Kansas, Site Decision	January 2009
Issued Site-Specific Threat and Risk Assessment	January 2010
Issued SSRA	October 2010
Completed CUP Design	November 2011
Issued Updated SSRA	February 2012
Completed Main Laboratory Facility Design	July 2012
Completed NAS Study on NBAF Options	July 2012
Completed Site Preparation	August 2012
Awarded Contract Modification for CUP Construction	February 2013
DHS Approved Acquisition Program Baseline	August 2014
Awarded Main Laboratory Construction Contract Modification	May 2015
Completed CUP Construction	October 2015

The following photographs summarize the status of NBAF construction at the end of 2015:



**View of Completed CUP**



**View of Tower Cranes**



**Excavation for the Main Laboratory**



**Excavation for the Main Laboratory**

### III. Construction Plan Update

The annual outlays presented in this plan are based on expenditure data available through November 2015.

**Table 2: NBAF Planned Obligations and Expenditures for FY 2016 and Beyond**

**PROGRAM SPENDING PLAN: NBAF ACQUISITION**

**APPROPRIATIONS AND GIFT FUNDING IN \$ MILLIONS**

Prior Obligations <sup>1</sup>	1,235.855
Planned Obligations (Appropriations)	14.396
Planned Obligations (Gift Funds)	0.000
<b>Total Acquisition Baseline Cost</b>	<b>1,250.251</b>

**PLANNED OBLIGATIONS IN \$ MILLIONS**

	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
From Appropriated Funds	923.855	0.000	14.396	0.000	0.000	0.000	0.000
From Gift Funds	312.000	0.000	0.000	0.000	0.000	0.000	0.000
Plan Cumulative	1,235.855	1,235.855	1,250.251	1,250.251	1,250.251	1,250.251	1,250.251
Cumulative % Allotment	98.85%	98.85%	100.00%	100.00%	100.00%	100.00%	100.00%

**PLANNED OUTLAYS IN \$ MILLIONS<sup>2</sup>**

	Prior	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
From Appropriated Funds	211.777	91.314	117.077	208.716	224.397	72.494	12.475
From Gift Funds	94.070	10.897	21.793	39.227	50.124	61.020	34.869
Plan Cumulative	305.847	408.058	546.928	794.872	1,069.393	1,202.908	1,250.251
Cumulative % Allotment	24.46%	32.64%	43.75%	63.58%	85.53%	96.21%	100.00%

Differences of \$1,000 or less are attributed to rounding.

<sup>1</sup> Includes appropriations and funding provided by the State of Kansas and the City of Manhattan

<sup>2</sup> The annual outlays lag behind the annual obligations as a result of some contracts being fully obligated before construction and then expended throughout the construction process.

## IV. Acquisition Baseline Schedule

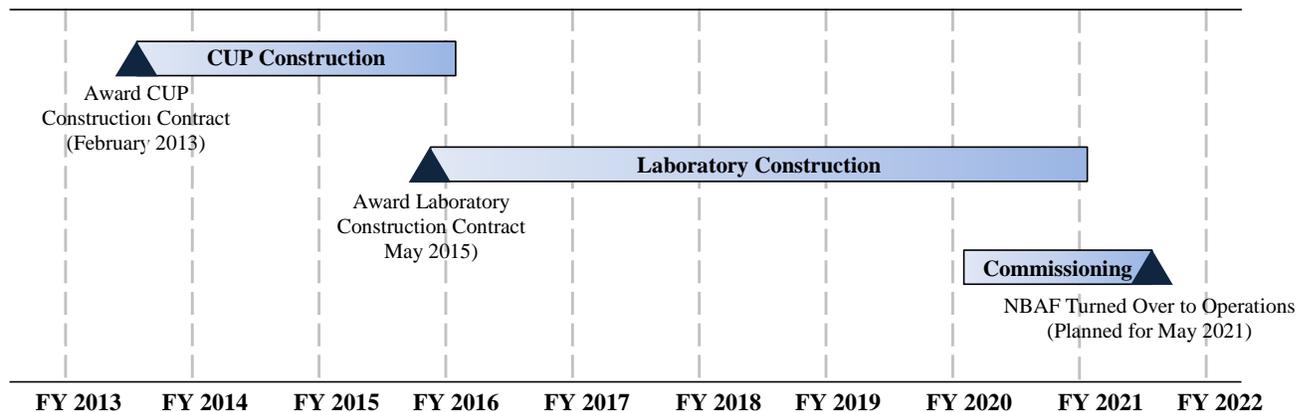
DHS S&T awarded construction of NBAF in three separate fixed-price modifications to the construction management services contract. In September 2009, McCarthy Mortenson Joint Venture was awarded a base contract through a competitive process on the basis of its expertise in constructing biocontainment labs. The contract provides options to award future construction tasks for the duration of the NBAF development process as the construction manager.

The first modification, completed in August 2012, was for site preparation activities, such as utility distribution and site grading, to support the initiation of construction activities. This modification was awarded using the State of Kansas gift funds.

The second modification was for the construction of the CUP, which was authorized by Congress in 2011. This modification was awarded in February 2013 using FY 2011 appropriations and matching the State of Kansas gift funds.

The third modification was for construction of the main laboratory facility. This modification was awarded in May 2015 using prior-year appropriations and the State of Kansas gift funds.

**Figure 1: NBAF Construction Schedule**



Construction and commissioning activities are expected to take approximately 6 years from the May 2015 contract modification for the main laboratory construction. The main laboratory's construction will be completed in December 2020, and commissioning activities will be completed in May 2021. NBAF will become fully operational in December 2022 when DHS acquires select agent registration for the laboratory spaces.