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Report to Congressional Requester

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FOOD AND DRUG ADMINISTRATION FACILITY

Requirements for Building on a Floodplain Met

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United States General Accounting Office
Washington, D.C. 20548

General Government Division

B-283625

December 15, 1999

The Honorable Bob Franks
Chairman, Subcommittee on Economic Development,
Public Buildings, Hazardous Materials and
Pipeline Transportation
Committee on Transportation and Infrastructure
House of Representatives

Dear Mr. Chairman:

This report responds to your April 17, 1999, request concerning the construction of the Food and Drug Administration (FDA) facility for its Center for Food Safety and Applied Nutrition (CFSAN) in College Park, MD. You asked us to provide you information on (1) the General Services Administration's (GSA) authority to construct a new facility for FDA in College Park, (2) whether the requirements for building on a floodplain had been met, and (3) the planned placement of computers in the basement of the new building. On the computer issue, you wanted to know whether (1) steps had been or will be taken to mitigate the risk of damage from water entering the basement of the building, and (2) CFSAN staff were involved in the decision to place the computer operations in the basement.

Results in Brief

GSA's authority to construct the FDA facility in College Park, MD, is derived from the Food and Drug Administration Revitalization Act (P. L. 101-635, 104 Stat. 4583 (1990), 21 U.S.C. 379b) and subsequent appropriations acts.

The design team for the project has satisfactorily met the minimum requirements, set by the state of Maryland, to construct a building with a basement on a floodplain. The basement was necessary because of a local building height restriction due to the proximity of the site to the College Park Airport. Although basements are not normally allowed in buildings on a floodplain in Maryland, the state granted a variance, in part because a taller or wider building was prohibited.

The new CFSAN facility has been designed with several systems to mitigate the risk of damage from water entering the building. With the steps taken by the design team to protect the building from an external flood, FDA officials believe that the potential for internal water damage

(broken pipe, roof leak, accidental fire sprinkler activation, etc.) is a greater probability than is damage from a flood condition. To protect the data stored on the computers, CFSAN officials plan to develop a mitigation plan for the new facility that they say will be appropriate to the nature of the systems installed, the data stored, and risk factors at the time the building is occupied.

The decision to locate the main computer room in the basement of the building was reached by consensus of the project team—the design team consultants and representatives from GSA and FDA. The FDA representatives included CFSAN telecommunications personnel and staff from FDA's Office of Information Resources Management (OIRM).

Background

In October 1996, GSA acquired a 13.18-acre site, immediately adjacent to the College Park Metrorail station, in College Park, MD, specifically for the new CFSAN facility at a cost of $4 million. Part of the site is located on a Prince George's County-designated floodplain. GSA has subsequently demolished a building that was on the site when it was acquired.

When the CFSAN facility is completed, it is to have four stories above ground and a basement; and it is to have about 410,000 square feet of office, laboratory, and support space. The building is scheduled to be ready for occupancy in October 2001. The total cost to design and construct the building, including the cost of the land, is estimated to be about $86 million.

The Federal Emergency Management Agency (FEMA) is the federal agency responsible for floodplain management. FEMA has promulgated regulations with floodplain management criteria to be used by state and local governments. In the state of Maryland, the Department of the Environment (MDE) is responsible for floodplain management.

As part of FDA's consolidation of its programs in the Washington, D.C. metropolitan area, FDA is to vacate the federal office building at 200 C Street, SW, Washington, D.C. FDA plans to decommission the laboratories in the building—clear the hazardous chemical residue—prior to turning the space back to GSA for reassignment. The Architect of the Capitol has expressed some interest in this building for congressional use.

Scope and Methodology

To determine GSA's authority to construct a new CFSAN facility for FDA, we reviewed the legislation that authorized the Secretary of Health and Human Services and the Administrator of GSA to consolidate FDA

facilities and reviewed subsequent legislation relating to the appropriation of funds for the project.

To determine whether the project had met the state of Maryland requirements for building the facility on a floodplain, we reviewed actions taken by GSA and the project's design consultants to obtain the needed construction authorizations from MDE. We also reviewed the floodplain studies prepared specifically for this project to show the effect the project would have on the floodplain.

To determine whether FDA planned to place computers in the basement of the new building, we interviewed GSA and FDA personnel involved in the project. To determine whether steps have been taken to mitigate the risks involved in placing computers in the basement and who was involved in making the decision to place the computers in the basement of the building, we reviewed project documents and interviewed GSA and FDA project management officials, FDA managers responsible for information management resources, and representatives of the firms responsible for designing the new facility.

We also obtained from the design consultants a detailed description of the features incorporated into the design of the new facility to protect the building from external flood waters. We reviewed the final construction drawings and construction specifications for the building to assure ourselves that the features described to us had been incorporated into the design of the building. We also visited the construction site to view the constructed basement slab and walls and systems and equipment being installed to mitigate the risk of water entering the building, to confirm that the building will have some of the features described to us.

We did our review from May through September 1999, in accordance with generally accepted government auditing standards. We requested comments on a draft of this report from GSA's Administrator and FDA's Commissioner.

Congress Authorized and Provided Funds for the CFSAN Project

In 1990, the Food and Drug Administration Revitalization Act became law. The act authorized the Secretary of Health and Human Services (HHS) and the Administrator of General Services to enter into contracts for the design, construction, and operation of a consolidated FDA administrative and laboratory facility. In addition, the FDA Revitalization Act expressly authorized the appropriation of $100 million for the project in fiscal year 1991 and authorized the appropriation of such funds as may be necessary

for subsequent fiscal years. GSA's fiscal year 1991 appropriations act did not include funds for this project.

GSA's fiscal year 1992 appropriations act appropriated $200 million for consolidation, site acquisition, planning and design, and construction of new FDA facilities in Montgomery and Prince George's Counties, MD.[1] The Conference Report[2] accompanying GSA's appropriations act stated that the conferees provided these funds to begin the process of consolidating FDA from its existing 34 buildings and 11 locations to campuses in Maryland's Montgomery and Prince George's Counties. The report further stated that the president and Congress had expressed their support for this project by enacting the FDA Revitalization Act that specifically authorized construction of new administrative and laboratory facilities for FDA.

The Conference Report accompanying the fiscal year 1992 appropriations act also contained language directing FDA, GSA, HHS, and the Office of Management and Budget (OMB) to submit a plan for the consolidation project's future funding needs to the appropriations committees by no later than December 31, 1991.[3]

The Senate Appropriations Committee Report[4] accompanying the Treasury, Postal Service, and General Government appropriations act for fiscal year 1993 stated that despite clear instructions, the administration had not expended any of the funds already appropriated, and no funding plan had been submitted as previously directed. The Committee stated that it strongly supported the project because, in addition to the inefficiencies resulting from being scattered among so many different buildings, many of FDA's facilities were outmoded and obsolete, even hazardous.

The FDA Revitalization Act and subsequent appropriations acts, particularly the act containing GSA's appropriations for fiscal year 1992, authorized GSA to construct the FDA facility in College Park, MD. OMB approved a consolidation plan for the FDA headquarters programs on March 15, 1994. This plan called for CFSAN to be located in Prince George's County.

[1]P. L. 102-141, 105 Stat. 834, 850 (1991).

[2]H.R. Conf. Rep. No. 102-234, at 25-26 (1991).

[3]Id.

[4]S. Rep. No. 102-353, at 72-73 (1992).

Requirements for Building on a Floodplain Were Met

GSA officials knew the construction site was on a Prince George's County-designated floodplain when they bought the land.[5] Before purchasing the property, GSA hired an engineering firm to complete an environmental assessment and floodplain studies to determine the viability of constructing a facility on the site and the effect that the project would have on the site. The preliminary floodplain study, which focused on the viability of constructing on the site, concluded that

- constructing the proposed facility on the site would not increase the 100-year floodplain elevation;[6]
- the site was suitable for the proposed development; and
- because the building would be in the very upper reaches of the watershed, the actual peak 100-year flood elevation would affect the building for only a short period of time before it receded.[7]

FEMA has not designated a floodplain on this site. The project director for the firm that did the floodplain study for GSA told us that the County is more conservative in its floodplain designations than FEMA. He said that the County's designations take into account the existing built environment and anticipated future developments—new construction—in the area when calculating the floodplain area, but FEMA takes into account only the existing built environment and open areas. Figure 1 shows the existing 100-year floodplain, as designated by Prince George's County.

[5]FEMA defines a floodplain as any land area, such as the lowland and relatively flat areas adjoining inland and coastal waters, susceptible to being inundated by water from any source.

[6]The 100-year floodplain elevation is the water-surface level (elevation) associated with a flood that is equaled or exceeded once in 100 years on the average; in other words, a flood that has a 1-percent chance of being equaled or exceeded in any given year.

[7]It would take only a little over 5 hours for the 100-year flood elevation to recede to bank full conditions (the 1-year event flow).

Figure 1: Existing Prince George's County-defined 100-Year Floodplain in Area Surrounding the Proposed FDA Facility

Source: Developed by GAO; derived from a Maryland-National Capital Park and Planning Commission map of the College Park-Riverdale Transit District Overlay Zone.

The floodplain study contained the state of Maryland's and the County's requirements that would have to be met for construction on the floodplain. State and County regulations prohibit a project from increasing the 100-year flood elevations outside the project site. They also require that the lowest floor of any structure be at least 1 foot above the 100-year flood elevation, unless it is in the overall public interest for it to be otherwise. If a variance is granted and a basement is authorized, it must be waterproofed.

The State and Prince George's County required specific documentation before GSA could obtain approval to construct the foundation for the building. This documentation had to include the floodplain hydraulic calculations—100-year floodplain evaluations of the impact of the construction on adjacent properties. The required documentation also had to show

- that the first floor will be at least 1 foot above the 100-year flood elevation;
- how the basement will be waterproofed;
- how sump pumps and other drainage systems were to be used; and
- that the building will be able to withstand the force of the water in event of a flood, i.e., it will not float up.

After receiving the required documentation, MDE's Water Management Administration issued an Authorization to Proceed (No. 97-NT-0711/199766248) on September 11, 1997, which permitted GSA to begin constructing the building foundation and to relocate existing utility lines. Citing the great public benefit from the project and the site constraints that prohibited a taller or wider building, MDE agreed to a variance permitting a basement below the 100-year flood elevation. However, MDE required that the basement be waterproofed to comply with MDE and FEMA regulations.

On March 2, 1999, the final floodplain study, which presented the results of the hydraulic analysis to determine the effect the proposed building would have on the site, was submitted to MDE for review and approval. The engineering firm that did the study used the U.S. Army Corps of Engineers' computer program, HEC-2, to calculate the flood elevations resulting from the new building and grading changes on the site. The study compared the existing and proposed conditions and stated the following:

The elevations for the two conditions were compared to determine the effects of the project. This comparison shows that the proposed FDA development would not have any adverse impact on the flood elevations upstream of the site. The computations do indicate that a slight increase (0.1 foot) in the 2-year flood elevation will occur at the downstream end of the site. However, the computations indicate the increase would be dissipated before the upstream end of the site. The 10- and 100-year flood elevations will be lower slightly in some areas for proposed conditions, because the new building will be further away from the stream than the existing building. With the building further away from the stream, the area available to move the flow will increase, causing the flood elevations to decrease.

MDE requested that the following three items be submitted to it for review and comment before it would authorize the superstructure of the facility to be built.

- Final HEC-2 backwater computations of the floodplain: these were to include all new changes made to the floodplain due to the new FDA facility. GSA advised us that this was submitted to MDE on March 2, 1999.
- Structural design calculations of the basement walls and foundations: these were to show that the design took into account the additional hydrostatic forces that would result when high water tables are experienced. GSA advised us that the structural calculations were submitted to MDE on August 9, 1999.
- Two sets of final signed construction plans: these were to indicate what will be built on the site as well as what topographic changes will occur on the site. GSA advised us that these construction plans were submitted to MDE on August 27, 1999.

On September 7, 1999, MDE approved the construction of the superstructure.

Computer Operations Are to Be Housed in the Basement of the New CFSAN Facility

Computer operations are to be housed in the basement of the CFSAN facility. There are to be between 15 and 20 servers located in the basement, along with other building support components—e.g., mechanical space, fitness center, health center, and laboratory storage. FDA officials informed us that after an exhaustive review of the related constraints, alternatives, and opportunities, the decision to locate the main computer room in the basement of the new facility was reached by consensus of the project team. This team consisted of the architect-engineering consultants and representatives of GSA and FDA. The FDA representatives were selected from FDA's Division of Facilities Planning, Engineering and Safety and from CFSAN, which is to occupy the new facility.

Every kind of data that CFSAN maintains could potentially be stored in these computers. This would include data relating to all CFSAN programs, such as premarket approval, research, industry surveillance, finance, personnel, and any other data generated and/or used by CFSAN. If the computers were damaged by a flood, FDA officials estimated that it would cost about $4 million to replace and install the computers, peripherals, network, and other computer-related equipment; load the software; and retrieve and restore the data.

CFSAN currently backs up the data on its servers daily, with a copy transferred to an off-site storage area on a weekly basis. CFSAN officials told us that backup and off-site storage for the new facility will be developed that are appropriate for the nature of the systems installed, the data stored, and the risk factors at the time the new facility is occupied.

FDA officials told us that no matter where the computer room is located, there is always the potential for water damage from internal sources. They believe that with the steps that have been taken by the design team to protect the building from an external flood, the likelihood of internal water damage (e.g., broken pipe, leak in the roof, or accidental fire sprinkler activation) will be greater than the likelihood of damage from a flood condition.

Steps Have Been Taken to Protect the Building From an External Flood

The new facility will have several different, but complementary, systems to mitigate damage from water entering the building. It has been designed and is being constructed essentially as a hull of a ship, with the top of the basement wall and waterproofing extending to the floor slab of the first floor of the building, which is 1-1/2 feet above the 100-year floodplain level.

Initially, the design team intended to construct a building of five stories above grade with no basement. However, as the design process evolved with involvement from the local communities, a height restriction of 84 feet was placed upon the site by the College Park-Riverdale Transit District Development Plan for the area surrounding the College Park Airport. To accommodate this limitation, the building program had to include a basement.

GSA and FDA officials told us that if they could have obtained a waiver from the height limitation and were able to build a five-story building, the main computer room would have been located on the first floor. However, because a basement was necessary, they felt the use of the basement space for support areas was consistent with common building design practices,

met the needs of the program, and provided better control for the ambient temperature requirements of the computer room.

The design team decided to give priority to window space for offices and laboratories. The design consultants and FDA officials told us that putting the computer operations on another floor higher up in the building would have forced program space, either offices or laboratories, into the much less desirable basement space with no windows. The design team explained that with the way the building has been designed, every laboratory and laboratory office will have the benefit of natural daylight. Half of the offices are to have direct natural light, and the other half are to receive indirect natural light through clerestories[8] in the office corridor walls. They told us that they also considered physical security needs to ensure that the computers would not be vulnerable to vandalism or interference from outside sources.

During our review, we visited the construction site near the end of the foundation construction phase of the project to observe how the basement was being constructed and verify that some of the design features we were told about had been incorporated into the facility. We also reviewed the final construction drawings and the specifications for the construction of the superstructure of the building to confirm that the plans included the systems and equipment we were told had been designed into the facility to mitigate the risk of water entering the building. This work verified that the following features have been built into the facility, or are included in the construction drawings and specifications to be used to complete the facility.

- The basement walls and floor slab have been constructed of reinforced concrete. The waterproofing system that has been installed creates a waterproof envelope under the basement slab and up the basement walls to protect the basement from water infiltration.
- The building has a complete underslab and perimeter drainage system to remove water coming up from below the structure, as well as water approaching the outside of the facility at ground level. The piping system installed to remove water terminates in a pumping station located outside the waterproofed basement and therefore will not bring groundwater into the building. Four pumps capable of pumping 500 gallons per minute each are to be installed in the pumping station. These pumps are to be sequenced to come on as the water inflow increases. The water is to be

[8]A clerestory is that part of a building that rises above the roofs of the other parts of the building, with windows for admitting light to the central interior area.

discharged into the stream located to the south of the site. All pumps are to have emergency power backup in the event of a power failure.

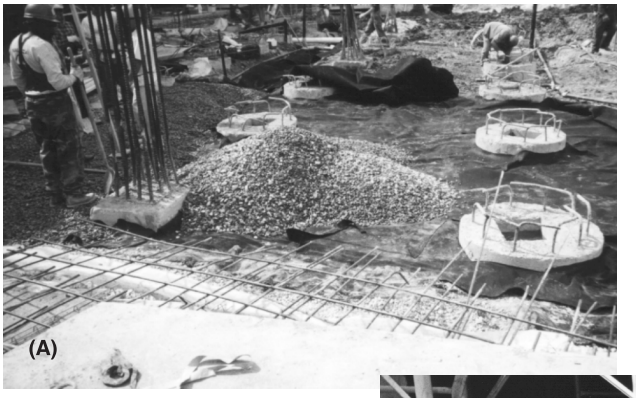
- Additionally, the main mechanical room, also located in the basement, is 3-1/3 feet deeper than the rest of the basement floor, resulting in a very large retention area if a catastrophic event took place and water entered the building. Emergency drains are located about 1 inch above the depressed floor. These drains discharge into two sump pumps that discharge into the storm sewer in the parkway at the perimeter of the property. These pumps are also to be on emergency power.
- The computer room is to have a raised floor. The concrete slab constructed beneath the raised floor is depressed 12 inches below that portion of the basement outside the main mechanical room. Emergency floor drains have been provided in this depressed area that are connected to two sump pumps.
- Finally, the discharge pipes from all six of the sump pumps in the basement were designed to have check valves and alternate discharge pipes. Should flood waters rise above the level of the discharge pipes, the check valves would prevent this water from entering the pumps and divert the water from the sump pumps to the alternate discharge pipes, which discharge outside the building above the 100-year floodplain level.

When we visited the construction site we also observed the structural system being installed to prevent the building from floating as a result of the buoyancy force[9] caused by the hydrostatic pressure[10] of flood waters.

[9]The power of a fluid to exert an upward force on an object placed in it.

[10]The pressure exerted by water on an object.

Figure 2: Photographs of Construction Site



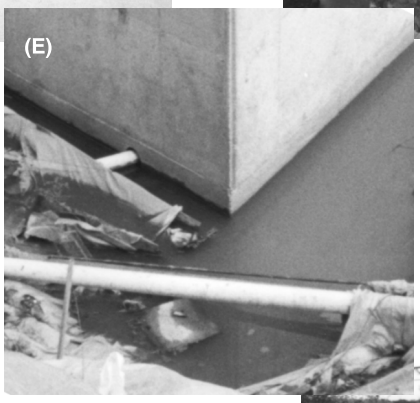
(A) Shows the bentonite membrane and various layers of material under the slab. The bentonite absorbs any water that passes by the filtering system. When the bentonite gets wet it becomes sticky and gooey, thus sealing everything.

(B) Shows perforated 8-inch drainpipes (PVC schedule 40) used for the drainage system being installed under the concrete mud mat. The drainpipe is wrapped with a permeable filter fabric and buried in gravel, and an impervious filter fabric is then laid on top to keep out silt and dust. The mud mat is poured on top of the gravel base.

(C) This area is to house the mechanical equipment for the building; i.e., generators, boilers, and chillers, which are to be installed in this recessed area.

(D) Shows inside the computer room area looking towards the southeast side of the building, with the 12-inch recessed slab in the computer area where the raised floor is to be installed.

(G) Shows a typical auger cast stressed, torqued, and locked pile cap, which is a structural system installed to prevent the building floating as a result of the buoyancy force from the hydrostatic pressure of flood waters.



(E) Southwest corner wall showing penetration and sleeve for permanent discharge into the primary sump pump system. Discharge pipe from this location is to run across the property with a 24-foot drop to the sump pump station at the southeast corner of the site.

(F) Sediment pond for deep well discharge. The permanent sump pump station is to go into this place.

Source: GAO.

Some CFSAN Employees Were Involved in Computer Room Placement Decision

FDA officials informed us that the decision on where to place the computers was a part of the decision on the overall design and layout of the building. The representatives from the design consultants told us that this decision was made primarily by the design team on the basis of a thorough analysis of specific program needs, workplace factors, security requirements, and site constraints. The design team made recommendations, which included the basement location for the computers, to GSA, FDA, and CFSAN personnel for a decision. We were told that a number of computer telecommunications personnel from CFSAN and OIRM were involved in periodic meetings to plan the telecommunications space needs in the new building and develop telecommunication design guidelines with the telecommunications consultant and were involved in the decision on the placement of the computers.

FDA officials told us that some computer staff expressed concerns in October 1997 about the placement of the computers. They said these concerns were forwarded to GSA and to the design team. Also in October 1997, the telecommunications consultants gave CFSAN and OIRM officials a copy of their College Park Design Guidance for Telecommunications Infrastructure for comment. In December 1997, FDA provided comments. CFSAN's telecommunications representative expressed satisfaction that all items noted in the review documents were discussed and either clarified or modified for inclusion in a revised design for the telecommunications infrastructure.

Further, FDA and CFSAN officials told us that the design of the new facility was presented to representative groups of employees during the design process, as well as to the National Treasury Employee's Union stewards from FDA. In March 1999, FDA initiated a series of employee briefings on the new building. These briefings, we were told, were being conducted for employees from one or more of CFSAN offices at each session. They covered such topics as the basic design of the building; the current status and schedule for completion; and features of interest to employees, such as the food service area, library, auditorium, training rooms, employee parking, layout of laboratories, and office sizes.

The Director of CFSAN said that the briefing sessions would continue until all of the employees moving to the College Park building have had an opportunity to attend a session. It is also planned that there will be some mock-ups of laboratory and office designs. In addition, the Director of CFSAN said that an e-mail address had been set up to which employees can send questions concerning the new facility, and FDA's Office of

Facilities has set up a Web page where progress is to be updated and CFSAN photos are to be archived. He said that employees have access to the Internet and can access this information. Further, once a month the Director is holding 1-hour meetings with all interested employees who are given the opportunity to raise questions and receive answers. A member of the planning team for the College Park facility has been asked to attend each of these latter meetings to answer any questions about the building and move.

Agency Comments and Our Evaluation

We provided copies of a draft of this report to the Administrator of General Services and the FDA Commissioner for comment.

On December 1, 1999, we received oral comments from GSA's National Capital Region Assistant Regional Administrator for the Public Buildings Service and from the Public Buildings Service's Office of Portfolio Management. They concurred with the report without further comment.

On December 2, 1999, we received oral comments from the Directors of CFSAN and FDA's Division of Facilities Planning, Engineering and Safety. They concurred with the information as presented in the report and provided some technical clarifications that we have incorporated where appropriate.

We are sending copies of this report to Representative Robert E. Wise, Ranking Democratic Member, House Subcommittee on Economic Development, Public Buildings, Hazardous Materials and Pipeline Transportation; Senator George V. Voinovich, Chairman, and Senator Max S. Baucus, Ranking Minority Member, Senate Subcommittee on Transportation and Infrastructure; Senator Paul S. Sarbanes; Senator Barbara A. Mikulski; Representative Steny Hoyer; the Honorable David J. Barrum, Administrator of General Services; and the Honorable Jane E. Henney, Commissioner, FDA. Copies will be made available to others upon request.

If you have any questions about this report, please call me or Ron King on (202) 512-8387. A key contributor to this assignment was Shirley Bates.

Sincerely yours,

Bernard L. Ungar
Director, Government Business
Operations Issues

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