

GAO

Report to Committee on Foreign  
Relations, Senate and the Committee on  
Foreign Affairs, House of Representatives

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July 2010

# NEW EMBASSY COMPOUNDS

State Faces  
Challenges in Sizing  
Facilities and  
Providing for  
Operations and  
Maintenance  
Requirements



GAO

Accountability \* Integrity \* Reliability

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Highlights of [GAO-10-689](#), a report to Committee on Foreign Relations, Senate and the Committee on Foreign Affairs, House of Representatives

## Why GAO Did This Study

In response to the 1998 bombings of two U.S. embassies, the Department of State (State) embarked on a multiyear, multibillion dollar program to replace insecure and dilapidated diplomatic facilities. Since 2001, State has constructed 52 new embassy compounds (NECs) under this program, and moved over 21,000 U.S. government personnel into more secure and safe facilities. GAO was asked to examine (1) the extent to which new facilities match the space and functionality needs of overseas missions and State's actions to address space and functionality challenges; and (2) operations and maintenance challenges at these new facilities and State's steps to address them. GAO analyzed staffing data and other documentation for 44 NECs built from 2001 to 2009 and interviewed State headquarters and embassy officials at 22 of these 44 NECs to obtain information on their functionality and operations and maintenance issues.

## What GAO Recommends

GAO recommends that the Secretary of State take several actions to (1) improve its processes for determining NEC size and ensuring that these facilities are fully functional, and (2) address challenges in meeting NECs' long-range operations and maintenance needs.

GAO received comments from the Department of State, which agreed with our recommendations. State's comments are reprinted in appendix II.

View [GAO-10-689](#) or [key components](#). For more information, contact Jess T. Ford (202) 512-4128, [fordj@gao.gov](mailto:fordj@gao.gov) or Terrell G. Dorn (202) 512-6923, [dornt@gao.gov](mailto:dornt@gao.gov).

## NEW EMBASSY COMPOUNDS

### State Faces Challenges in Sizing Facilities and Providing for Operations and Maintenance Requirements

#### What GAO Found

State has located nearly one-quarter of overseas staff in NECs, which posts said are an improvement over older facilities. However, NECs do not fully meet the space and functionality needs of overseas missions. Current staffing levels exceed the originally-built desk—or office—space at over half of the 44 NECs GAO analyzed. Post management has dealt with space limitations by converting spaces, like conference rooms, into offices, but 4 posts have had to retain space outside the compound for staff that could not fit in the NECs. Also, officials at almost all of the 22 NECs that GAO reviewed in depth reported some spaces, like consular affairs spaces, did not fully meet their functional needs. According to State officials, it is difficult to predict changing foreign policy priorities that can affect staffing levels, and the process for planning NECs has been unable to fully account for these changes. Budget constraints also affected decisions about the size of NECs and types of features provided. State has taken some actions to improve NEC sizing, but does not have sufficient flexibility in its staffing projection and design processes to better address sizing challenges. To address problems with functionality, State implemented a lessons learned program to analyze issues in completed NECs and modify design criteria for future NECs, but State has not completed, in a timely manner, planned evaluations that are designed to identify such issues.

While NECs are state-of-the-art buildings, they have presented operations and maintenance challenges, and the larger size and greater complexity of NECs, compared to facilities they replaced, have resulted in increased operations and maintenance costs. In 2010, State developed its first long-range maintenance plan that identifies \$3.7 billion in maintenance requirements over 6 years for all overseas facilities, but it does not include time frames for implementing identified maintenance projects or address increased operating costs. Problems with testing, or “commissioning,” new building systems have contributed to problems with building systems that do not function as they should, causing higher maintenance costs. State strengthened its commissioning process, though this change only applies to future NECs and does not address problems at existing NECs. Further, State does not currently recommission—or retest—NECs to ensure they are operating as intended. In addition, more than half of the 22 NECs that GAO reviewed in detail experienced problems with some building systems, resulting in the need for premature repair and replacement. Through its lessons learned program, State has changed some design criteria for future NECs to avoid problems with building systems. Finally, State has had problems hiring and training personnel who have the technical skills necessary to manage the complex NEC systems. State has taken initial steps to improve its staff hiring and training, but does not have an overall plan to establish its NEC human resource needs and the associated costs.

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## Abbreviations

BME	Building Maintenance Expenses
BOE	Building Operating Expenses
DOE	Department of Energy
ICASS	International Cooperative Administrative Support Services
IG	Inspector General
LEED	Leadership in Energy and Environmental Design
LROMP	Long-Range Overseas Maintenance Plan
M/PRI	Office of Management Policy, Rightsizing, and Innovation
NEC	new embassy compound
OBO	Bureau of Overseas Buildings Operations
PEPFAR	President's Emergency Plan for AIDS Relief
SED	Standard Embassy Design
State	Department of State
USAID	U.S. Agency for International Development

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United States Government Accountability Office  
Washington, DC 20548

July 20, 2010

## Congressional Committees

In the wake of 1998 terrorist bombings of embassies in Dar es Salaam, Tanzania, and Nairobi, Kenya, that exposed the poor condition of and security vulnerabilities at U.S. diplomatic facilities overseas, the Department of State (State) began a multiyear, multibillion dollar program to replace insecure and aging diplomatic facilities worldwide. The goal of this program, the Capital Security Construction Program, is to construct safe, secure, functional, and modern diplomatic facilities at approximately 214 overseas posts as quickly as possible. The program incorporates the requirements of the Secure Embassy Construction and Counterterrorism Act of 1999<sup>1</sup> that calls for new diplomatic facilities to be sufficiently sized to ensure that all U.S. government personnel at the post are located on-site.<sup>2</sup> State's Bureau of Overseas Buildings Operations (OBO), which operates the program, also intends that these new embassy and consulate compounds are efficient, state-of-the-art office buildings.

In 2006, we reported that State has made significant progress constructing new facilities but that better planning is needed for operations<sup>3</sup> and

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<sup>1</sup>H.R. 3427 (106th Cong.), Title VI (H.R. 3427 was incorporated by cross-reference in the conference report to H.R.3194 [Div. B]. H.R. 3194, the Fiscal Year 2000 Consolidated Appropriations bill, became Public Law 106-113 on Nov. 29, 1999). State elaborates on these requirements in the U.S. Department of State *Foreign Affairs Handbook*, 12 FAH-5.

<sup>2</sup>Agencies may request a waiver to the collocation requirement if security conditions permit and it is determined that U.S. national interests are best served by locating personnel outside new facilities.

<sup>3</sup>Within the Department of State, Operations and Maintenance (O&M) falls under two main categories of funding: (1) Building Operating Expenses (BOE) and (2) Maintenance and Repair (M&R). The term "operations and maintenance" is used to describe both aspects of running a facility. BOE (i.e., operations) includes costs associated with occupying a facility to include utilities, janitorial services, trash collection, grounds care, the labor costs of locally employed maintenance staff, and maintenance service contracts (i.e., Building Maintenance Expenses) for building systems (e.g., elevators, generators, etc.). BOE costs, for facilities shared by State and other agencies, are funded through posts' International Cooperative Administrative Support Services (ICASS) system.

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maintenance<sup>4</sup> requirements.<sup>5</sup> State supported our recommendation that it should develop a plan that addressed the financial and human resources for meeting the immediate and long-term operations and maintenance requirements for new embassy compounds (NEC). Since 2001, OBO has completed 52 NECs, and moved more than 21,000 United States government personnel—about one-quarter of those employees working overseas—into more secure, safe, and functional facilities.<sup>6</sup> OBO continues to manage ongoing construction and design of 33 additional facilities.

In response to your request, we examined: (1) the extent to which NECs match the space and functionality needs of overseas posts and the actions State has taken to address any space and functionality challenges, and (2) operations and maintenance challenges at NECs and State's steps to address them.

To address these objectives, we reviewed program, planning, budget, evaluation, and other analysis documents from State, as well as previous GAO reports on State's embassy construction program. To examine space needs, we analyzed data from State's capital security cost-sharing program for 44 of the 52 completed NECs. Our analysis does not include 8 completed NECs, which generally were excluded from our scope because they are unique projects, such as the NECs in Baghdad, Iraq, and Kabul, Afghanistan, or were recently completed in fiscal year 2010. We also reviewed 22 of the 44 NECs in greater depth, examining space, functionality, operations, and maintenance issues; we reviewed these NECs in more detail based on factors such as their geographic location and their history with staffing, functionality, operations, or maintenance challenges. For these 22 locations, we conducted site visits at 8 posts and

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<sup>4</sup>Maintenance and Repair (M&R), which is funded by OBO, includes those maintenance activities that a landlord would take to maintain a property in acceptable condition. M&R funds services and materials for items of a recurring nature such as painting and minor repairs to building systems.

<sup>5</sup>GAO, *Embassy Construction: State Has Made Progress Constructing New Embassies, but Better Planning Is Needed for Operations and Maintenance Requirements*, [GAO-06-641](#) (Washington, D.C.: June 30, 2006).

<sup>6</sup>The term "NEC" refers to all new facilities—including new embassy compounds, new consulate compounds, new office buildings, and newly acquired buildings—constructed for the purposes of locating all U.S. government employees at a new and single location. Further, for the purposes of this report, the term "post" refers to the entirety of the U.S. government's operations in an overseas location.

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teleconferences with 14 posts. As part of our review of operations and maintenance issues, we reviewed State documents and reports, including the Long-Range Overseas Buildings and Maintenance Plans. In addition, we discussed the embassy construction program with State officials in Washington, D.C.; from OBO; regional bureaus; and Office of Management Policy, Rightsizing and Innovation. Appendix I provides more information on our scope and methodology.

We conducted this performance audit from February 2010 to July 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

The United States maintains facilities at more than 260 diplomatic missions, including embassies, consulates, and other diplomatic offices, located around the world. More than 80,000 U.S. government employees from 30 agencies depend on infrastructure that State provides and maintains.

In 1998, terrorist bombings of embassies in Dar es Salaam, Tanzania, and Nairobi, Kenya, killed more than 220 people and injured 4,000 others. In 1998, State formed the Accountability Review Boards to investigate the bombings. The Boards reported that unless security vulnerabilities at U.S. embassies and consulates were addressed, U.S. government employees and the public would remain at risk from terrorist attacks at many overseas facilities. In 1999, the Secretary of State formed the Overseas Presence Advisory Panel to appraise the condition of overseas facilities and consider the future of U.S. overseas representation. The Panel reported on the unsafe, overcrowded, deteriorating, and “shockingly shabby” conditions of U.S. embassies and consulates. Both the Boards and the Panel recommended that State replace insecure and aging diplomatic facilities worldwide. That same year, State embarked on a multiyear, multibillion dollar program to replace overseas facilities. Through its Capital Security Construction Program, administered by OBO, State intends to construct new facilities at 214 overseas posts with the goal of providing safe, secure, functional, and modern buildings as quickly as possible. The program incorporates the requirements of the Secure Embassy Construction and Counterterrorism Act of 1999 that calls for new diplomatic facilities to be sufficiently sized to ensure that all U.S. government personnel at the post

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are located on-site. In June 2006, we reported that State had made significant progress in completing new embassy and consulate compounds.<sup>7</sup> As of April 2010, State has completed 52 NECs and placed over 21,000 U.S. government employees—or about one-quarter of the population working overseas—in more safe, secure, and functional facilities.

To enable timely completion of its construction projects, OBO typically uses the design-build project delivery method<sup>8</sup> and a Standard Embassy Design (SED) that can be adapted to accommodate conditions at each project site.<sup>9</sup> NECs generally consist of a main office building (chancery), compound access control buildings, utility buildings for mechanical and electrical systems, and Marine Security Guard quarters (if a post has a Marine contingent). Depending on the site, the project budget, and the needs of the post, a new compound could also include a General Services support annex, a warehouse, maintenance shops, recreation facilities, and employee and public parking areas. Some compounds also include an annex building for USAID or other program or agency functions. In 2003, we found that staffing projections for NECs were developed without a systematic approach or comprehensive rightsizing analyses, potentially resulting in wrong-sized buildings, and recommended, among other things, that State provide overseas posts with comprehensive guidance on developing staffing projections for NECs.<sup>10</sup> In 2004, State created the Office of Management Policy, Rightsizing, and Innovation (M/PRI), which now manages the process for developing NEC staffing projections. In establishing project requirements, OBO obtains information on a post's projected staffing from

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<sup>7</sup>GAO-06-641.

<sup>8</sup>The design-build project delivery method reduces project cycle time by combining design and construction in a single contract award and allows contractors to begin construction before the building design is complete.

<sup>9</sup>In 2002, OBO implemented the SED to expedite the planning, design, and construction of NECs. The SED is a template that standardizes the basic plans for the structural, spatial, safety, and security requirements for each NEC. Since 2002, there have been three primary SED classes—small, medium, and large—based on the size and cost of the facility. Each size has a predefined project schedule and duration. In 2004, State introduced a fourth class of SED, called Extra Large or Special SEDs, for construction that generally exceeds the size and cost of large SEDs. Finally, in 2007, State introduced the Standard Secure Mini Compound, which is generally smaller and less costly than a small SED. See GAO, *Embassy Construction: Additional Actions Are Needed to Address Contractor Participation*, GAO-09-48 (Washington, D.C.: Jan. 16, 2009) for additional information on SED.

<sup>10</sup>GAO, *Embassy Construction: Process for Determining Staffing Requirements Needs Improvement*, GAO-03-411 (Washington, D.C.: Apr. 7, 2003).

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M/PRI, which works closely with officials at the post, State's regional bureau, and other U.S. government agencies to develop a 5-year projection of the post's staffing needs based on an assessment of mission priorities and the staffing levels required to pursue those priorities. With this information, OBO outlines space requirements that define functional needs for office (desks), common use (conference rooms, cafeteria), support (janitor closet, mechanical rooms), and future growth space. OBO uses this space requirements analysis to estimate the cost of each project, which forms the basis for State's Capital Security Construction Program budget request. At the time of State's budget submission, OBO considers project requirements to be "locked," meaning it intends to construct the facility according to the requirements that were used to set the budget request. OBO generally locks project requirements 2 years prior to awarding a contract for design-build services.

In our June 2006 report on State's progress in constructing NECs,<sup>11</sup> we noted the comparatively higher utility consumption of the new facilities caused, for example, by the need to continually operate heating, ventilation, and air conditioning systems—that may not have existed in former facilities—to adequately condition spaces in the sealed buildings.<sup>12</sup> In addition, we reported that posts have had to hire additional maintenance staff with the skills and qualifications to maintain the state-of-the-art buildings. In consideration of these and other factors, we estimated that once all new diplomatic facilities were completed, total post-funded annual operations and maintenance costs, adjusted to 2006 constant dollars, could increase by at least \$71 million and possibly by several times more over those posts' previous facilities. Because we found that State was slow to recognize the increased funding needed to operate and maintain its new facilities and had not developed a comprehensive plan that details long-term resource requirements necessary for protecting its investment in the facilities, we recommended that the Secretary of State develop an integrated and comprehensive facilities plan that clearly specifies the financial and human resources for meeting the immediate and long-term operations and maintenance requirements for NECs. State agreed with our findings and indicated it would take action to address the recommendation.

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<sup>11</sup>GAO-06-641.

<sup>12</sup>NEC windows are nonoperable and thus cannot be opened to allow fresh air in, and the security requirements to filter and pressurize the air within an NEC effectively creates a sealed building.

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## NECs Do Not Fully Meet the Space and Functionality Needs of Overseas Posts and State Actions Have Addressed Some, but Not All, Challenges

State is making progress moving staff into more secure and functional facilities. However, we found that over half of the 44 NECs completed from 2001 through 2009 have staffing levels that exceed the number of desks originally provided by 5 percent or more. Additionally, officials at nearly all of the 22 NECs we reviewed in greater depth reported the design of some spaces—such as consular areas, warehouses, or maintenance shops—did not fully meet their functional needs. According to State officials, it is difficult to predict changes in foreign policy priorities that can affect overseas staffing levels, and the current process for planning NECs has been unable to fully account for these changing needs. State officials also indicated that budget constraints affected decisions about the overall size and types of features provided in NECs. In some cases, space and functionality challenges resulted in the need to conduct follow-on projects after posts occupied the NEC, resulting in millions of dollars of additional costs. State has taken steps to address some space and functionality challenges, such as creating M/PRI to standardize the process for projecting future staffing levels; incorporating some additional flexibility for future growth into NECs; and implementing a lessons learned program to analyze issues in completed NECs and modify design criteria for future NECs. However, sizing NECs remains challenging and State did not provide the analytical basis for determining how much growth space should be incorporated into an NEC. Additionally, State has not conducted planned evaluations of completed NECs to ensure timely identification of issues.

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## State Is Making Progress Locating Staff in More Secure and Functional Facilities

As of April 2010, State has moved over 21,000 people—or about one-quarter of all overseas staff—into new facilities. State’s Inspector General (IG) and OBO have reported that posts are satisfied with many aspects of their NECs, such as the improved security they provide. In 2008, State’s IG reported that posts commented favorably about their NECs and praised their design, space, and security.<sup>13</sup> In 2007, OBO surveyed officials at posts with NECs, and occupants responded positively about many aspects of their NECs, particularly when compared with old facilities. For example, 86 percent of respondents agreed or strongly agreed with the statement that “the layout of the NEC is well designed compared with the previous facility.” Overall, respondents rated security improvements and the fact that personnel were all located on a single compound as NECs’ two most

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<sup>13</sup>U.S. State Department, Office of the Inspector General, *Report of Inspection: Bureau of Overseas Buildings Operations*, Report Number: ISP-I-08-34 (Washington, D.C., August 2008).

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important improvements to achieving their diplomatic mission. In many cases, posts moved from facilities that were in poor condition, insecure, and scattered throughout the city. State officials noted that, in general, NECs are a dramatic improvement over older facilities. For example, the former embassy in Sofia, Bulgaria, consisted of seven buildings spread throughout the city that did not meet current security standards and suffered from seismic and structural deficiencies. In comparison, officials in Sofia noted the NEC was one of the nicest buildings in Bulgaria. Additionally, officials at overseas posts and State’s regional bureaus commented on the professional environment of the NECs. For example, officials at overseas posts stated that NECs were a positive representation of the United States’ commitment to the host country. However, some officials also pointed out that the external appearance of NECs can be imposing and that increased security standards, including the fact that many NECs are located far from city centers, in part to meet more stringent security requirements, reduced the willingness of host government officials to hold meetings at NECs.

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**As Originally Constructed, Over Half of NECs Did Not Have Enough Desks for Current Staffing Levels, Resulting in the Need to Add Desks, Which Has Had Some Negative Consequences**

Over half of the 44 NECs we analyzed did not have enough desk space to meet current staffing needs. Post management has converted common spaces, such as conference rooms or training rooms, into offices in order to accommodate additional desks on the compound. However, actions taken to accommodate additional staff have had some negative consequences, such as the loss of common spaces.

**Current Staffing Levels Exceed Originally Constructed Desk Space at Over Half NECs**

While NECs are a long-term investment that State intends to serve a post for decades, our analysis shows that most posts have filled their originally constructed space within just a few years of occupying the NEC. Over half (25 of 44) of the posts occupying NECs completed from 2001 through 2009 currently have more staff requiring desks than were provided in the NEC’s original construction.<sup>14</sup> Specifically, as indicated in figure 1, our analysis of data for all 44 posts in our scope shows that current staffing levels exceed as-built desks—the number of desks provided when the NEC was constructed—by 10 percent or more at 21 of the 44 posts and exceed as-

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<sup>14</sup>State plans NECs based on projections of the number of “desk” positions—or positions that will require an assigned office or workspace—that will occupy the facility.

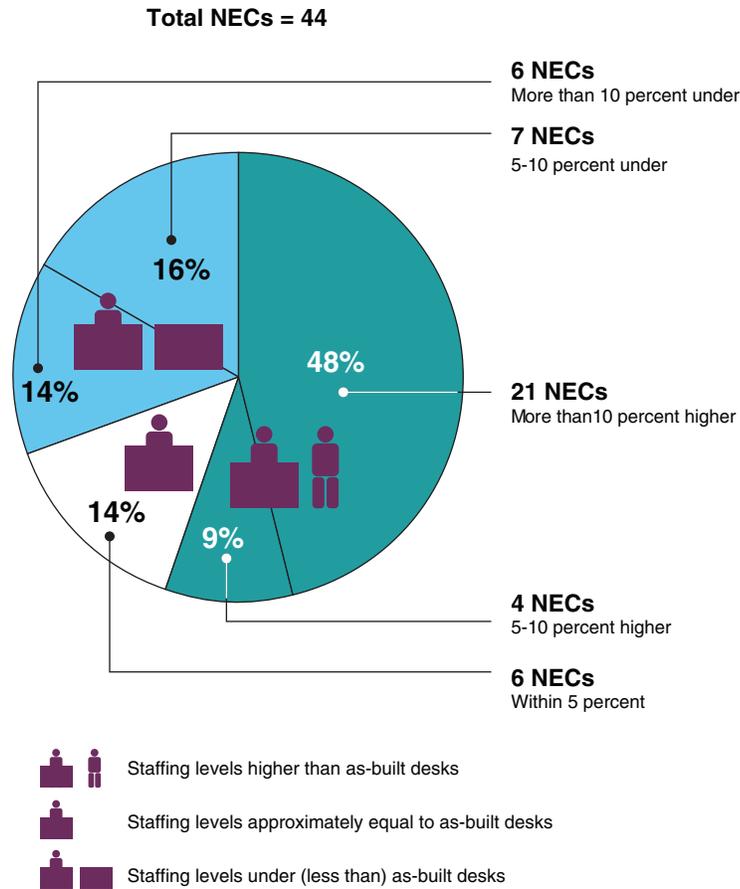
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built desks by at least 5 percent at 4 additional posts.<sup>15</sup> Not all posts have exceeded the desk space initially provided. For example, our analysis also shows 13 posts have current staffing levels at least 5 percent below as-built desk space. However, officials at overseas posts noted that having some excess space can be helpful, as posts may require additional space over time and it provides flexibility for post management to adapt to changing circumstances.

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<sup>15</sup>“Current staffing levels” refers specifically to authorized positions at overseas posts that post management indicated required a desk on the compound in 2009 staffing data. There may be a discrepancy between the number of positions that are authorized and the number of positions that are actually filled; however, State’s staffing data do not provide sufficient detail for us to distinguish between the two. Some positions at overseas posts, such as guards or some facilities maintenance positions, do not require a desk and, therefore, are not included in our analysis of current staffing levels.

**Figure 1: Percentage Difference between Current NEC Staffing Levels and As-Built Desks**



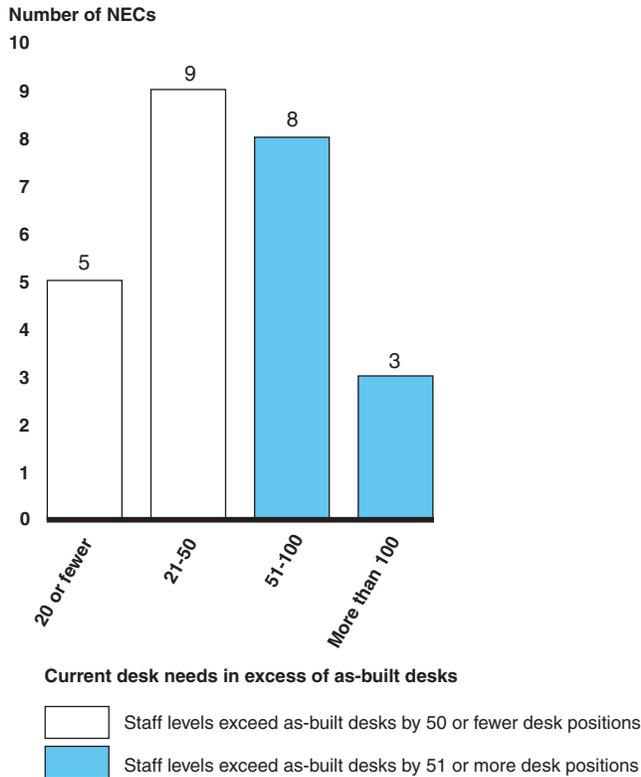
Source: GAO analysis of State data.

Note: Numbers may not add to 100 percent due to rounding

As figure 2 demonstrates, our analysis shows a difference of more than 50 desks for 11 of the 25 posts in which current staffing levels exceed as-built desk space by at least 5 percent.<sup>16</sup>

<sup>16</sup>The 11 posts with a difference of more than 50 desks are Abu Dhabi, United Arab Emirates; Abuja, Nigeria; Beijing, China; Berlin, Germany; Dar es Salaam, Tanzania; Dushanbe, Tajikistan; Frankfurt, Germany; Nairobi, Kenya; Skopje, Macedonia; Tblisi, Georgia; and Tunis, Tunisia.

**Figure 2: Desk Differential in 25 NECs with Staffing Levels Exceeding As-Built Space by at Least 5 Percent**



Source: GAO analysis of State data.

State typically plans NECs with some additional desk space for future growth, but the amount of growth space provided fluctuated over time and across posts. When the NECs we examined were designed, State typically budgeted for NECs to include from 5 percent to 10 percent additional desk space as future growth space.<sup>17</sup> Some growth space is designed as office space, with desks or cubicles installed during construction, while other growth space may initially be designed as conference rooms or file rooms, with the intention that they can be converted to office space in the future, if needed. State's typical growth factor for NECs has fluctuated over time. Prior to 2003, OBO typically planned for growth space equivalent to 10 percent of the projected desk space in an NEC. However, in 2003, due to concerns about the high cost of the embassy construction program, OBO

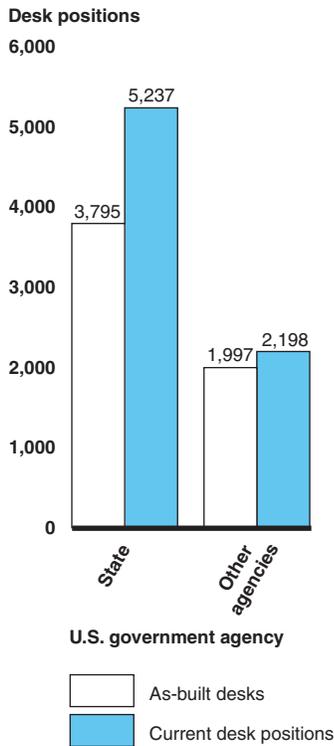
<sup>17</sup>Growth space is not included in our analysis of as-built desk space.

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reduced the growth space allowance to 5 percent of an NEC's projected desk space needs. In 2008, OBO returned to a 10 percent growth factor to provide a greater margin to accommodate unanticipated growth. These policies only serve as general guides, though, and some NECs received less growth space than is typically budgeted. For example, in Bamako, Mali, State eliminated growth space in the chancery in order to reduce total construction costs to meet construction contractor bids that were higher than anticipated.

For the 25 posts in which current staffing levels exceed as-built space by at least 5 percent, we found that, in general, the number of State positions has grown more than the number of positions for all other agencies, including the U.S. Agency for International Development (USAID). As shown in figure 3, for the 25 posts collectively, the number of current State desk positions exceeds as-built desk space by more than 1,400 desks, or 38 percent. Comparatively, the number of desk positions for all other U.S. government agencies combined exceeds as-built desk space by about 200 desks, or 10 percent. Individually, we found a larger increase—both in terms of absolute numbers and percentage increase—in the number of State desk positions than in the number of other agency desk positions at 20 of the 25 posts.

**Figure 3: As-Built Desks versus Current Staffing Levels for State and other U.S. Government Agencies**



Source: GAO analysis of State data.

Because our analysis groups all non-State agencies into a single category, it may not highlight the changing make up of overseas posts. While some non-State agencies have grown substantially, other agencies have reduced their overseas presence. For example, according to one State official, law enforcement agencies have increased their overseas presence since September 11, 2001, while the Departments of the Treasury and Transportation reduced their overseas staffing levels. Additionally, some of the growth within State may have resulted from consolidating administrative services once all agencies collocated at the NEC. State has

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taken on additional administrative responsibilities while other agencies were able to reduce administrative staff.<sup>18</sup>

Some State officials commented that the earliest-built NECs are more likely to have space shortages, since it is difficult to project staffing levels farther into the future and there has been more time for the post to outgrow the space originally provided. However, we found that the age of an NEC was not a major factor in explaining space shortages. For example, while 4 of the 6 NECs completed from 2001 to 2003 have shortages of 5 percent or more, 8 of the 16 NECs occupied since 2007 also have shortages of 5 percent or more.

Posts Have Used Growth Space, Converted Conference Rooms and Other Common Spaces, and Reduced Cubicle Size to Locate Staff On-Compound

We reviewed 22 posts in greater depth to determine how they found office space for additional staff. At most of the 22 posts we reviewed, State was able to find enough space on the new compound for all additional staff. Current staffing levels exceed as-built desk space by at least 5 percent in 15 of the 22 posts we reviewed. Eleven of those posts were able to accommodate all desk positions on compound by using growth space; converting common spaces, such as conference rooms or training rooms, into offices; or reducing cubicle sizes. Figure 4 provides examples of some spaces that posts have converted into office space.

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<sup>18</sup>Administrative support services are primarily provided through the International Cooperative Administrative Support Services (ICASS) system. ICASS functions are most commonly covered by State and, therefore, most ICASS positions are listed under State. As staffing levels at a post increase, there is often a corresponding increase in ICASS positions, which accounts for some of the increase in State positions.

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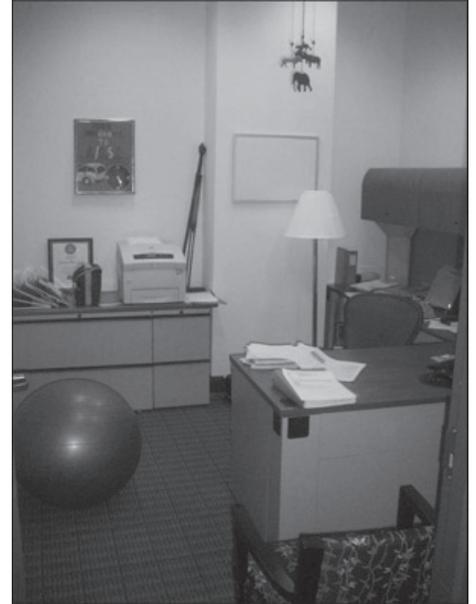
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**Figure 4: Space Alterations in Kigali, Rwanda, and Belmopan, Belize**

Before



After



Left photo to right photo, Kigali, Rwanda: File room converted to office space.



Above photo, Belmopan, Belize: Kitchen converted to office space.

Source: GAO.

However, 4 of the posts we reviewed had to retain some office space off-site. Table 1 lists the posts that have office space off-site, as well as the reasons for doing so.

**Table 1: Reasons for Off-Site Employees at Four Posts**

<b>Post</b>	<b>Reason(s) some employees are off-site</b>
Abuja, Nigeria	Staffing levels at the post outgrew the amount of space that was initially planned. Space constraints in Abuja have been exacerbated by substantial delays in construction of a USAID annex, which was planned concurrently with the chancery but not funded at that time. <sup>a</sup> Currently, the post leases off-site space for staff who cannot fit on-compound, including those who will be located in the USAID annex. Even once the USAID annex is completed, however, post management anticipates it will be too small for their current needs, and some agencies will likely have to remain off-site.
Beijing, China	Staffing levels at the post outgrew the NEC before construction was completed. The post retained one of the old embassy buildings to temporarily house the employees that cannot fit in the NEC, and OBO plans to construct an additional annex on the new compound.
Berlin, Germany	The size of the new chancery was reduced due to budget limitations, resulting in a new facility that could not accommodate all post staff. The post retained two old facilities—an office building and a warehouse/General Services Office annex building—to house staff and functions that could not fit in the new facility.
Kathmandu, Nepal	The NEC site is not large enough to accommodate a General Services Office annex and warehouse. State was required to retain some of the old facilities, so it opted to keep some functions, including a small number of desk positions, on the old compound.

Source: GAO.

<sup>a</sup>Prior to the creation of the Capital Security Cost Sharing program, which centralized funding for NEC construction, State built new embassy compounds in separate stages, typically constructing USAID annexes after construction began—or sometimes after construction was completed—on the rest of the compound. For additional information, see GAO, *Embassy Construction: Achieving Concurrent Construction Would Help Reduce Costs and Meet Security Goals*, [GAO-04-925](#) (Washington, D.C.: Sept. 24, 2004).

In addition to potentially increasing the security risks for those employees not on-compound, State officials noted that having employees off-compound results in additional costs and can affect coordination across the mission and reduce the efficiency of posts' operations because embassy personnel have to spend more time in transit between facilities. In the cases in which posts have some staff working off-site, post management has had to either retain old facilities or lease additional office space. In the case of Berlin, the most cost-effective option for locating staff off-site—at an estimated cost of \$25 million—involved purchasing and renovating an office facility the post had formerly leased. In Abuja, leasing off-site office space costs over \$800,000 per year.

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Space Constraints and Actions Taken to Add Desks Have Had Some Negative Consequences for Post Operations

State officials noted that, because post management often has to convert common areas, such as conference rooms or training rooms, into offices to accommodate additional staff, posts may not have sufficient meeting or training space. For example, regional bureau officials stated that dedicated training rooms in NECs are often converted into office space, but that having training space is important for embassy operations. Officials also noted that other actions, such as having staff share desks or locating new staff in available spaces far from the rest of their agency or section, can result in operational inefficiencies. For example, at one African post, some FBI staff have to work in shifts in order to share a limited number of classified computers.

Additionally, officials at some of the posts we reviewed expressed concerns that space could increasingly become a consideration in approving requests for new overseas positions, potentially reducing the post's ability to execute its mission. In general, the vast majority of new position requests are approved—over 97 percent of all requests were approved in 2008 and 2009. In considering new position requests, State advises Chiefs of Mission to consider space availability, among other issues, and we found that a few position requests at posts with NECs have been denied, at least in part, because of space constraints. According to State data, in a few instances, posts have cited resource limitations, including space constraints, when denying requests for new overseas positions. Of the seven posts that cited resource limitations when denying requests for overseas positions in 2008 and 2009, three currently occupy NECs and one is scheduled to move into an NEC with known space shortages in 2010. Some post officials also noted that space shortages can make it difficult to accommodate short-term, or temporary duty, positions. Officials noted that, in cases where the NEC has little or no available office space, it can be difficult to find places for short-term staff to work. At some posts, the number of short-term positions can be quite large. For example, an official in Beijing, China, stated that the post can have up to 100 short-term staff at the NEC on any given day and finding desks for them can be challenging.

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Officials at Nearly All Posts We Reviewed Reported the Design of Some Spaces Did Not Fully Meet Their Functional Needs

Though staff at overseas posts noted many aspects of NECs function well, officials at 21 of the 22 posts we reviewed reported the design of some spaces within the NEC did not fully meet their functional needs, with an average of five functionality-related issues per post. While officials reported a variety of different concerns about each of the spaces, several officials noted an overarching concern that the design of some spaces in the NEC failed to take into account local conditions, such as weather or

economic factors, or how the post would ultimately use the space. Table 2 shows the six most commonly cited issues.

**Table 2: Features Cited as Not Fully Meeting Posts' Functional Needs**

Features commonly cited as not fully meeting posts' functional needs at 22 NECs	Number of posts reporting issues
Warehouse	16
Maintenance shops	16
Parking	16
Quality-of-life amenities (e.g., cafeteria, recreational facilities)	14
Atrium and other representational space	13
Consular Affairs section	11

Source: GAO.

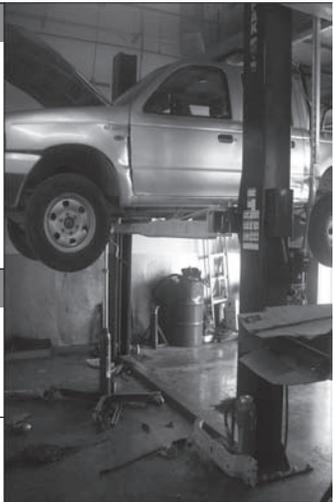
Figures 5 through 10 provide descriptions of some of the types of issues post officials reported with each of the above functional areas.

**Figure 5: Issues with Warehouse Facilities**

<b>Size / No Warehouse:</b>	
<b>Layout:</b>	
<p>Officials reported that some on-compound warehouses are too small, in some cases resulting in the need to rent an additional warehouse off-site or to use supplemental storage, such as shipping containers, on compound. Additionally, some NECs do not have a warehouse on compound, which can be challenging, according to some post officials. It can result in added costs to lease off-site space and one official noted that, because security requirements prohibit American officers from working full time from an off-site warehouse, one official noted it can be more difficult to oversee warehouse operations when they are off compound. Post officials also said increased transportation time between facilities can result in inefficiencies.</p> <p>The layout of some NEC warehouses, including the type of shelving provided or the configuration of the shelves, did not meet posts' needs.</p> <p>To the right: In Nairobi, Kenya, it can take up to 2 hours for staff to drive one way from the NEC to the off-site warehouse. Consequently, post staff moved several shipping containers onto the NEC (shown at right) to meet their more immediate storage needs.</p>	

Source: GAO.

**Figure 6: Issues with Maintenance Shops**

<p><b>Size / Type of Shops:</b></p> <p>Officials reported issues relating to the size or types of shops provided, often noting that shops are too small for their intended purpose, or space was not provided for one or more shops needed for the post's operations. For example, officials in Panama City, Panama, said that no vehicle maintenance shop was provided in the NEC. Additionally, some post officials said having no maintenance shops at the NEC can pose challenges, such as having to lease off-site space, resulting in reduced efficiency associated with traveling between locations.</p>	
<p><b>Design:</b></p> <p>The design of some shops does not meet posts' needs. For example, in Accra, Ghana, officials noted that the welding shop was not outfitted with adequate ventilation, so maintenance staff cannot use it for its intended purpose.</p>	
<p>To the right: The ceiling in the auto maintenance shop in Port-au-Prince, Haiti, is too low to fully extend the vehicle lift for large vehicles like trucks.</p>	

Source: GAO.

**Figure 7: Issues with Parking Areas**

<p><b>Staff/Visitor Parking:</b></p> <p>Some NECs do not have adequate parking for staff or visitors. Some officials noted that, because many NECs are located far from city centers where public transportation can be less reliable, parking can take on an added importance.</p>	
<p><b>Covered Parking:</b></p> <p>Some officials reported their NEC has inadequate covered parking for official armored vehicles. The vehicles' armor coating can be damaged by exposure to the intensive sun common at some overseas posts. Having inadequate covered parking can shorten the lifespan of the armor and result in costly replacements or repairs.</p>	
<p>To the right: In Belmopan, Belize, the NEC has only two covered parking spaces for five armored vehicles.</p>	

Source: GAO.

**Figure 8: Issues with Quality-of-Life Amenities**

**Size/Design:**  
In some cases, officials noted the size or design of one or more quality-of-life amenities, such as cafeterias and gyms or other recreational facilities, was inappropriate given the number of staff at the post or the availability of alternatives in the vicinity of the NEC. Some officials noted that design problems resulted in amenities that, while nice, were largely unused.

**Features Not Provided:**  
In other cases, officials stated that some features were not provided in the NEC. For example, in Abuja, Nigeria, the NEC does not have a cafeteria, so the post is currently using two shipping containers as a temporary replacement. According to State officials, many overseas posts are located in places that provide few commercial recreational options, making quality-of-life amenities important for staff morale.

To the right: The commercial cafeteria in Belmopan, Belize, which post staff estimated cost \$1 million, has largely been unused in the 3 years the NEC has been occupied. Post management reported that the cafeteria is far too large for its needs and that the relatively small size of the post, in combination with its remote location, make it unlikely that the post will be able to support a commercial vendor.



Source: GAO.

**Figure 9: Issues with Representational Space**

<p><b>Atrium:</b></p> <p>Until 2006, the SED included a three- or four-story atrium, which was intended, in part, as space to host representational functions. While officials at some posts commented that the atrium space was useful for representational events, officials at other posts reported challenges associated with the atrium, including that it is expensive to heat and cool, difficult to maintain, and its long, narrow layout and location inside the embassy, which requires additional security procedures for guests and caterers, can make it difficult to use for events.</p>	
<p><b>Other Representational Space:</b></p> <p>Some NECs, including some that were planned prior to the development of the SED or special projects like the NEC in Berlin, do not have an atrium. Officials at some of these posts also reported difficulties with hosting representational functions at the NEC.</p>	
<p><b>Executive Offices:</b></p> <p>Officials reported that offices for the Ambassador and Deputy Chief of Mission can be too small, making it difficult to use the space for meetings.</p>	
<p>To the right: Officials in Tashkent, Uzbekistan, reported that the long, narrow layout of the atrium makes it difficult to host large events in the space.</p>	

Source: GAO; Department of State (photo).

**Figure 10: Issues with Consular Affairs Section**

<p><b>Consular Interview Windows:</b></p> <p>Some posts reported concerns about either the layout or number of consular interview windows in the NEC. For example, some officials said the layout of the desk area on the teller side of the window provided little room for reviewing and processing papers and that poor acoustics complicated transactions between consular staff and visitors.</p>	
<p><b>Waiting Areas:</b></p> <p>Officials reported issues with some consular waiting areas, such as interior waiting areas that are too small or outdoor waiting areas that have insufficient cover from sun or rain.</p>	
<p><b>Supervisory Line of Sight:</b></p> <p>Officials at four posts reported issues associated with consular supervisors having a clear line of sight of the consular section. According to a Consular Affairs official, a clear line of sight is intended to improve management controls and prevent visa malfeasance. Consular Affairs guidance notes that consular officers should be able to easily see all the print areas, most work areas, most of the interview windows, and have clear views from two or more angles into the cashier booth, from their desks.</p>	
<p>To the right: View from the office designed for the consular chief in Belmopan, Belize, from which only two of the four consular windows and none of the print areas or work areas are visible. As a result of this obscured line of sight, the consular chief cannot use the office and, instead, has moved to a cubicle in the main work area.</p>	

Source: GAO.

**Challenges with Projecting Future Staffing Levels and Budget Constraints Have Resulted in the Need to Conduct Follow-on Work**

According to State officials, it is difficult to predict changes to staffing levels associated with shifting foreign policy priorities, and the process for planning NECs has not been able to fully account for those changes. State officials also indicated that budget limitations contributed to decisions about the overall size and types of features provided in NECs. In some cases, space and functionality challenges resulted in the need to conduct follow-on projects, resulting in millions of dollars of additional costs.

**The Current Process for Sizing NECs Has Not Been Able to Fully Account for Changing Foreign Policy Priorities**

According to State officials, the process for planning NECs has not been able to fully account for changing staffing levels associated with shifting foreign policy priorities. Because of the time required to plan and construct an NEC, there can be a lag of multiple years from the time staffing projections are finalized to the time a post moves into an NEC. The process for projecting future staffing needs starts with an assessment of mission priorities and the staffing levels necessary for carrying out those priorities. Therefore, State officials noted it can be very difficult to predict future staffing levels when changes occur as a result of unexpected

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events or initiatives. Officials at overseas posts, OBO, the regional bureaus, and M/PRI all agreed that changes in U.S. foreign policy priorities following the planning or construction of an NEC resulted in significant growth at many posts, contributing to the differences between current staffing levels and as-built desk space. According to State officials, some posts have had large increases in staffing due to recent initiatives, such as the President's Emergency Plan for AIDS Relief (PEPFAR) and recent State and USAID initiatives to substantially increase their Foreign Service presences. For example, according to officials in Kigali, Rwanda, the post's staffing projections predicted that the Centers for Disease Control and Prevention would have 18 desk positions at the time the NEC opened, but it actually had 34 desk positions when the NEC opened because of increases associated with PEPFAR. Staffing levels have also reflected changing needs in response to world events. For example, according to an M/PRI report, following the terrorist attacks of September 11, 2001, many law enforcement, security, and military agencies increased their overseas presence. According to State officials, many of these initiatives were not anticipated when NECs were planned.

Additionally, when staffing projections are prepared, an agency may not have clearly planned for or articulated future needs. According to State officials, some agencies have historically been better than others in developing staffing projections and articulating the policy justifications for staffing growth. However, other agencies have been less clear in their planning, complicating State's ability to plan an NEC. For example, State officials report that USAID frequently revises its projected staffing levels, sometimes even after construction of a facility has begun. Also, as our earlier analysis showed, at the posts that have exceeded as-built desk space by at least 5 percent, State has grown substantially more than other agencies, indicating it has also been challenging for State to predict its own future staffing levels.

State officials also noted that the staffing projections that determine an NEC's size are not directly tied to the process for approving actual staffing levels at each post.<sup>19</sup> OBO sizes NECs based on staffing projections provided in a post's rightsizing report. While posts, tenant agencies, and the regional bureaus all have input into the rightsizing process, M/PRI has

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<sup>19</sup>The precise structure of a mission is determined by the Chief of Mission through the National Security Decision Directive 38 (NSDD-38) process, which provides authority for the Chief of Mission to determine the size, composition, or mandate of personnel operating at the mission.

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final approval for these staffing projections. However, State officials noted that the Chief of Mission has authority over actual staffing levels at each post and may approve positions beyond the levels planned for in the NEC. According to State officials, in cases where M/PRI and the Chief of Mission do not agree on the appropriate staffing levels for a post, discrepancies can result between an NEC's planned size and the post's actual staffing levels. For example, in Addis Ababa, Ethiopia, the post's initial projections anticipated the post would expand and become a regional center. Both M/PRI and State's IG disputed the premise that Addis Ababa should be a regional center, noting that Nairobi, Kenya, already serves a regional role in East Africa. In addition, M/PRI found the post's initial projections included substantial growth even though the post had dozens of unfilled positions. Therefore, the rightsized staffing projections anticipated more limited growth, reducing the post's initial projections by 47 desk positions. However, the Chief of Mission continued to add new positions at a rate even faster than the post initially projected and, in 2009, OBO had to initiate changes after construction of the Addis Ababa NEC had already begun in order to accommodate 96 additional desk positions at a cost of about \$13 million.

OBO officials report it is difficult to make changes to a project to accommodate changing needs after the staffing projections have been finalized. The NEC construction process typically requires a 2-year lag from the time staffing projections are initiated to the time a contract is issued and an additional 3-year lag between contract issuance and the time a post moves into the NEC. When changes are requested, State officials said State and other tenant agencies may reassess the project to determine whether the requirements are critical enough to warrant changing the project's planned schedule and budget. In some instances, State officials reported changes could be accommodated to the program and in other cases changes could not. OBO officials noted it is easier to make changes to a project before a contract has been awarded. While changes have been made to a few projects after a contract has been issued, OBO officials stated it is not preferable because it can increase costs and delay construction.

Budget Limitations Also  
Contributed to Space  
Constraints and Functionality  
Issues

Budget limitations also contributed to space constraints and functionality issues in some NECs. According to OBO officials, congressional and executive concerns about the high cost of the embassy construction program were a primary reason for the 2003 decision to reduce the NEC growth factor from 10 percent to 5 percent. Budget limitations also impacted decisions about the overall size of the NEC at some posts with significant desk shortages. For example, State officials noted that, the

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Space and Functionality  
Challenges Resulted in the  
Need for Follow-on Work at  
Some Posts

overall size of the NEC in Dushanbe, Tajikistan—where, according to our analysis, current staffing levels are more than double the number of desks initially provided—was largely based on the planned budget.<sup>20</sup> We identified 10 posts in which some spaces or features were reduced or eliminated between the initial planning and final construction of the NEC. Some NECs were significantly affected by budget limitations. In Berlin, Germany, for example, more than one-third of the originally planned space in the new facility was cut due to budget limitations.<sup>21</sup> In Conakry, Guinea, functional spaces—including the cafeteria, multipurpose room, and most conference rooms—were cut in order to meet the project’s planned budget. According to OBO officials, programmatic support facilities, such as warehouses, recreational facilities, and cafeterias, were eliminated from a project’s scope before any changes were made to office space. State officials noted that, in some cases, reducing the scope of a project may have been preferable to delaying the project.

In some cases, problems with space and functionality resulted in the need to conduct follow-on work after the post moved into the NEC, such as planning for a major redesign of interior space or constructing an office annex or support facility, which has cost implications.<sup>22</sup> In particular, State has completed or plans to complete new construction or major renovations in at least six of the 44 completed NECs within our scope. For example, State is constructing an office annex in Beijing, China, to accommodate 318 additional desks at a cost of \$103 million. In Dushanbe, Tajikistan, OBO developed a plan to rearrange space within the existing chancery to accommodate new and projected desk positions, as well as build a warehouse and maintenance shops on-compound. In total, OBO estimates the changes will cost about \$7.5 million, but notes that, even with the recommended changes to add office space, there will be no available space for future growth beyond the staffing levels projected for 2013. Additionally, in its 2010 Long Range Overseas Maintenance Plan, OBO identifies 96 needed projects for the 22 posts we reviewed in greater

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<sup>20</sup>OBO officials noted that OBO received the amount of money it requested for the facility.

<sup>21</sup>As a result of these space reductions, some staff are located off-site in Berlin. Post management noted that the most cost-effective option for locating staff off-site—at an estimated cost of \$25 million—involved purchasing and renovating an office facility the post had formerly leased.

<sup>22</sup>While OBO has not conducted a formal study comparing the costs of initially building a larger space with building an annex at a later date, OBO officials noted it is generally cheaper to increase the size of a single building than build a separate building because of the fixed costs that come with each building.

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depth at a total cost of approximately \$98 million. Most of the costs are attributable to major rehabilitation projects, including \$42 million in Frankfurt, Germany, for renovations that were anticipated but not undertaken when the post originally moved into the new facilities in 2005.<sup>23</sup> Additionally, officials at 16 of the 22 posts we reviewed reported they have already undertaken follow-on projects of varying size and complexity to correct problems with their respective NEC.

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**State Has Begun to Take Actions to Address Space and Functionality Challenges, but Not All Problems Have Been Fully Addressed**

State has recognized many of the problems related to space and functionality and has taken actions that have resulted in improvements, but not all problems have been fully addressed. To improve NEC sizing, State created M/PRI to standardize the process for projecting future staffing levels. Additionally, OBO has taken some actions to incorporate additional flexibility for growth in NECs. However, accurately projecting future staffing needs remains challenging and State did not provide an analytical basis for determining how much growth space is appropriate. To address functionality challenges, OBO implemented a lessons learned program that analyzes issues in completed NECs and, as appropriate, modifies design criteria for future NECs. However, State has not ensured timely identification of problems in completed NECs through reviews, like post-occupancy evaluations.

**State Has Taken Actions to Improve Sizing of NECs, but Challenges Remain**

Through its creation of M/PRI in 2004, State standardized the process for developing staffing projections for posts receiving an NEC. As we noted in 2003, under State's prior process, State's headquarters gave embassies little guidance on factors to consider in developing projections, and U.S. agencies therefore did not take a consistent or systematic approach to determining long-term staffing needs. M/PRI now directs the process and has developed formal guidance on developing staffing projections for posts. According to State officials, in combination with the 2005 establishment of the Capital Security Cost Sharing program, through which each agency with an overseas presence contributes funds for construction on the basis of its overseas staffing levels and the type of space occupied, changes made through the rightsizing process have brought greater discipline to the planning process and have provided greater incentive for State and other agencies operating overseas to

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<sup>23</sup>In Frankfurt, Germany, State rehabilitated an old military hospital for use as the new Consulate, rather than construct a new facility. OBO officials noted that State undertook the initial renovation project in Frankfurt with the knowledge that additional work would be required following the post's move-in.

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seriously consider their long-term staffing needs. State has also undertaken efforts to work more closely with tenant agencies to better understand their staffing needs. For example, State now meets with officials from USAID on a monthly basis to discuss future staffing needs.

OBO has also taken actions to incorporate some additional flexibility for growth into NECs. According to OBO officials, the SED was changed to incorporate more flexibility after the first year of its use. For example, the first version of the SED included detailed floor plans that dictated where offices and open workstations would be located. However, in the SED's second year, OBO moved to a different approach that focused on the overall size of the NEC but left greater interior flexibility to rearrange office space. Recognizing the need to reassess the amount of growth space provided in NECs, in 2008 OBO increased the standard growth factor from 5 percent back to 10 percent, which it had been prior to 2003, to provide a greater margin to accommodate unanticipated growth. According to State officials, OBO has made an effort to be more accommodating to changing post needs through the design and construction process, when possible. OBO officials noted four cases in which they made changes to add space to an NEC's design after the staffing projections were finalized. However, officials also stated that, while they want to accommodate posts' needs, OBO prefers to avoid making changes after the contract has been issued because it is costly and can cause substantial delays.

While the implementation of a formal rightsizing process is an important step to improving projections for sizing NECs, accurately planning for future needs remains challenging. State officials acknowledged it remains difficult to accurately project future staffing needs. While only 6 of the 44 posts included in our scope underwent a thorough rightsizing review when planning their NEC, our analysis of staffing data at these posts suggests that accurately projecting future staffing needs can still be difficult. We found that current staffing levels exceed as-built desk space by at least 20 percent at four of the six posts that underwent a rightsizing review, all of which were completed in 2008 or later.

OBO, M/PRI, and regional bureau officials agreed that the NEC planning process should include a greater degree of flexibility to account for unanticipated changes. OBO officials indicated it may be more advantageous to plan buildings based on flexible bands that correspond to a post's general size—for example, posts with a need of 200 to 250 desks might constitute one band—rather than focusing on a specific desk count. Officials noted construction costs tend to come in bands and such an approach could incorporate more flexibility than is allowed in the current

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process. M/PRI officials also said that placing less focus on a specific desk count in planning NECs could be beneficial, as it would allow them to focus more resources on assessing the potential for policy changes that could impact future staffing levels.

### Analytical Basis for Growth Factor Unclear

While State revised the growth factor for NECs in 2008, officials did not provide the analytical basis for determining how much growth space is appropriate. OBO officials stated that, while the growth factor was originally intended to provide space for future growth, even a 10 percent growth factor can be exhausted very quickly at many posts, essentially providing some posts with no available growth space from the moment they occupy the NEC. As our earlier analysis showed, nearly half of all NEC posts have current staffing levels that exceed as-built space by more than 10 percent, while some posts have staffing levels lower than the initial projections. However, while the amount of growth space provided is sometimes reduced based on budget or other considerations, officials noted that State essentially applies a uniform growth factor across all posts and does not adjust the growth factor based on post-specific characteristics, such as a post's geographic location or the presence of rapidly growing agencies or functions, that might help forecast growth not explicitly planned for in the staffing projections. State officials did not indicate they have conducted any analysis of characteristics associated with rapid growth at completed NECs, but officials from M/PRI acknowledged that examining such characteristics could improve the process for sizing NECs. OBO officials report they have considered changing the standard growth factor based on certain post characteristics, such as adding 5 percent additional growth space at posts in which USAID has a presence. While we could not identify clear industry or government standards regarding how much growth space is appropriate, one agency—the National Institutes of Health—recommends that in determining how much flexibility should be incorporated into a building, one should consider the cost of incorporating flexibility now compared with the cost of renovating space in the future, among other factors. However, according to State officials, State has no current plans to make any changes to the NEC growth factor.

### State Implemented a Lessons Learned Program to Improve Future NEC Design

In 2004, State implemented a formal lessons learned program that seeks to improve the design of future NECs. According to OBO officials, the program entails bringing together representatives from a variety of technical disciplines within OBO to systematically evaluate issues identified in completed NECs and, if appropriate, take action to modify NEC design criteria to avoid similar problems in future facilities. OBO identifies topics to evaluate through the lessons learned program through

a variety of sources, including post-occupancy evaluations, contractor roundtables, and facilities management industry best practices. Through the lessons learned program, State identified many of the functionality issues at the posts we reviewed and has taken action to change the design criteria for a number of functional areas of future NECs. According to State officials, for fiscal years 2005 through 2008, OBO implemented changes to design criteria for over half of the issues identified through the lessons learned program. OBO officials noted that, on average, the program reviews about 500 issues of varying size and complexity per year. Table 3 lists certain recent modifications that have been made through the lessons learned program to address functionality challenges.

**Table 3: State's Recent Modifications to Address Functionality Challenges**

<b>Features cited as not fully functional</b>	<b>Selected actions taken</b>	<b>Fiscal year implemented</b>
Warehouses and maintenance shops	Developed an assessment tool to improve planning of warehouses and maintenance shops.	Currently in pilot phase
Cafeterias	Incorporated a food service study into the planning phase to more accurately predict cafeteria needs.	2010
Consular areas	Redesigning consular teller windows to address ergonomics and waiting area acoustics and improve microphone systems.	Currently in pilot phase
Atriums	Converted from a 3- to 4-story atrium to a 2-story gallery to make it easier to maintain and less costly to heat and cool.	2006

Source: GAO analysis of State information.

**Post-Occupancy Evaluations Provide a Useful Tool for the Lessons Learned Program, but State Has Not Ensured Timely Completion of Evaluations**

Evaluations of completed NECs are one mechanism for obtaining information for the lessons learned program. State has undertaken post-occupancy evaluations on some completed NECs to assess what aspects of the building worked well and what aspects need improvement. State officials reported post-occupancy evaluations are a very important tool for identifying issues and noted that some of the design changes they have initiated were based on issues identified through post-occupancy evaluations. In conducting a post-occupancy evaluation on the NEC in Yerevan, Armenia, for example, State reported it identified a number of issues with the maintenance shops, which led to a recommendation to examine how State could improve maintenance shops in future NECs. In addition to post-occupancy evaluations, in 2008, OBO initiated a “look back” study to identify issues and problems for review through its lessons

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learned process with regard to the planning, design, construction, and maintenance of 55 NECs and office annexes completed from 2001 to 2007. For example, OBO officials report that the look back study found posts have had issues with consular windows, such as poor acoustics impacting the privacy afforded to visa applicants. While the look back study was an important tool for identifying issues in completed NECs, the study had some limitations. For example, according to an OBO official, it was completed in a very short time frame and the level of detail in its findings was inconsistent across posts.

While State's efforts to implement the lessons learned program have resulted in improvements, State has not ensured that reviews of completed NECs are undertaken in a timely manner. Due to the time required to contract and construct NECs, it can take 4 years for an approved lessons learned recommendation to materialize as an improvement in future NECs. Therefore, according to State officials, timely identification of issues through OBO reviews, such as post-occupancy evaluations, is critical to ensure that problems are not repeated in future designs.<sup>24</sup> We found that OBO has completed a post-occupancy evaluation for 10 of the 44 NECs completed since 2001 and has not completed any post-occupancy evaluations since 2008. OBO officials reported that OBO intended to complete 17 post-occupancy evaluations of NECs in 2009, but did not complete any because staff were diverted to other priorities. OBO officials also report they plan to complete 9 post-occupancy evaluations of NECs in 2010; however, as of May, 2010—almost halfway through the year—no evaluations have been completed.

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<sup>24</sup>Some other U.S. government agencies, such as the National Institutes of Health (NIH) and the Naval Facilities Engineering Command (NAVFAC), require post-occupancy evaluations for all facilities above a certain cost threshold—\$10 million for NIH and \$5 million for NAVFAC. Additionally, the proposed Embassy Design and Security Act, (S. 3210, introduced in the Senate on April 15, 2010), would require that State conduct post-occupancy evaluations of each completed facility.

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## NECs Are Challenging to Operate and Maintain; State Has Taken Steps to Address These Challenges, but Problems Remain

State has constructed NECs that are state-of-the-art buildings, built in accordance with current building codes, security, and energy-efficiency standards. The comparatively larger size of NECs, relative to the facilities they replaced, and complexity of NEC building systems have resulted in increases to operations and maintenance costs. State has developed a plan that identifies future maintenance requirements to protect the investments made in NECs but the plan does not report on the increased operating costs, and likely future costs, to operate NECs. NECs have also presented challenges for some posts due to rushed testing of building systems—recognized in the industry as “commissioning”<sup>25</sup>—or poorly coordinated transfer of the NEC from OBO to the post, which has contributed to operational issues affecting building cooling and fire protection systems. More than half of the 22 NECs we reviewed also have experienced problems operating building systems, which have resulted in the need for earlier-than-anticipated repair and replacement projects. State has made organizational changes, revised its commissioning process, and changed design criteria to avoid problems with future NECs. However, State has not developed a plan to recommission or retest completed NECs to ensure building systems are operating as efficiently as possible and that outstanding and potential problems with NEC building systems, such as the increased risk of failure of NEC cooling systems, are being fully addressed. In addition, State has had problems in hiring U.S. facility managers and hiring and training locally employed maintenance staff that have the necessary technical skills to operate and maintain an NEC’s complex systems.

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<sup>25</sup>Commissioning is a process of assuring by testing, verification, and documentation that systems perform according to the design and the building owner’s operational needs, including the preparatory training of facilities personnel. Commissioning is generally performed by a third party. If commissioning is improperly performed, the owner (i.e., State) is at risk of taking possession of a facility with building systems that may not be installed correctly, are defective, or are not integrated to operate optimally and efficiently. In addition, essential training and documentation on the systems might not be provided to operations and maintenance staff. In such cases of improperly performed commissioning, energy efficiency is reduced and the performance of the facility fails to meet owner and occupant expectations.

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## State Is Making Progress in Constructing Facilities That Meet Building Codes and Security Standards and Support Federal Energy Reduction Goals

State constructs NECs in accordance with modern building codes, State security standards, and federal energy-efficiency goals. The new facilities are modern, state-of-the-art buildings that incorporate technologically sophisticated building systems and are more secure than the old embassies and consulates that would not meet current codes and standards. (Fig. 11 shows examples of the equipment that support the sophisticated NEC building systems.)

**Figure 11: Typical NEC Building Systems**



Source: GAO.

Note: Power generation system (upper left); cooling system (upper right); fire suppression system (lower left); water treatment system (lower right).

NECs are modern, state-of-the-art facilities designed and built in accordance with the International Building Code, which guides design of the facilities' structural components, fire and life safety features, and seismic engineering provisions, among other elements. For example, NECs have modern fire protection systems that require fire pumps to protect multiple buildings on a typical 10-acre compound. In addition, NECs are safer than older embassies because the designs for NECs consider the seismic conditions in local areas to enable the NECs to be constructed to

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withstand seismic events. The NEC in Port-au-Prince, Haiti, for example, was one of the few facilities to withstand the January 2010 earthquake in the country and was used in support of recovery operations. Meeting modern code requirements by including fire pumps and designing structural systems to withstand seismic events contribute to NECs being larger than the facilities they replaced. Additionally, NECs provide common areas (e.g., cafeterias, atriums, and recreational facilities) that also contribute to the larger size of NECs.

NECs are constructed to meet security standards and, as a result, are more secure than the facilities they replace because the buildings' exteriors are hardened to provide blast protection, and windows and doors also are designed to meet forced-entry and ballistic-resistance standards. In addition, NECs' heating, ventilation, and air conditioning systems are equipped with larger, technologically sophisticated systems to filter potentially harmful airborne contaminants and effectively create an air-tight environment within the buildings. NECs also have redundant systems such as generators that operate in the event of local power loss and provide storage for water and fuel so that posts are capable of maintaining operations. Some NECs receive services from local utility systems while others must independently produce their own utility services. The NEC in Port-au-Prince, Haiti, for example, operates its own utility systems that enable it to generate electricity, produce potable water on-site, and treat waste water. Constructing NECs to meet current security standards, such as hardening structures and having built-in system redundancies, contributes to NECs being more secure and larger than the old facilities.

To meet federal energy mandates to reduce energy and water consumption, NECs contain technologically sophisticated building automation and energy management systems that control and monitor heating, cooling, ventilation, lighting, and power systems.<sup>26</sup> In addition, starting in 2008, State's goal is to design all new NECs to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design

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<sup>26</sup>Building automation systems (BAS), also known as energy management control systems, provide centralized control—through the use of BAS software and hardware (e.g., computer, modems, sensors, controllers, and printers)—to monitor and adjust building systems (e.g., temperature settings and schedules for running equipment)—such as a building's cooling systems. A BAS is intended to optimize the integrated performance of the individual equipment components that comprise the system. Data can be recorded so they can be analyzed. The Department of Energy's Federal Energy Management Program indicates that the objective of a BAS is to achieve an optimal level of occupant comfort while minimizing energy use.

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(LEED) certification requirements related to promoting energy efficiency and minimizing environmental impacts.<sup>27</sup> To date, State has constructed LEED-certified NECs in Sofia, Bulgaria (see fig. 12); Panama City, Panama; Brazzaville, Republic of Congo; and Johannesburg, South Africa. State officials report that the department has approximately 30 projects registered with the LEED program and they expect many of the projects will receive LEED certification over the next few years.<sup>28</sup>

**Figure 12: Sofia, Bulgaria, the first LEED-Certified U.S. Embassy**



Source: GAO.

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<sup>27</sup>The U.S. Green Building Council's Leadership in Energy and Environmental Design green building rating system defines sustainable features for buildings and includes a set of performance standards that can be used to certify the design and construction of buildings. By meeting the standards during facility design and construction, builders can earn credits and become certified in accordance with an established four-level scale—certified, silver, gold, and platinum.

<sup>28</sup>Projects registered include both completed projects and projects where construction has not yet been completed.

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Larger, More Technologically Complicated New Facilities Cost More to Operate and Maintain than Those They Replaced

The comparatively larger size of NECs and the complexity of their building systems have resulted in higher operations and maintenance costs than at the facilities they replaced. Costs of utilities, maintenance staff, and service contracts are contributing to the cost increases. In our review of 10 recently completed posts,<sup>29</sup> we found that total post-managed operations and maintenance costs were about \$12 million greater than at the facilities they replaced.<sup>30</sup> Utility costs (e.g., electricity, gas, fuel oil, water, and sewer) increased on average \$827,000—or about 250 percent—per post. Each of the 10 posts experienced at least a 75 percent increase in utility costs after moving into an NEC. Our analysis is consistent with a State 2009 benchmarking study of approximately 165 overseas posts that shows a trend of increasing operations and maintenance costs. In addition, State’s report shows that four of the five posts with the highest utility costs (calculated on a gross square meter basis) were NECs.<sup>31</sup> Table 4, for NECs completed in 2007 and 2008, shows the pre-NEC utility costs approximately 1 year prior to the move into the NEC compared to posts’ fiscal year 2009 utility costs.

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<sup>29</sup>For projects completed in 2007 or 2008, we compared operations and maintenance costs for the last full year of operation in the old facility with NEC operations and maintenance costs for fiscal year 2009.

<sup>30</sup>The total reported is the aggregate nominal cost increase associated with operating and maintaining NECs and is not adjusted for inflation due to the short time frames involved. OBO officials report that the maintenance of older facilities may not have been fully funded at appropriate levels and that there might not have been such a large cost increase with the NECs if the old facilities had been properly maintained

<sup>31</sup>U.S. State Department, *Benchmarking: Operations and Maintenance Costs* (Sept. 1, 2009). The four posts identified are Beijing, China; Belmopan, Belize; Bridgetown, Barbados; and Panama City, Panama. Beijing’s cost did not fully reflect 1 full year of occupancy as the NEC did not open until August 2008.

**Table 4: NEC Utility Costs Pre- and Post-Move for NECs Completed in 2007 and 2008 (costs rounded to the nearest thousand)**

NECs completed in 2007 and 2008	Pre-NEC utility cost	Post-NEC utility cost (FY 2009) <sup>a</sup>	Percentage increase
Accra, Ghana	\$77,000	\$923,000	1,099%
Kigali, Rwanda	178,000	1,624,000	812%
Beijing, China	486,000	2,704,000 <sup>b</sup>	456%
Berlin, Germany	324,000	1,373,000 <sup>c</sup>	324%
Algiers, Algeria	96,000	375,000	291%
Panama City, Panama	620,000	1,489,000	140%
Port-au-Prince, Haiti	368,000	821,000	123%
Managua, Nicaragua	619,000	1,338,000	116%
Kathmandu, Nepal	234,000	425,000	82%
Rangoon, Burma	263,000	464,000	76%
<b>Total</b>	<b>\$3,265,000</b>	<b>\$11,536,000</b>	<b>253%</b>

Source: GAO analysis of costs, as reported by posts.

<sup>a</sup>Posts were asked to report utility costs separate from lease costs for old facilities that were vacated as a result of consolidating onto a new compound. Posts may or may not have included utilities costs for leased facilities.

<sup>b</sup>Beijing provided actual cost data for 11 months of operation in 2009.

<sup>c</sup>Berlin provided cost data based on extrapolating actual cost data for 10 months.

State officials noted that while building systems in NECs are more energy efficient compared to systems in buildings that were replaced, operating conditions cause them to consume a greater amount of energy due to, for example, additional security equipment such as security gates, lighting, cameras, and vehicle barriers that all require power. Further, NECs are physically larger than replaced facilities, meaning that costs to heat and cool the NECs will be greater. In addition, the air filtration equipment needed to maintain the sealed environment in NECs is about 50 percent larger in size and costs about 40 percent more to operate than if the filtration systems were not installed.

### Maintenance Staff Costs Are Increasing at NECs

The costs for maintenance staff increased by approximately \$200,000 on average at the 10 posts for which we analyzed cost data because of the need to hire additional facilities staff to operate and maintain the NECs. For example, officials in Kigali, Rwanda, reported the size of its facilities staff prior to occupying the NEC was 20. Kigali now has 50 facilities maintenance staff as a result of the larger chancery and increased staff housing. Fourteen of those staff are dedicated solely to the NEC operations and maintenance. The additional annual cost for those 14

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positions solely dedicated to NEC maintenance in Kigali was approximately \$236,000.

### Service Contracts Are Needed to Support Some NEC Maintenance

For fiscal year 2011, to ensure proper maintenance of systems and equipment at NECs, OBO estimates that posts would spend approximately \$150,000, on average, to fund maintenance service contracts. Posts use service contracts to obtain technicians to maintain some systems, like elevators and building automation systems, that may not have existed at the older facilities. Some posts also use service contracts to obtain maintenance service from regional sources when they are unable to find skilled labor to hire locally. Because some posts' maintenance personnel may not be capable of fully addressing all maintenance requirements of an NEC's technically sophisticated systems, use of maintenance service contracts enables posts to obtain contractors that can perform specialized maintenance, such as conducting infrared testing on equipment temperatures.

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### State Has Developed Its First Long-Range Overseas Maintenance Plan, but Plans Are Incomplete

#### State's Strategy to Maintain NECs Includes Revisions to Processes for Funding Routine Maintenance and Service

In fiscal year 2010, partly in response to our 2006 recommendation, OBO developed its first Long-Range Overseas Maintenance Plan (LROMP) to support State in budgeting for what OBO reports in the plan as an "investment protection" strategy for the multibillion dollar investment made in constructing NECs. The LROMP outlines facility maintenance needs—characterized as "non-capital projects"—over a 6-year planning horizon for NECs as well as older facilities at posts not scheduled to move into an NEC.<sup>32</sup> State intends to update the plan annually as a companion document to the Long-Range Overseas Buildings Plan which outlines State's capital construction plan for building new embassies over the same period. The plan is intended to inform State's budget requests beginning with the fiscal year 2011 budget request. The plan currently identifies over 3,300 potential projects for the period from fiscal year 2010 through fiscal year 2015. Overall, the plan presents what State characterizes as "the universe of requirements" (i.e., based on approximately 5,200 facilities

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<sup>32</sup>State's LROMP also outlines a "legacy maintenance strategy" for maintaining older facilities that will not be replaced by an NEC in the near future.

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located in over 260 locations) identified in fiscal year 2010, which total just over \$3.7 billion. State has also identified a number of areas where the LROMP needs to be improved in next year's edition, such as ensuring that posts have accurately identified all their maintenance requirements, better defining costs for major rehabilitation projects (e.g., costs to move staff into temporary space during a project), and better automating the process for escalating or reducing project costs as proposed projects move between fiscal years.

In addition to identifying future maintenance projects, State has taken action to improve its processes for establishing budget targets for (1) determining and allocating funding for posts' routine maintenance and repair and (2) setting funding targets for posts' maintenance service contracts. The LROMP reports that starting with its fiscal year 2011 budget request, State changed its approach for setting posts' annual routine maintenance and repair budgets that fund maintenance activities that are considered routine, recurring, and minor, and that are managed by posts, such as painting and weather stripping. Historically, routine maintenance and repair funds were allocated to posts by simply escalating prior year funding levels without consideration for factors such as the age of posts' facilities. Under a new approach, a more objective determination of posts' budget levels is made based upon factors such as the age and current condition of posts' facilities, the amount of space needed to be maintained, and an index for geographic costs considerations, such as the costs to procure or ship maintenance materials in the region. Under this new approach, State identified a requirement of \$98 million for fiscal 2011 to support routine maintenance and repair at overseas posts, more than double the amount of State's 2009 budget of \$44.5 million for routine maintenance and repair. The LROMP also reports that, starting in fiscal year 2009, State took action to establish a new cost category for Building Maintenance Expenses (BME)<sup>33</sup> in order to improve how it budgets, funds, and captures costs for preventative maintenance service contracts (e.g., service contracts for elevators, generators, fire protection systems, and building automation systems) at overseas posts. The new process places the responsibility for setting State's budget targets for maintenance service contracts with OBO as opposed to posts and other agencies; other

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<sup>33</sup>BME is a category of cost within Building Operating Expenses (BOE) that is used to capture costs attributable to occupying buildings and grounds. BOE includes costs for facilities maintenance staff, custodial and trash services, fuel, utilities, applicable government assessments and taxes, insurance on real property, and service contracts on building systems (i.e., BME).

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agencies at posts are still required to fund their share of the maintenance service contracts. State made the decision to fund its agency's share of the maintenance service contracts out of existing OBO funding in order to protect the investment made in NECs. According to a senior State official, development of the LROMP, as well as the shifting of responsibilities to OBO for setting funding targets for State's share of posts' maintenance service contracts, should be seen as moving State toward clarifying at least the maintenance requirements for overseas posts.

State's Plan Does Not Provide Planning Time Frames to Implement Projects

While the LROMP has begun to outline maintenance requirements, and does prioritize projects, our analysis of the plan found it does not provide an indication as to when projects would be executed over the 6-year period and the likely implications of delaying projects due to lower-than-anticipated budgets. Rather, the plan outlines the "universe of requirements" of 3,300 potential projects at a cost of nearly \$3.7 billion over a 6-year period. A senior State official acknowledged the plan does not indicate in what specific fiscal years projects are planned to be implemented.<sup>34</sup> He noted that undertaking the first edition of the LROMP was itself a major undertaking and getting posts to identify maintenance requirements was challenging. Without some detail on the planned time frames to implement some of the maintenance projects, for at least the current fiscal year and pending budget year, the usefulness of the plan in supporting State's budget requests is diminished.

State's Plan Does Not Address Increasing Costs to Operate NECs

While the LROMP is a step toward providing insight into the maintenance resources needed to protect the investment in NECs, we found it does not provide insight into operating costs, such as the costs for utilities.<sup>35</sup> In 2007, OBO took action to create a utility database to capture some of posts' annual operating costs as well as posts' energy and water

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<sup>34</sup>One member of OBO's Industry Advisory Panel suggested State consider examining the sequencing of projects relative to other requested projects in a given facility, as it could affect when a building owner (e.g., State) funds and executes projects. For example, he stated that an owner may want to fund projects to replace windows and lighting first before upgrading the building's mechanical plant; otherwise, the owner may overdesign the mechanical components being replaced by failing to have considered performance efficiencies resulting in reduced heating and cooling needs that would be gained by replacing the other two systems.

<sup>35</sup>Executive Order 13327, *Federal Real Property Asset Management* (signed in 2004) established a Federal Real Property Council (FRPC) that requires agencies to report the annual operating costs, among other data, for their real property assets. In 2008, State's Inspector General reported that the Department's reporting of annual operating costs to the FRPC was inaccurate. See ISP-08-34.

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consumption data; however, our review of database reports shows that many posts have reported incomplete or missing data for recent years, including data for some of the NECs we reviewed. OBO prepared a 2009 benchmarking study that may enable State to focus on reducing operating expenses at posts with high costs.<sup>36</sup> However, according to OBO, except for providing posts with first-year operating cost estimates for individual NECs, planning for operations is not an area that OBO officials feel they can address directly, as it is outside OBO's program area of responsibility.<sup>37</sup> State and other agencies at overseas posts are responsible for funding operations through the International Cooperative Administrative Support Services (ICASS) process,<sup>38</sup> while OBO is responsible for funding maintenance. Following State's briefing of the LROMP to its Industry Advisory Panel, one of the panel members representing a leading international facilities management organization commented that he felt that State's plan was missing the "operations piece." He reported that his organization found that building owners must plan for both operations and maintenance and remarked that, while the LROMP does outline future maintenance budget needs, it does not provide insight into future operations costs.

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<sup>36</sup>State's 2009 benchmarking study examined operating and maintenance costs at overseas posts (both NEC and non-NEC posts); however, the study looked at just over 160 posts (out of over 240 posts) due, in part, to data on costs not being reported by some posts.

<sup>37</sup>OBO prepares first-year operating cost estimates for individual NECs based on when an NEC is expected to be completed. Those operating cost estimates are provided to posts and also reported in State's Long-Range Overseas Buildings Plan. In its 2008 review of OBO, State's IG reported that 12 of 17 posts (that took occupancy of an NEC after January 2005) stated that either no estimates were provided, or if they were, the estimates were not accurate. See ISP-08-34.

<sup>38</sup>The funding responsibilities for the NEC operating costs (i.e., BOE) at posts are not an OBO responsibility but rather are shared costs paid by State's regional bureaus, diplomatic security and consular programs, and other government agencies at post through ICASS. OBO staff characterized the ICASS system as providing each agency at post with a vote, which may make it difficult for OBO and the facilities managers to convince the ICASS council to approve the funding for additional maintenance staff.

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## Problems in Commissioning and Transferring the Early NECs from OBO to Post Posed Potential Safety Risks and Hindered Efficient Operations

NECs have presented operations and maintenance challenges for posts due to problems, in part, related to the inspection, testing, and documentation of building systems—recognized in the construction industry and by the federal government as “commissioning.” In 13 of the 22 posts we reviewed, we found problems that were linked, in part, to commissioning. State’s Inspector General identified significant problems with the commissioning process in its 2008 report on OBO’s operations, citing it as the most maligned issue raised by posts with NECs.<sup>39</sup> Officials at NECs report they have had to contend with operational issues, including some systems not functioning properly due to commissioning-related issues. Officials’ concerns regarding commissioning relate to operational issues they have experienced with critical systems, such as NEC cooling, building automation, and fire protection systems. Prior to September 2008, the commissioning agents did not work for State directly, but rather were hired by the construction contractors. Furthermore, we found there were problems when NECs were transferred from OBO to post, such as the facility managers not receiving accurate drawings of the NEC to support maintenance.

## Commissioning of Critical NEC Building Systems Has Been Challenging

At more than half the posts we reviewed, we found problems related, in part, to the commissioning of heating, ventilation, and cooling systems and the building automation systems controlling those systems. For example, in Berlin, Germany, the facility manager told us that, nearly a year after taking occupancy, the embassy’s building automation system has had ongoing operational problems, resulting in it not being able to fully control NEC mechanical systems. He believes these problems should have been identified during commissioning. He further noted that OBO is providing funding for a contractor to continue to work on the programming of the building automation system. In Sofia, Bulgaria, one official noted the building automation system as commissioned and transferred by OBO was not programmed to provide for the most efficient operation of heating and cooling systems and that it took time for maintenance staff to learn how to adjust the system and achieve energy savings by optimizing the system. Similarly, in Yaoundé, Cameroon, officials reported that the building automation system was only recently programmed—nearly 4 years after the NEC was completed—to run the NEC’s cooling system at a reduced level during periods of low occupancy such as during nights and on weekends. Post officials reported this change allowed them to save \$4,000 per month (\$48,000 per year) in utility costs. In addition, the embassy in

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<sup>39</sup>ISP-I-08-34.

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Kathmandu, Nepal, reported that systems were not commissioned for efficient operation and that maintenance staff had to undertake their own efforts to optimize operations of the new chancery's building automation, cooling, and power generator systems, resulting in reduced energy consumption and savings of approximately \$58,000 in electrical energy costs and \$84,000 in diesel fuel costs between approximately November 2008 and May 2009.

Prior to 2009, commissioning responsibilities for fire protection systems resided with OBO's Office of Design and Engineering, rather than OBO's Office of Fire Protection, which is largely responsible for inspections of existing fire protection systems, supporting posts in maintaining those systems, and investigating fires. While OBO's Office of Design and Engineering had fire protection engineers verifying compliance with contract documents in an effort to ensure fire systems were commissioned before NECs were occupied, OBO officials reported those staff engineers did not have the direct authority to prevent occupancy of NECs. Also, while commissioning of fire protection systems may have been conducted before post personnel moved into the NECs, post officials reported many problems with those systems shortly after commissioning, including false alarms, problems with fire alarm panels, and some fire devices (e.g., smoke detectors) not being connected. In its written responses to our questions, OBO's Office of Fire Protection reported that some early NECs were occupied without the correction of critical deficiencies.

In its review of OBO and its survey of overseas NECs, the State IG also reported there were numerous comments about NEC fire systems not being fully ready at occupancy.<sup>40</sup> Embassy officials in Panama City, Panama, reported to us that when post personnel moved into the NEC, the fire alarm system in the warehouse was not hooked up, some smoke detectors were not installed, and the fire alarm panels were problematic. They believe that schedule pressures led to occupying the NEC before issues were fully resolved. Officials at 3 NECs we reviewed told us that OBO's fire engineers, or its contractors, had visited their post to help fix problems that occurred after moving into the NECs.

State's Commissioning  
Approach Lacked  
Independence

State reported that until 2008 the testing and commissioning of NECs was largely an activity controlled by OBO's project director and the construction contractor who employed the commissioning agent, rather

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<sup>40</sup>ISP-08-34.

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than a third-party independent entity working for State. Department of Energy (DOE) federal facilities commissioning guidance states that the use of independent third-party commissioning agents is the most common option used by federal agencies for conducting commissioning.<sup>41</sup> The guidance also states that for large projects with highly sophisticated systems, the savings to the government by employing an independent agent typically outweigh the government's cost to obtain those commissioning services. DOE further reports that using an independent commissioning agent provides an independent judge, with a minimum possible conflict of interest, and avoids instances when contractors perform commissioning activities on their projects and evaluate their own work. Some State officials further stated that the completion of the commissioning tests may have been subject to pressures driven by OBO officials wanting to complete projects on schedule and that in some cases commissioning was not completed before staff moved into the NECs. OBO officials reported that starting in 2008, State generally extended the duration of NEC project schedules by 4 to 5 months, in part, to allow more time for commissioning and transfer activities at the end of projects.<sup>42</sup>

Some posts questioned the independence of commissioning agents that were working for the construction contractor.<sup>43</sup> Officials at the NEC in Managua, Nicaragua, believe that OBO's former commissioning process resulted in many problems that post officials have had to resolve. For example, they said post had to hire a contractor to fix problems with air pressurization controlled by the building's air handling and ventilation system, which they said is due to the incorrect set up of the building automation system. They believe there would have been fewer problems after moving into the building had OBO used an independent

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<sup>41</sup>The DOE, Federal Energy Management Program (FEMP) mission is to facilitate the federal government's implementation of sound, cost-effective energy management and investment practices to enhance the nation's energy security and environmental stewardship. DOE/FEMP prepared: *Commissioning for Federal Facilities – A Practical Guide to Building Commissioning, Recommissioning, Retro-Commissioning, and Continuous Commissioning* (Washington, D.C.).

<sup>42</sup>In previous GAO work examining embassy construction, we found that 7 of 15 State construction contractors reported to us that getting a timely response from OBO on final commissioning approvals was a major or moderate challenge. See [GAO-09-48](#).

<sup>43</sup>OBO officials indicate OBO's construction contracts did call for an "independent" agent to do commissioning; however, because those commissioning services were obtained by the construction contractor under contract to OBO, posts felt those agents were not independent of the construction contractors.

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Several Posts Reported the Transfer of an NEC from OBO to the Post Resulted in a Lack of Information

commissioning agent. In addition, in response to our written questions on what could have been done differently to eliminate operations and maintenance problems that occurred, embassy officials in Belmopan, Belize, indicated that OBO should have hired an independent commissioning agent, which they believe would have resulted in OBO identifying many of the problems that post staff identified on their own after occupying the NEC.

In addition to commissioning issues, we found that at 11 of 22 NECs, transferring<sup>44</sup> of completed facilities from OBO's on-site project director, who managed the construction of the NEC, to posts and their facility managers was not always well coordinated or without problems, resulting in some information—such as preventative maintenance plans, operations and maintenance manuals for building systems, and as-built drawings—either not being turned over to the maintenance staff or being incomplete. In addition, officials at many posts reported that the training for NEC maintenance staff to support effective operations and maintenance activities is inadequate. OBO officials acknowledged there has been a wide variance in the completeness and accuracy of construction contractors' turnover documents. In particular, we found

- 6 of 22 posts had not received preventive maintenance plans;
- 8 of 22 posts did not receive as-built drawings that accurately reflect details of the final construction; and
- 16 of 22 posts thought that the basic familiarization training on new building systems provided by construction contractors to local facilities staff, by itself, is insufficient to fully train staff.

Among the problems reported by post officials were cases when maintenance plans were not fully loaded into the NEC's computerized maintenance management system.<sup>45</sup> As a result of not having complete

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<sup>44</sup>The "transfer" of an NEC is commonly referred to in OBO guidance as the "turnover" of the NEC.

<sup>45</sup>DOE reports computerized maintenance management systems (CMMS) automate many functions performed by facilities staff, such as maintenance work order generation and tracking, inventory control, document storage, warranty management, maintenance management, and tracking costs. DOE reports that benefits of a CMMS include achieving a higher level of maintenance, more efficient use of staff, and maintaining optimal equipment performance to include reducing downtime and extending equipment life. DOE reports that one common pitfall associated with CMMS is inadequate training of staff on the CMMS.

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information about system components (e.g., equipment make and model, required maintenance, and location in the facility), facilities staff at three posts we visited reported staff had to populate the incomplete maintenance databases, an effort that required posts' maintenance staff to populate the databases themselves with information such as the location of equipment, the manufacturer, and the required preventative maintenance that needed to be undertaken on the systems. In Belmopan, Belize, for example, post officials said that wiring diagrams for the building automation system showing the connections between it and the NEC building systems it controlled were not provided with the as-built drawings. As a result, the facilities staff must use a trial-and-error approach to determine how the system is configured, which makes it difficult for them to respond in emergency situations.

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### State Revised Its Commissioning and Transfer Processes for Future NECs, but Issues with Completed NECs Remain

#### State Strengthened Its Processes for Commissioning and Transferring NECs and Made Organizational Improvements

OBO has recognized and taken action to address posts' concerns regarding issues related to past commissioning and turnover of the early NECs. Senior OBO officials emphasize that while they believe that on-site project directors fully enforced contract requirements related to commissioning, there may have been some instances when commissioning by the construction contractor was rushed. In 2008, OBO changed its process for commissioning NECs; OBO now contracts with independent commissioning agents to oversee the commissioning process on behalf of the government and provide a more independent assessment of the testing of building systems than State had in the past. In 2009, in briefing its Industry Advisory Panel, OBO's Director reported there was a disconnect between OBO's on-site project directors, who oversaw construction, and posts' facility managers with regard to expectations on system performance and turnover documentation that resulted in instances of each blaming the other for building systems' problems. In recognition of the organizational disconnect between those constructing the NECs and those maintaining them, the OBO Director combined OBO's Office of Construction Management and its Office of Facility Management under a single managing director to improve communication, coordination, and efficiency related to both commissioning and turnover of completed

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projects from OBO's construction project directors to posts and their facility managers. In addition, given issues with commissioning and maintenance of fire protection systems, OBO's Director removed the fire engineers from OBO's Office of Design and Engineering and assigned them to OBO's Office of Fire Protection. In written comments to us, OBO officials reported those staff engineers did not have the direct authority to prevent occupancy of NECs. According to the director of the Office of Fire Protection, starting in January 2009, that office now has full authority for overseeing commissioning tests of the fire protection systems in NECs and provides the final approval authority on acceptance of those systems prior to issuance of a certificate of occupancy that allows post to move into the NEC. Furthermore, that office is organized so that staff conducting and overseeing commissioning reviews and testing are fully independent of the fire protection engineers who conduct the design and construction reviews of the fire protection systems to support the on-site construction project director. This is to ensure OBO's fire commissioning officials are not pressured by project director concerns related to completion schedules and that they have an independent perspective on the project.

OBO has also made changes to the process it uses to transfer a completed NEC to post. For example, in 2009 it established an NEC Transition Program and a new Transition Division, with the intent to assign an on-site Operations and Maintenance Transition Coordinator—6 months before, and 6 months after an NEC opens—to assist posts, the project director, and the incoming facility manager during the turnover to ensure, among other things, that maintenance staff receive required maintenance manuals, maintenance plans, and as-built drawings. The individual will also serve as coordinator with OBO headquarters to assist post management and the facility manager in resolving contractor punch lists and warranty issues that may still be at issue after a post has moved into the NEC and OBO's project director has departed.<sup>46</sup>

In 2009, OBO also updated its standard operating procedures governing the responsibilities of all parties involved in the transfer of NECs from the project director to the post facility manager and provided additional guidance to smooth the transition process of NECs. OBO officials also reported they now conduct a warranty inspection site visit approximately 8 to 11 months after construction to ensure all warranty-related issues

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<sup>46</sup>A punch list identifies tasks, usually minor, to be completed by the construction contractor at the end of a project.

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Changes to the Commissioning and Transfer Processes Do Not Address Completed NECs

have been addressed before the contractor's 1-year warranty period expires. OBO officials report that NECs that are completed in fiscal year 2010 would be the first set of projects where the changes made to the commissioning process should be evident and result in fewer issues after posts move into the NECs.

While OBO has taken action to change its commissioning process, the changes do not address problems that resulted at NECs completed under the old process. We note that DOE's commissioning guide for federal agencies states that federal facilities should be recommissioned every 3 to 5 years and that the costs associated with commissioning the systems again—effectively a tune-up of the building—will typically be recaptured in about 2 years as the tune-up results in energy cost savings. More than a third of completed NECs are now nearly 5 years old, but OBO has not undertaken any complete recommissioning of NECs despite the many reported issues with some NECs' building cooling, fire protection, and other systems. While OBO has undertaken some limited recommissioning on individual systems—such as systems in Beijing, China; Conakry, Guinea; and Phnom Penh, Cambodia—one official noted that the problems with one system sometimes have linkages to others. Industry commissioning experts cite that, while some building owners (e.g., the federal government) do undertake limited commissioning on existing building systems, focusing on a single system does not typically result in a facility that operates optimally overall; an integrated approach maximizes positive results to ensure the building is operating efficiently and safely.<sup>47</sup> For example, the building cooling system may be affected by electrical power conditioning problems. One OBO management official indicated that he would like State's goal to be to recommission NECs every 5 years but further noted there is no established budget for recommissioning. In our review of State's Long-Range Overseas Maintenance Plan, we found the plan did not include any proposed prioritization, schedule, or costs for recommissioning completed NECs. OBO officials affirmed they are not performing recommissioning on a 5-year basis and do not have a formal plan to recommission NECs.<sup>48</sup>

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<sup>47</sup>Building Commissioning Association, *Best Practices in Commissioning Existing Buildings*, August 18, 2008.

<sup>48</sup>State officials report they anticipate requesting funding for recommissioning NECs in their fiscal year 2012 budget request. OBO officials noted that such a plan would require approval by State and the Office of Management and Budget.

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## Several NECs Had Problems with Building Systems, Including Failures That Disrupted NEC Operations

More than half of the 22 NECs we reviewed have experienced problems with operating critical building systems, which have resulted in the need for projects to repair or replace some systems. The problems involved three building systems, including NEC cooling systems, fire alarm systems, and security doors and windows, and were common across many of the NECs we reviewed. In particular, we found that

- 14 of 22 NECs had problems with their cooling systems—specifically the chillers<sup>49</sup>—not performing as intended, including failing completely;
- 16 of 22 NECs had false alarms or other recurring problems with the fire alarm systems; and
- 16 of 22 NECs had problems with their forced-entry and ballistic-resistant security doors or windows.

These problems, some that should have been caught during commissioning, have caused varying levels of disruption to post operations, ranging from nuisances caused by false fire alarms to substantial disturbance resulting from chiller failures that have caused flooding with damage to property and equipment.

## Posts Have Had Numerous Problems with NEC Building Cooling Systems

According to a 2007 OBO study, NECs have experienced numerous failures with the buildings' cooling systems that are due to problems with the air conditioning chiller units. The report shows that over 100 chillers, installed since 2001, have either failed or experienced serious operating problems. OBO identified 22 completed NECs that have experienced problems that affected the proper operation of the units, including chiller failures. At the NEC in Panama City, Panama, for example, post officials noted that one of the chillers failed on several occasions, resulting in critical spaces being flooded with water used within the cooling system and causing damage to equipment. One post official further noted that to adequately address the problem, major portions of the cooling system had to be redesigned and that OBO is planning to replace the system in 2010. In 2009, OBO funded emergency repairs of two chillers that failed in Conakry, Guinea, at a reported cost of \$250,000. In 2008, State's IG reported that in Abuja, Nigeria, chillers did not work properly for at least 2 years after the post opened. One

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<sup>49</sup>A chiller is a refrigeration system that cools water similar to an air conditioner. Once cooled, chilled water has a variety of applications such as cooling the air within a facility. Two to three chillers, associated piping, cooling towers (if installed), and water pumps make up a typical NEC chiller plant.

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OBO official reported that a new chiller is planned to be installed in Abuja sometime in 2010.

OBO officials identified that most chiller problems are associated with a single manufacturer's units and characterized some problems as "latent defects," meaning that the problems were not detectable at the time of inspection and acceptance. Circuit board burn outs, refrigerant loss or leakage, defective refrigerant valves, and compressor failures have led to failures of the chillers. OBO reports that the manufacturer has addressed some of the problems with the chillers during the one year warranty period. However, our review of OBO reports found that some chillers have been replaced prior to the units' expected useful life, which is estimated to be at least 25 years. Our review found that OBO has already identified a need to replace chillers in Yaoundé, Cameroon (completed in 2005), and Kathmandu, Nepal (completed in 2007). In interviews with OBO, the chief of the mechanical engineering branch reported that OBO is starting to develop a program to replace chillers where critical problems exist; however, OBO does not yet have a clear idea of which posts will definitively need their chillers replaced. OBO's 2007 study estimated the cost to replace a single post's chillers to range from \$500,000 to over \$1 million.

Our review of OBO's study on chillers found OBO's mechanical engineering branch was neither fully involved in the selection and approval of chillers as proposed by the contractor nor the commissioning of building cooling systems. In addition, OBO's mechanical engineering branch chief noted the NEC design specifications for chillers were "not as tight as they perhaps could have been." In some instances, he noted the building cooling systems were oversized resulting in chillers not operating properly. Those issues reveal that some problems State experienced were not due solely to problems with the units but rather were also due, in part, to problems with OBO's internal processes. In addition, both OBO and post officials have reported that local facilities staff at some posts may not have the requisite technical skills to adequately maintain the chillers and could have also contributed to problems posts experienced. An OBO official reported that the design criteria for NECs prior to 2007 allowed contractors to install either water-cooled or air-cooled chillers based on life-cycle cost considerations.<sup>50</sup> They further reported that maintaining

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<sup>50</sup>Two common methods used to provide air conditioning are "water-cooled" chillers that use water towers, recirculated water, and compressors to condense refrigerant fluid, and "air-cooled" chillers that use compressors and fans to draw air over finned coils to condense refrigerant.

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water-cooled chillers is challenging due to technical issues, such as having to treat the water-cooled systems by using potentially hazardous chemicals. In 2007, after learning of the problems that facilities staff had maintaining the water-cooled systems, OBO changed its design criteria to require air-cooled chillers to be installed in future NECs. OBO based its decision on its conclusion that the units are less difficult to operate, in part, due to not having cooling towers to maintain. OBO reported that water-cooled systems will no longer be used in NECs, despite being generally more cost effective with regard to energy use. OBO officials believe there is no case where energy savings of using water cooled chillers would outweigh the costs of maintaining those systems.

In addition to problems with chillers, we found evidence of other issues related to the NECs cooling systems, including temperature control problems, building air pressure issues, condensation on pipes and in ductwork, mold, and inadequate cooling of computer server rooms. Some of the contributing factors include design and installation issues and lack of required preventative maintenance on the systems. (See figs. 13 and 14 for examples of problems we found that are related to the design, installation, operation, or maintenance of the NEC cooling systems.)

**Figure 13: Example of Condensation Causing Mold**



Source: GAO.

Note: Condensation from chilled water piping (left) causes mold to grow on ceiling tiles (right).

**Figure 14: Example of Inadequate Maintenance of Air Supply Diffuser and Cooling Units Added After System Failure**



Source: GAO.

Note: Inadequate maintenance of an air supply diffuser (left) and two supplemental cooling units (right) added by post maintenance staff to the computer server room after the NEC cooling system failed.

## Fire Alarm Systems at Many Posts Have Been Problematic

Several posts we reviewed have experienced false alarms or other repeated problems with operations of their fire alarm systems. These alarms disrupt operations—particularly consular services and classified operations—when post personnel need to cease activities and secure classified materials and workspaces prior to evacuating the building in the event of an alarm. Embassy officials in Sofia, Bulgaria, reported, for example, repeated false alarms during the first 4 years of occupancy that took several visits from OBO and contractor teams to troubleshoot and resolve.<sup>51</sup> In Yaoundé, Cameroon, officials reported they experienced four false alarms per week and that OBO spent \$120,000 on repairs to the NEC fire alarm system.<sup>52</sup> At one NEC, officials said the ambassador would advise people he was meeting with that the NEC fire alarm system had problems and they need not evacuate the building unless the public address system indicated there was an actual fire incident.

<sup>51</sup>Post officials noted that while the situation has improved and alarms have not been triggered recently, the fire panel indicates there is still a problem with the system.

<sup>52</sup>OBO officials reported that both Sofia (fiscal year 2001 contract) and Yaoundé (fiscal year 2005 contract) were two of State's earlier projects.

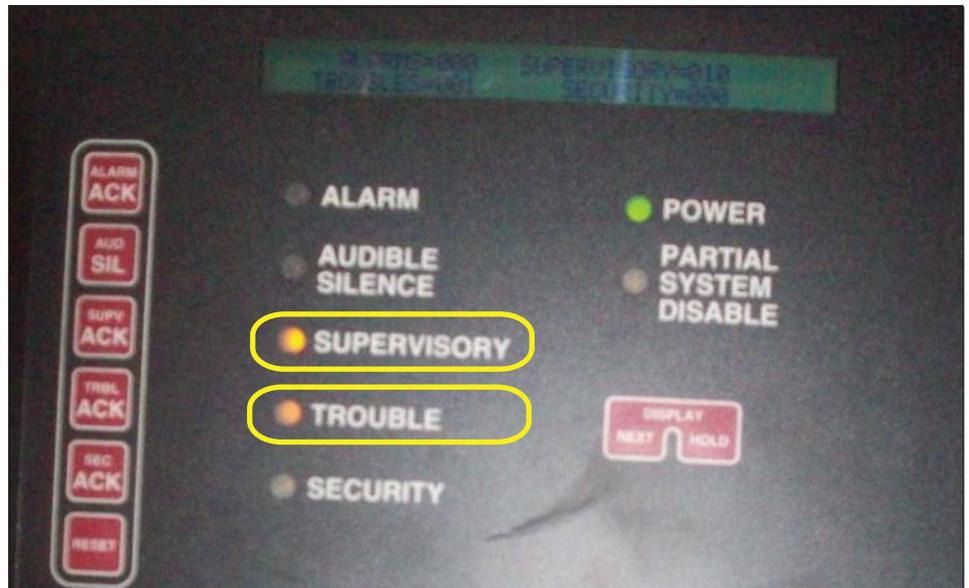
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In addition to false alarms, several NECs have had repeated problems with fire alarm control panels, with illuminated “trouble” or “supervisory” lights, or the sounding of an alarm on the panel that signals a problem with the system.<sup>53</sup> OBO fire officials report that the problems with the fire alarm control panels are related to one manufacturer’s products that are complex to operate and cannot easily be corrected by the maintenance staff because of special tools and programming codes from the manufacturer that are needed to troubleshoot and fix the problems. These alarms can cause disruptions. For example, in Kigali, Rwanda, the General Service Officer who oversees warehouse operations commented that the fire alarm control panel in the warehouse routinely sounds an audible alarm. The alarm is very loud and disturbing to warehouse staff. While the alarm has been reset many times, she noted it has been an issue since the facility was completed in 2008. During our visit, we found the panel had both trouble and supervisory lights lit. Post facilities personnel noted they have been waiting for nearly 8 months for OBO to find a solution. Figure 15 shows the fire alarm control panel at Kigali, Rwanda, which we observed had warning lights indicating a condition in the system that requires attention. Similar trouble and supervisory conditions were found at some of the other posts we visited as well.

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<sup>53</sup>The main fire alarm control panels are typically installed within NEC’s main security post and subordinate panels are installed in other locations like the warehouse. Trouble lights could signify a relatively minor problem with the fire alarm system, like a dirty smoke detector, or a more serious problem such as the loss of power to a smoke detector that may prevent it from working. Supervisory lights are generally more serious indicators of a problem within the fire suppression system such as the fire pump running or a closed sprinkler valve. An audible alarm sounding at the panel gives post personnel another indication that there is a condition within the system that should be examined.

**Figure 15: NEC Fire Panel in Kigali, Rwanda, with Trouble and Supervisory Lights Illuminated**



Source: GAO.

OBO fire officials report that while they assess most problems as being minor in nature, they report there are some problems that are more significant and require extensive troubleshooting by trained technicians. Fixing the problems is complicated by most posts' lack of qualified and experienced staff to perform testing and maintenance of the complex fire protection systems. As a result, OBO staff or contractors must be sent to posts to resolve the problems. In discussions with OBO's fire officials, they noted they are aware of many of the past problems with false alarms and are trying to address them; however, higher priorities to conduct final acceptance testing on NECs under construction has slowed their ability to respond to the problems as quickly as they would like.

### NEC Security Doors and Windows Had Problems and Replacements Are Under Way

More than half the posts we reviewed have encountered problems with their security forced-entry and ballistic-resistant doors and windows, including problems with doors malfunctioning and window glass cracking. State officials reported, as the NEC program grew and the demand for security doors and windows increased, recurring problems with the doors and windows became evident as projects were completed. Problems with doors and windows relate to a combination of design, manufacturing, and installation defects. For example, doors used in early NECs were fitted with hinges that were incapable of supporting the door's weight and prone

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to premature failure, especially in high-traffic areas such as main lobbies and the consular applicant waiting areas. Doors installed at NECs built prior to 2005 also presented maintenance challenges because their design specifications did not adequately allow for adjustment to keep doors properly aligned in relation to the door frame and building structure. State has revised its specifications to ensure the doors are installed correctly and that they allow for future adjustment to properly maintain the doors. Similarly, windows used at early NECs exhibited manufacturing defects that contributed to their cracking, especially in locations with high temperatures. Also, because some contractors were not experienced with these products, doors and windows were not always installed correctly, and as a result, did not operate properly after the facilities were occupied.

While OBO expects fewer problems with security doors and windows in the future because of improvements made to design specifications, manufacturing processes, and installation techniques, it is systematically managing efforts to repair or replace defective doors and windows at several existing NEC locations.<sup>54</sup> For example, in Yaoundé, Cameroon, OBO reports that it funded a project to replace 24 doors at a cost of approximately \$840,000. In Kathmandu, Nepal, 30 windows cracked shortly after the NEC opened in 2007, and post officials report OBO is planning to replace them. Going forward, our review shows that OBO plans to repair or replace security doors and windows in at least 16 additional NEC locations at a total estimated cost of \$25 million (see figs. 16 and 17).<sup>55</sup> While some replacements are reported by OBO officials as being driven by an increase in the security standards since the NECs were completed, it is unclear the extent to which replacements are also due to poor performance of those products or deficiencies in the design criteria for the doors in early NECs.<sup>56</sup>

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<sup>54</sup>Some doors and windows have been replaced under warranty at contractors' expense, while others have been replaced via follow-on projects at government expense.

<sup>55</sup>Estimated costs are based on data within OBO's Long-Range Overseas Maintenance Plan, for fiscal years 2010 to 2015.

<sup>56</sup>In 2006, the security requirements for Marine Security Guard Quarters were strengthened. In 2007, the security requirements for Compound Access Control facilities were strengthened.

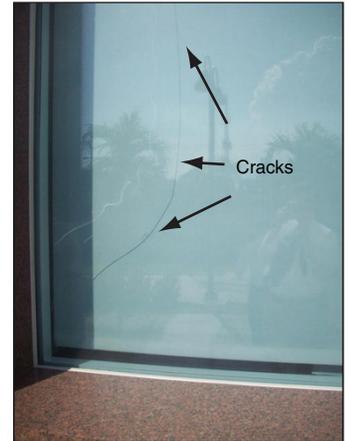
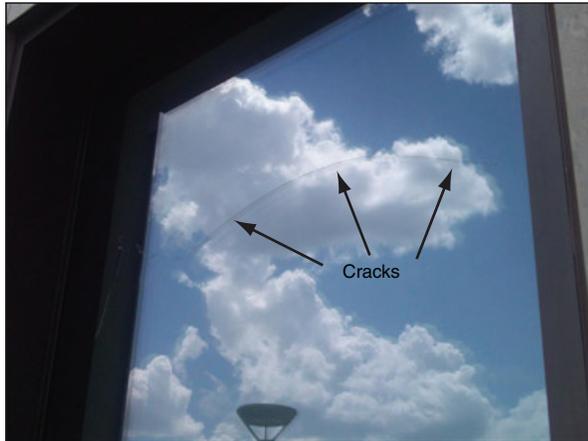
**Figure 16: NEC Sofia, Bulgaria**



Source: GAO.

Note: New security doors being installed (left) and old security doors removed (right) at the time of our visit.

**Figure 17: NECs Kigali, Rwanda, and Port-au-Prince, Haiti**



Source: GAO.

Note: Cracked security windows at NEC Kigali, Rwanda (left), and Port-au-Prince, Haiti, prior to 2010 earthquake (right) at the time of our visits.

## State Has Taken Steps to Avoid Future Problems with Building Systems

As previously discussed, State has a lessons learned process that examines issues and problems with past projects so as to inform future designs of NECs. OBO officials have acknowledged the numerous issues posts reported, such as problems with building cooling systems, fire alarm panels, and security doors and windows. We found that OBO has taken action to change the SED design and contract requirements that govern future NECs with regard to all three of those building systems. Table 5 outlines some of the changes that have been made through the lessons learned program to avoid the problems that exist with the underperformance or failure of building systems in earlier NECs; however, due to the time required to contract and construct NECs, it typically takes 4 years before these changes are evident in completed NECs. While changes to SED design criteria for future projects do not resolve problems with completed NECs, interviews with OBO officials and our review of State’s LROMP show evidence that OBO is trying to address some of the problems with chillers and security windows and doors through planned replacement projects, a few of which have already been completed. OBO fire officials are also working with posts to develop maintenance contracts to assist in troubleshooting maintenance problems with NEC fire alarm systems.

**Table 5: Changes Made by State to the Standard Embassy Design to Avoid Problems with Building Systems on Future NECs**

<b>Problem area</b>	<b>Selected actions taken</b>	<b>Fiscal year implemented<sup>a</sup></b>
Building cooling systems	Changed requirements to require contractors to provide only air-cooled, rather than water-cooled, chillers. OBO staff report that while less energy efficient, air-cooled chillers will be easier to operate and maintain and will reduce water consumption.	2007
Fire alarm control panels	Changed the requirements for fire alarm panels, removing language that may have restricted contractors to procuring units from one manufacturer. OBO staff report that other manufacturers’ units may be less difficult to maintain.	2008
Security doors and windows	Instituted a Government Procured Equipment program for security doors and windows with the intent to improve performance of those products in more recent NECs. Modified requirements to require contractors to provide a certified installer to train installation crews on job sites.	2005

Source: GAO analysis of State information.

<sup>a</sup>While changes to the design requirements have been made, due to the time required to contract for and construct NECs, it typically takes 4 years before results are evident in completed NECs.

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## State Faces Challenges in Hiring and Training NEC Facilities Staff and Lacks a Plan to Fully Address Challenges

State has experienced problems in hiring U.S. Foreign Service facility managers and the locally employed maintenance staff that possess needed technical skills to operate and maintain the NECs. In addition, the local maintenance staff need more training on operating the sophisticated NEC building systems. As a result, facilities may be operating suboptimally and important maintenance activities may be compromised, leaving NECs at risk of not performing as expected. We found that State's LROMP does not identify costs or a schedule to address the training needs of local maintenance staff to ensure the investment in NECs is protected. If State cannot hire enough facility managers and local maintenance staff with the technical skills and qualifications needed to understand the NEC building systems and also train the local facilities staff responsible for operating and maintaining those sophisticated systems, State puts at risk the investment made in those NECs, the safety of the people operating and working in the facilities, and the ability of U.S. government employees to conduct their work.

## State Faces Challenges Hiring Qualified U.S. Foreign Service Facility Managers and Local Maintenance Staff

State officials reported that, based on sophisticated building systems installed in NECs, State's hiring criteria needed to be strengthened for U.S. facility managers and, further, hiring appropriate staff has proven to be a slow process. Specifically, State now requires that newly hired facility managers have a degree in facilities management or a related engineering field. OBO currently has approximately 170 facility managers, of which approximately 145 are assigned to overseas posts and some facility managers have regional duties supporting more than one post; however, to meet its intent of placing specially qualified facility managers at every large embassy and consulate worldwide, OBO is undertaking a long-term recruitment and hiring effort. OBO officials reported a goal to hire 20 facility managers in fiscal year 2009, 20 in fiscal year 2010, and 24 total for fiscal years 2011 to 2015.<sup>57</sup> However, OBO has fallen short of achieving its hiring goals. In fiscal year 2009, for example, OBO reported that it hired 11 facility managers (i.e., just over half of its goal), and as of May 2010, OBO had hired a total of 6 facility managers relative to its fiscal year 2010 goal of 20. Some of the challenges and delays in hiring were due to the process

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<sup>57</sup>OBO officials report that they estimate the average cost for hiring an additional overseas facility manager is approximately \$330,000 annually. Costs generally include salary, benefits, overseas housing costs, travel and moving expenses, training, and education allowances for dependents. Based on OBO's stated goal of hiring 20 additional facility managers in fiscal year 2009, that added cost would amount to \$6.6 million annually for just those additional U.S. facility managers. Costs for State's overseas facility managers are directly funded by OBO and not by posts or ICASS.

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of developing new position descriptions that require facility managers to have a degree in facilities management or a related engineering field, and working with State's human resources department to get those new qualifications requirements approved.

Overseas posts are responsible for hiring locally employed maintenance staff and sometimes face challenges hiring individuals with the technical skills and experience required to operate NECs' complex systems. OBO officials report a key issue with NEC maintenance, which they believe has contributed to the problems with some systems, is that posts have not been able to hire appropriately qualified local staff. OBO provides individual posts with a recommended maintenance staffing plan and advises posts that, because NECs are large and have sophisticated building systems, posts should be prepared to hire additional staff to properly support the maintenance needs when an NEC opens. State's IG, in surveying posts with NECs about whether they had hired the required maintenance staff, found that several did not hire the required maintenance staff due to budget constraints or had not hired them by the time the NEC initially opened.<sup>58</sup>

As noted previously, local staffing costs at NECs increased by approximately \$200,000, on average, at 10 posts we reviewed because of the need to hire additional local maintenance staff.<sup>59</sup> State's Inspector General reported that the level and quality of maintenance services appears to be determined by available ICASS funds rather than need, and a few posts reported concerns that ICASS budgets did not keep pace with increased NEC staff needs. Some posts also reported that it can be difficult in some less developed countries to find qualified maintenance technicians to hire. OBO officials reported to us that part of the reason why posts face problems hiring local maintenance staff in a timely manner is these additional positions must be approved by other agencies located at the post through ICASS. OBO officials also indicated that in some cases, the salaries needed to get qualified technical staff—such as a building automation operator—have created difficulties for posts when it would require paying the new hire more than senior local staff in other offices within the embassy.

To address hiring challenges related to facility manager positions, OBO officials report they are reaching out to industry facilities management

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<sup>58</sup>ISP-I-08-34.

<sup>59</sup>Costs for locally employed facilities staff are funded through ICASS as a shared cost paid by State and other federal agencies.

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State Faces Challenges in  
Training Maintenance Staff to  
Operate and Maintain the NECs

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associations and universities to increase the number of potential applicants that apply for the positions. As we reported, State did not meet its fiscal year 2009 goal for hiring new facility managers and may not meet its goal for fiscal year 2010. Starting in 2009, OBO reports that the new Operations and Maintenance Transition Coordinators assigned to each project will assist posts' management officials in hiring additional local maintenance staff as needed; however, OBO officials reported that the approval and hiring of local facilities staff, to include setting salaries, remains an ICASS decision and is not under OBO's control.

State officials report that prior to 2008, the department had not focused on training and career development needed for its facilities maintenance personnel. While State had provided training in the areas of management and leadership for facility managers, there was no formal training program available that provided technical training on the sophisticated NEC systems and State policies governing overseas facility management in an embassy environment. In addition, there were no training programs for local maintenance staff. State has started to take action to address some of the challenges, but OBO officials report those actions will not fully address the needs of local maintenance personnel. In 2008, OBO developed a training program for State's facility managers. Unlike local maintenance staff, OBO officials report they are directly responsible for training and career development for facility managers. OBO officials recognized the need to provide more training for facility managers and report that newly hired facility managers now attend courses at the Foreign Service Institute and receive specialized training in areas such as (1) building automation systems; (2) heating, cooling, and ventilation systems; and (3) fire protection systems. In addition, facility managers receive training on overseas facilities management related to specific State regulations governing maintenance budgets and the maintenance protocols for classified areas.

Training of the local maintenance staff remains a problem.<sup>60</sup> As noted earlier, the basic familiarization training provided by the NEC construction contractor during the time of commissioning and prior to transfer is not sufficient by itself to fully train the local maintenance staff on the building

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<sup>60</sup>State reports that the facility manager courses are available to locally employed staff on a space available basis but that the first priority is newly hired facility managers. According to a State official, the Foreign Service Institute will initiate additional sessions if the number of waitlisted requests justifies the need. However, funding to pay for the costs of travel and training of posts' local staff may still need to be identified.

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systems. As a result, operation of building automation systems, in particular, has been challenging for posts. Our review of OBO reports and interviews with posts show that 14 of the 22 NECs we reviewed encountered problems with operating building automation systems.<sup>61</sup> For example, embassy officials in Kigali, Rwanda, report that personnel will have difficulty learning enough programming on the system to facilitate programming replacement components in the event the original components fail; they report that emergencies may not enable post to wait for a service contractor or OBO to travel to post to troubleshoot or fix problems. One of State's contractors noted that sufficiently operating and maintaining the building automation system is challenging, since it requires training and knowledge of both mechanical engineering and advanced computer programming. He reported that at some NECs he finds sensors, controllers, and equipment that have been shut off by facilities staff who have not had adequate training on the systems and may not understand the implications when components are merely turned off. For example, shutting a component down may restrict fresh air being provided to a closed office.

We found that State's LROMP does not identify needed resources and costs to meet the training needs of local maintenance staff at NECs. OBO officials recognize that NEC building systems require extensive training to operate. OBO officials also recognize that if the local maintenance staff are not trained properly, the condition and operation of the NECs will be affected; however, OBO officials report they do not receive funding to train overseas maintenance staff, as it is an ICASS responsibility. Regardless, in 2009, OBO took some initial action to address some of the training deficiencies of local maintenance personnel and reported that it would be providing posts' local staff with access to online training in areas such as water and wastewater treatment, environmental security protection systems, building automation systems, and work order management. However, two of these courses came online only recently and one is still in development; therefore, the action is too recent to assess in terms of the number of staff trained and the effectiveness of the training.<sup>62</sup> OBO officials also reported that they have just begun

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<sup>61</sup>DOE reports that building automation system operators must be fully trained on the system's capabilities in order to optimize and realize energy efficiency of the new system and that refresher training is needed.

<sup>62</sup>In May 2010, State officials reported that development of online facilities training for work order management and environmental security protection systems was completed and is now available to overseas posts staff.

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discussions with a facility management training provider to explore if they can develop facility maintenance courses that could be made available to posts' local staff. Again, the actions are too recent to assess in terms of their effectiveness.

According to State officials, they are trying to compensate for the lack of technical skills of the local staff through the use of regional maintenance programs and posts' maintenance service contracts;<sup>63</sup> however, that may not be the most cost-effective solution. For example, State's IG reported that the U.S. embassy in Abidjan, Cote d'Ivoire, did not have trained personnel to maintain the critical elements of the NEC's heating and cooling systems and that post had to bring in a contractor from South Africa for emergency repairs at a cost of about \$9,000 per visit. OBO officials reported they are exploring the idea of making use of OBO's facility managers to act as trainers to control costs as OBO does not have dedicated funding to train posts' local maintenance staff. According to OBO officials, some of OBO's efforts to provide more training to local maintenance staff are being funded out of existing NEC project funds. Starting in 2009, OBO began to set aside 0.1 percent of NEC project funding—which would equate to \$100,000 on a \$100 million NEC project—to provide additional training, but OBO officials acknowledged it alone will not be sufficient to fully train local maintenance staff. OBO officials further noted that, while ICASS should normally fund the training of local staff, OBO is funding what it can to try to address some of the local staff training needs.

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## Conclusions

State has built 52 NECs that are more secure, safe, and functional for U.S. government personnel working overseas. Constructing such facilities that meet stringent requirements, such as building codes, security standards, and energy-efficiency goals, has been a significant undertaking requiring billions of dollars and sustained effort over nearly 10 years. However, State has encountered a number of challenges in building NECs that are the appropriate size for immediate and long-term staffing levels and in planning for the increased operational and maintenance needs of these new, technologically sophisticated buildings. As a result, State has had to build additional office space at some locations, and may need to construct more, and has also faced higher operating, maintenance, and repair costs.

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<sup>63</sup>State's International Maintenance Assistance Program and its recently created African Regional Maintenance Program (ARMP) dispatch maintenance contractors to support overseas posts maintenance needs. ARMP is uniquely focused on support for 15 NEC posts in Africa.

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Currently, the process to determine the size of an NEC does not allow enough flexibility to ensure that NECs have sufficient space to accommodate staffing changes related to ever-shifting foreign policy priorities. State has not analyzed post-specific characteristics in completed projects that have been associated with rapid staff growth, such as geographic location, nor have officials been able to explain the analytical basis for determining the amount of growth space to include in building an NEC. In addition, overseas officials have found that the design of some spaces does not fully meet functional needs. While State has been able to identify and address certain design issues, identifying these design problems earlier, by, for example, conducting timely post-occupancy evaluations in accordance with State's plans, is crucial to avoid similar problems in future NECs. Since State expects NECs to support U.S policy efforts for several decades, it is important that the facilities are large enough to safely and securely house the changing number of overseas staff in a manner in which staff are able to effectively carry out their missions.

State has not fully addressed the increased operations and maintenance requirements of the more technologically sophisticated NECs. Problems with commissioning and transferring the NECs from the contractors to the posts have resulted in some building systems that do not function as they should and led to added costs to repair and replace systems, contributed to higher operating costs, and created potential safety risks for staff. State has made changes to building design requirements to avoid future problems with NEC building systems. However, since changes can take at least 4 years to materialize in completed NECs, due to time to contract for and construct NECs, the changes are too recent to assess. State does not have a formal plan to recommission, or retest, the building systems at NECs that have already been completed. Recommissioning NECs would help ensure that the systems operate as efficiently as possible and that the problems with building systems are being fully addressed. State's recent LROMP outlines—for the first time—NEC maintenance costs over a number of years and identifies the need for improvements in future editions, but it does not establish a time table for when specific projects should be completed which would help to further strengthen the planning process. In addition, the LROMP is focused solely on maintenance costs and does not address operating costs, resulting in an incomplete assessment of all costs associated with the functioning of NECs. Finally, without a plan that comprehensively outlines all human resources required to operate and maintain NECs, including identifying hiring and training needs, State will have difficulty ensuring NECs operate in an efficient and cost-effective manner. As State continues building NECs and strives to maintain those already constructed, addressing these challenges is important to provide

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U.S. employees with a secure and dependable working environment and ensure that State protects the country's investment in these facilities.

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## Recommendations for Executive Action

In order to strengthen the operations of the extensive U.S. program that provides for new embassy compounds around the world, we recommend that the Secretary of State take the following six actions.

- Take steps to improve the process for determining the appropriate size for an NEC, including reassessing the analytical basis for projecting future staffing levels and determining how much growth space is allocated.
- Ensure that OBO conducts post-occupancy evaluations of completed NECs as planned.
- Develop a plan to recommission those NECs completed before 2008 to, for example, resolve any problems posts may still have with building systems, and ensure that the operating costs are not being incurred unnecessarily as a result of building systems that are not operating as efficiently as intended.
- Identify time frames for implementing the maintenance projects that are outlined in the LROMP.
- Expand on future editions of the LROMP to include reporting on operating costs to allow for a more complete assessment of the costs to maintain and operate NECs.
- Develop a human resource plan that addresses the requirements and cost implications for hiring required NEC facilities maintenance staff and sufficiently training the local maintenance staff.

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## Agency Comments

We received written comments on a draft of this report from the Department of State. State said that the report contains helpful input about its program to build NECs which State will use to further its efforts to improve the efficiency and effectiveness of its operations. State concurred with our principle findings, conclusions, and recommendations. For example, State wrote it will work to identify time frames for implementing the LROMP maintenance projects, develop a system to compile and report on operating costs, and undertake human resource planning to hire and train local maintenance staff. State further outlined specific actions that begin to address our recommendations in a few instances. For example, State said it is currently conducting post-occupancy evaluations at three

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posts and plans to evaluate at least six more by the end of 2010. In addition, State said it is conducting two pilot recommissioning studies, and plans to conduct two more studies in fiscal year 2011 if funding is available. State provided additional clarifying and technical comments on a number of points, which we have incorporated throughout the report, as appropriate. Many of State's comments we had already acknowledged in our report. State's complete comments, along with our responses to specific points, are reprinted in appendix II.

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We are sending copies of this report to interested congressional committees. We are also sending copies of this report to the Secretary of State. In addition, this report will be available at no charge on the GAO Web site at <http://gao.gov>.

If you or your staff have any questions about this report, please contact Jess T. Ford at (202) 512-4268, [fordj@gao.gov](mailto:fordj@gao.gov), or Terrell G. Dorn at (202) 512-6923, [dornt@gao.gov](mailto:dornt@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Other GAO contact and staff acknowledgements are listed in appendix IV.



Jess T. Ford  
Director, International Affairs and Trade



Terrell G. Dorn, PE  
Director, Physical Infrastructure

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*List of Requesters*

The Honorable John F. Kerry  
Chairman

The Honorable Richard G. Lugar  
Ranking Member  
Committee on Foreign Relations  
United States Senate

The Honorable Howard L. Berman  
Chairman

The Honorable Ileana Ros-Lehtinen  
Ranking Member  
Committee on Foreign Affairs  
House of Representatives

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# Appendix I: Scope and Methodology

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The objectives of this report were to examine (1) the extent to which new diplomatic facilities match the space and functionality needs of overseas posts and the actions State has taken to address any space and functionality challenges; and (2) operations and maintenance challenges at these new facilities and State's steps to address them.

Our scope included new facilities at 44 posts that State's Bureau of Overseas Buildings Operations (OBO) refers to as New Embassy Compounds (NEC), New Consulate Compounds, and New Office Buildings. In addition, we included any facility OBO refers to as a Newly Acquired Building if the purchase and renovation of such a facility were intended to locate all U.S. government employees at a new and single location.<sup>1</sup> We included all posts for which construction began in or after fiscal year 1999 and were completed by September 30, 2009.<sup>2</sup>

To obtain information on space, functionality, and operations and maintenance challenges identified at NECs within our scope, we reviewed State's 2008 Revalidation Look Back Study, which identified issues and problems, as well as successes, with regard to the planning, design, construction, and maintenance of the new facilities. The study took place between August and October 2008 and identified 23 challenges as frequently occurring throughout completed NECs. We also conducted interviews with officials at OBO and State's regional bureaus and reviewed other documentation, including the State Inspector General's (IG) inspection of OBO,<sup>3</sup> IG post inspection reports; posts' responses to a March 2008 IG

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<sup>1</sup>In this report, we use the term NEC to universally include NEC, New Consulate Compound, New Office Building, and Newly Acquired Building projects.

<sup>2</sup>The following posts that met our definition of an NEC were excluded from our review: 1) Posts, such as Doha, Qatar, where construction began and/or funding was provided before 1999; 2) Embassies Baghdad, Iraq and Kabul, Afghanistan, where operations are not reflective of normalized post operations and/or funding was obtained entirely through supplemental appropriations; 3) Facilities referred to by OBO as Standard Secure Mini Compounds (SSMC) or unique, small compounds that were precursors to the SSMC design (Koror, Palau and Kolonia, Federated States of Micronesia); and 4) NECs in which the post moved into the new facilities after September 30, 2009 (Ouagadougou, Burkina Faso; Antananarivo, Madagascar, and Khartoum, Sudan). Additionally, we excluded posts in Lima, Peru; Athens, Greece; Bogota, Columbia; and Tirana, Albania where annexes were built on or adjacent to facilities built prior to 1999; and an Interim Office Building in Dili, Timor-Leste.

<sup>3</sup>United States Department of State and the Broadcasting Board of Governors Office of Inspector General, *Report of Inspection: Bureau of Overseas Buildings Operations*, ISP-I-08-34, (Washington, D.C., August 2008).

satisfaction survey; posts' lessons learned cables; rightsizing reports; and post-occupancy evaluations of some completed projects.

To obtain more detailed information on space, functionality, and operations and maintenance challenges, we reviewed 22 NECs, or one-half of the posts within our scope, in greater depth. We selected these posts based on interviews with regional bureau officials, reviews of rightsizing reports and 2008 staffing data, OBO and OIG reports on embassy operations and maintenance issues, OBO's Revalidation Look Back study, and past GAO reviews of the NEC program. In addition to selecting posts with many identified space, functionality, and operations and maintenance problems, we also selected some posts with few identified problems to be able to analyze a range of experiences. Geographical diversity of posts and project type<sup>4</sup> were also factors in determining which posts to contact.

Of the 22 posts we reviewed in greater depth, we conducted site visits at 8 posts and conducted teleconference interviews with 14 posts. In addition to contacting officials at each post, we interviewed officials at the regional bureaus in Washington to obtain information on space, functionality, and operations and maintenance challenges at posts that we were unable to contact, as well as to gain further insight on how these challenges affect their respective regions as a whole.

Table 6 lists all 44 NECs within our scope and identifies those we visited or interviewed via teleconference.

**Table 6: Locations of 44 NECs within GAO's Scope**

<b>Region</b>	<b>New Embassy Compound</b>
Africa	Abidjan, Cote d'Ivoire
	<b>Abuja, Nigeria</b>
	<b>Accra, Ghana</b>
	Bamako, Mali
	Brazzaville, Republic of the Congo
	Cape Town, South Africa
	Conakry, Guinea
	Dar es Salaam, Tanzania
	Freetown, Sierra Leone

<sup>4</sup> Project type refers to the type of design and construction contracts, such as design-bid-build or design-build, which may make use of a standard embassy design.

Region	New Embassy Compound
	Johannesburg, South Africa <i><b>Kampala, Uganda</b></i> <i><b>Kigali, Rwanda</b></i> <i><b>Lome, Togo</b></i> Luanda, Angola <i><b>Nairobi, Kenya</b></i> <i><b>Yaoundé, Cameroon</b></i>
East Asia and the Pacific	<i><b>Beijing, China</b></i> <i><b>Phnom Penh, Cambodia</b></i> <i><b>Rangoon, Burma</b></i>
The Americas	<i><b>Belmopan, Belize</b></i> Bridgetown, Barbados Ciudad Juarez, Mexico Kingston, Jamaica <i><b>Managua, Nicaragua</b></i> <i><b>Panama City, Panama</b></i> <i><b>Port-Au-Prince, Haiti</b></i> Quito, Ecuador Sao Paulo, Brazil
Middle East and North Africa	Abu Dhabi, United Arab Emirates <i><b>Algiers, Algeria</b></i> Tunis, Tunisia
South and Central Asia	<i><b>Astana, Kazakhstan</b></i> Dushanbe, Tajikistan <i><b>Kathmandu, Nepal</b></i> <i><b>Tashkent, Uzbekistan</b></i>
Europe and Eurasia	<i><b>Berlin, Germany</b></i> Bern, Switzerland <i><b>Frankfurt, Germany</b></i> Istanbul, Turkey Skopje, Macedonia <i><b>Sofia, Bulgaria</b></i> <i><b>Tbilisi, Georgia</b></i> Yerevan, Armenia Zagreb, Croatia

Source: GAO.

Note: GAO visited or interviewed the 22 bolded, italicized posts.

To assess the extent to which initially constructed desk space matched posts' current desk space needs, we compared State data on the number of desks originally built at each post with current authorized collocated desk positions, as reported in each post's 2009 submission of staffing data for the purposes of determining each overseas agency's charges for the Capital Security Cost Sharing program for all 44 posts within our scope. We interviewed knowledgeable State officials and reviewed our analysis with the 22 posts we interviewed, OBO, and each of the regional bureaus and determined that both data sources were sufficiently reliable for our purposes. However, we identified a few limitations to our analysis, including: (1) in a small number of cases, current staffing data for other agencies, particularly the U.S. Agency for International Development, may not be completely accurate; (2) the data are based on a single point in time and subsequent changes may have occurred that altered the conditions at posts; (3) the as-built data may not have captured all changes made during construction and do not include planned growth space; and (4) the current staffing data report authorized positions representing the post's total need if all positions were filled, but some positions may not be filled. However, our checks found only a small number of inaccuracies in either source, most of which, in our judgment, had little impact on our overall findings. In addition, we interviewed officials at State's Office of Management Policy, Rightsizing, and Innovation (M/PRI) and OBO to discuss their respective roles in planning for the space needs of NECs.

To examine functionality challenges, we asked officials at the 22 posts we contacted open-ended questions about functionality concerns. We then summarized functionality challenges that were commonly identified during our interviews and site visits. These ranged from the amount of controlled access and noncontrolled access space available at NECs to issues with the NEC's quality-of-life facilities. Our methodology may not have captured all challenges experienced at all of the posts we reviewed, as post officials might have only reported the challenges they deemed to be most significant.

To analyze challenges found in operating and maintaining NECs, we quantified common challenges found across the 22 posts we contacted, based on officials' responses to open-ended questions in our interviews and site visits, as well as our review of documentation, including State IG reports and the Revalidation Look-Back study. These challenges ranged from problems with forced-entry and ballistic-resistant doors and windows to the process of turning over the NEC from the construction contractor and OBO to the posts. Our methodology may not have captured all challenges experienced at all of the posts we reviewed, as post officials

might have only reported the challenges they deemed to be most significant.

In addition, we analyzed operations and maintenance cost data from 10 NECs opened in fiscal years 2007 and 2008. We asked officials to provide fiscal year 2009 data on operating expenses (e.g. cost for utilities such as electric, gas, water, and sewer as well as other costs like grounds keeping and janitorial services), costs for maintenance service contracts (e.g. elevator service contract), and the cost of hiring additional facilities maintenance staff (e.g. building automation system operator) for the NEC. We also asked for data on each of these expenses for the last full fiscal year in which the post operated from its previous facilities. Because these NECs were completed recently, inflation and other time-related issues, such as price changes, did not play a significant factor in our comparison of 2009 costs at the NECs with the last full year of operation in the previous facilities, and thus the reported cost are not adjusted for inflation or currency fluctuations. We discussed potential discrepancies in the data with post officials and tested the data for internal consistency. Although in some cases, posts may or may not have included utilities costs for leased facilities, we determined that unreported utility costs for leased facilities would not materially impact our findings. We determined the data were sufficiently reliable for the purpose of demonstrating that the operating costs of the 10 NECs were substantially higher than the costs of the facilities they replaced.<sup>5</sup> Due to concerns about OBO having complete and accurate data on posts' expenses, we obtained the cost data directly from posts.

Finally, to identify actions State has taken to address space, functionality and operations and maintenance challenges, we interviewed State officials at OBO, the regional bureaus, and M/PRI. In addition, we reviewed documentation of programs or initiatives that State has developed to address identified challenges.

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<sup>5</sup>OBO officials report that the maintenance of older facilities may not have been fully funded at appropriate levels and that there might not have been such a large cost increase with the NECs if the old facilities had been properly maintained.

# Appendix II: Comments from the Department of State

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



United States Department of State

Chief Financial Officer

Washington, D.C. 20520

**JUN 28 2010**

Ms. Jacquelyn Williams-Bridgers  
Managing Director  
International Affairs and Trade  
Government Accountability Office  
441 G Street, N.W.  
Washington, D.C. 20548-0001

Dear Ms. Williams-Bridgers:

We appreciate the opportunity to review your draft report, "NEW EMBASSY COMPOUNDS: State Faces Challenges in Sizing Facilities and Planning for Operations and Maintenance Requirements," GAO Job Code 320750.

The enclosed Department of State comments are provided for incorporation with this letter as an appendix to the final report.

If you have any questions concerning this response, please contact Christina Maier, Program Analyst, Office of Overseas Buildings Operations at (202) 875-5752.

Sincerely,

A handwritten signature in black ink, appearing to read "James L. Millette".

James L. Millette

cc: GAO – Jess Ford  
OBO – Adam Namm (Acting)  
State/OIG – Tracy Burnett

Department of State Comments on GAO Draft Report

**NEW EMBASSY COMPOUNDS:**  
**State Faces Challenges in Sizing Facilities and Planning for Operations and**  
**Maintenance Requirements**  
**(GAO-10-689, GAO Code 320750)**

**Introduction**

The Department of State appreciates the opportunity to review the subject draft report. Overall, the report contains helpful input about the Department's on-going Capital Security Construction Program to build New Embassy Compounds (NECs) and New Consulate Compounds (NCCs). We will use GAO's findings to further our efforts to improve the efficiency and effectiveness of the Department's operations. We offer the following comments:

**Construction Progress**

The Department is pleased that GAO acknowledges State's progress in constructing NECs, NCCs, and annexes – 72 since 2001 – and moving over 21,000 staff into safer, more secure, and functional facilities. GAO also reiterates the findings of a State Office of Inspector General study where posts with NECs praised their design, space, and security, and found NECs to be a dramatic improvement over older facilities.

**Other Comments**

**Planning for Maintenance:** The Bureau of Overseas Buildings Operations (OBO) believes it has made measurable progress in planning for maintenance and operations since GAO's 2006 study.<sup>1</sup>

In March 2010, OBO issued the first Long-Range Overseas Maintenance Plan (LROMP). The inaugural LROMP is a comprehensive strategic planning document, focused on the management of \$3.7 billion in deferred and planned maintenance, repair, and rehabilitation needs. The plan aims to ensure the \$10+ billion invested in constructing new facilities since 2001 is protected through

<sup>1</sup> *Embassy Construction: State Has Made Progress Constructing New Embassies, but Better Planning Is Needed for Operations and Maintenance Requirements*; GAO-06-641, June 30, 2006

proper maintenance as well as ensure legacy facilities not planned for replacement receive appropriate maintenance and operations funding. The LROMP identifies post-by-post prioritized needs for more than 3,500 projects and is a companion publication to the Long-Range Overseas Buildings Plan (LROBP).

We have also accomplished the following:

- Studied and refined our estimates of future NEC operating costs;
- Enhanced the qualifications needed to become a Facility Manager (FM), including requiring an engineering or facility management degree;
- Instituted a new training curriculum for FMs at the Foreign Service Institute;
- Hired 11 new FMs who have completed the new curriculum, 6 are currently enrolled, 20 will begin class in August 2010 and there are 10 slots for a class in March 2011;
- Realigned the FM reporting structure at post in that FMs now report to management;
- Developed on-line training courses for locally employed maintenance staff at post and are developing an augmented, blended learning program;
- Improved our NEC staffing studies to provide post with guidance on hiring and training appropriate staff to maintain the NECs;
- The Lessons Learned Program has shortened the period for including changes into the program; and
- Adjusted the parametric model for estimating costs by including FY 09 construction award and project closeout data.

While the Department realizes that there is still room for improvement in our maintenance planning, we believe we have made substantial progress in this area. We will work to address GAO's recommendations on identifying time frames for implementing the LROMP maintenance projects, developing a system to compile and report on operating costs, and undertake human resource planning to hire and train local maintenance staff.

**Increased Maintenance Costs:** OBO is aware that posts with NECs are experiencing increased operating costs because the facilities are often larger to accommodate a growing overseas civilian USG presence, and are equipped with state-of-the art building systems and environmental security protection. While it may appear that costs are higher, they can actually be less on a per square meter basis, which is the standard industry measure. Using the industry recognized *Whitestone Facility Maintenance and Repair Cost Reference 2009 – 2010*, the maintenance costs for a medium sized NEC (approximately 11,600 gross square

See comment 1.

meters) have been precisely defined. Maintenance costs were carefully estimated, using the Standard Embassy Design drawings and specifications for a medium-sized NEC with the following building sizes:

- New Office Building: 7,555 GSM
- Marine Security Guard Quarters: 721 GSM
- Utility Building: 698 GSM
- Warehouse: 2,071 GSM
- 3 Compound Access Control Units 566 GSM

The results for the maintenance cost per gross square meter are:

- \$26.10 per gross square meter for an NEC
- \$29.50 per gross square meter for the equivalent Washington DC-area buildings as noted above

While maintenance costs have increased at NECs, maintenance has historically not been funded at a level to thoroughly address all needs. It is possible that the percent increase in maintaining NECs might have been less if the old facilities had been fully maintained. In addition, some maintenance funding intentionally decreases toward the end of occupancy of the older facilities, as OBO and post decide, for cost savings, to not fully maintain or upgrade systems in a building about to be vacated, thus making the NEC maintenance costs seem comparatively higher.

**NECs are Safer:** On page 42 of the draft report, GAO's subheading notes that problems in NEC commissioning "posed potential safety risks." State notes that any safety risks discussed by GAO would have been much less in the NEC than the safety risks posed by the aging, deteriorated facilities that the NEC replaced. For example, as GAO reports, the fire alarm systems at posts were problematic with false indicator lights, etc.; however, the NEC buildings were also equipped with fully operational fire sprinkler systems, which most of the previous embassy buildings did not have. Thus, the NEC provided a much improved level of safety. We are concerned that this subheading would lead a reader to conclude that we moved staff into unsafe facilities, and request that GAO delete the phrase [Posed Potential Safety Risks and].

See comment 2.

**GAO's Recommendations**

The GAO recommends that the Secretary of State take the following six actions:

1. Improve the process for determining the appropriate size for an NEC, including reassessing the analytical basis for projecting future staffing levels and determining how much growth space is allocated.

Response: The Department agrees with this recommendation and has evaluated both staffing projections and the development of growth factors for office space.

The Office of Management Policy, Rightsizing, and Innovation (M/PRI) has reviewed the posts with capital security projects that began after the inception of the Office of Rightsizing. The analysis includes sixteen posts with OBO projects that will be completed by the end of 2010 and shows a narrower margin of error -- between the rightsized number and the staff actually moved into the building -- 1.2 percent for U.S. direct-hire positions in aggregate. For all types of positions, the data show an average discrepancy of only 3.4 percent, well within OBO's ten percent growth margin.

We view this as a success, a validation of the Department's rightsizing efforts and an indication that the problem of inadequate office space is gradually being resolved. However, we also note that the effort to predict future office space needs will always contain some uncertainties, that staffing projection discrepancies will occasionally exceed ten percent, as they have in four of the sixteen "rightsized" posts included in the above-referenced analysis. The discrepancies at these four posts were wide enough to skew the standard deviation for all positions beyond the 10 percent range -- 12.5% for posts with staffing overages and 14.8% for all posts. NECs are being built in the most volatile areas of the world which makes it more difficult to plan for future needs -- mission priorities can change and programs can expand or contract in a short period of time. Dramatic changes at a minority of posts will affect our overall success rate at all posts.

M/PRI's strategic plan for the next five years includes a greater emphasis on pro-active analysis and objective comparisons. We also hope to move from our current focus on individual posts towards analyzing and projecting global staffing trends.

See comment 3.

See comment 4.

OBO has recently increased the amount of growth factored into its space programs. While OBO still utilizes a 10-percent growth factor (i.e. taking the approved desk total and adding an additional 10-percent of space to the total required for the number of desks), it has changed the formula so that each desk position creates 25 usable square meters of growth space (vice the previous factors of 6.5 or 10.8 net square meters). This is in recognition that growth desk positions have a ripple effect across the entire space program, and this change will provide more flexibility to posts. This change will be applied to all projects in FY11 and beyond and for FY10 projects as budget and schedule permits. The growth space will be allocated proportionally to include basic desk space, designated support space, and common areas. We note that because this change is being made for projects in FY 2011 (and beyond) and possibly some FY 2010 projects, the impact of this increase cannot be evaluated until FY 2014 at the earliest. However, as new information comes to light from the Lessons Learned Program (to include the Post Occupancy Evaluation process), OBO will continue to evaluate the results and determine whether this should be refined further. OBO remains aware that the fluidity in staffing projections creates a risk that some facilities may end up with excess space, as GAO found in its recent study of courthouses.<sup>2</sup> This would appear to be validated by the GAO's finding that only 13 of the 44 NECs they surveyed were under-occupied by five percent or more; however, it should be noted that this would allow for future growth space.

2. Ensure that OBO conducts post-occupancy evaluations of completed NECs as planned.

Response: The Department agrees with this recommendation. As of the date of these comments, an OBO team is in the field conducting post-occupancy evaluations (POEs) at three Western Hemisphere posts. We plan to conduct two more POE trips – to Western Hemisphere and African regions – to evaluate 6 to 8 more posts by the end of calendar year 2010. OBO envisions conducting 9 to 12 POEs per year, and accelerating the schedule to conduct additional POEs depends on the availability of resources.

Prior to 2008, available resources allowed OBO to perform on average four POEs per year. In 2008, OBO undertook a “Revalidation Look-Back” of the 55 NECs, NCCs, annexes, and other diplomatic facilities that had been completed between 2001 and 2006. This look-back provided a valuable overview of some

<sup>2</sup> *Federal Courthouse Construction: Preliminary Results Show Better Planning, Oversight, and Courtroom Sharing Could Help Control Future Costs*; GAO-10-753T, May 25, 2010

overarching issues being encountered by posts as they occupied their new facilities, and allowed OBO to implement improvements in areas such as consular operations, food service, warehouses, and maintenance shops. Much of 2009 was directed toward integrating the Revalidation Look-Back into the first edition of the LROMP (produced in March 2010), and conducting in-depth studies of the maintenance shop and warehouse issues identified during the look-back. In late 2009 and early 2010, OBO developed enhanced survey questionnaires and a new web-based application to facilitate communication with post and improve upcoming POEs.

3. Develop a plan to recommission those NECs completed before 2008 to, for example, resolve any problems posts may still have with building systems, and ensure that the operating costs are not being incurred unnecessarily as a result of buildings systems that are not operating as efficiently as intended.

Response: The Department agrees with this recommendation and will conduct recommissioning studies as resources allow. OBO is currently conducting two pilot recommissioning studies, and plans to conduct two more studies in FY 2011, if funding is available. We estimate that each initial study will cost approximately \$150,000 to \$200,000. Current plans are to seek funding in FY 2012 and beyond to conduct 10 recommissioning studies each fiscal year.

4. Identify time frames for implementing the maintenance projects that are outlined in the LROMP.

Response: The Department agrees with this recommendation. Upon receiving funding for requirements set out in the LROMP, the program will be executed similarly to the implementation of the LROBP. The timeline for implementing projects will be established concurrent with availability of funds.

5. Expand on future editions of the LROMP to include reporting on operating costs to allow for a more complete assessment of the costs to maintain and operate NECs.

Response: OBO provides estimated costs to operate a NEC to the regional bureaus before each new facility opens. Three major cost components are used in

See comment 5.

See comment 6.

the development of the Building Operating Expense (BOE) estimates for NEC/NCCs.<sup>3</sup>

- Locally Employed (LE) Staff Maintenance Labor Costs – Posts’ labor costs to maintain equipment within the embassy compound;<sup>4</sup> (costs assume that all equipment is installed and commissioned per the design intent); cost of providing proper preventative maintenance (90% of available work hours for the first year); and the cost of training facility management LE Staff.
- Local Service Contract Costs - includes local service maintenance contracts for grounds maintenance and landscaping; solid waste removal; custodial services; pest control; and pavement and sidewalk maintenance (sweeping and snow removal, if applicable). Contracts are dependent upon approval of funding by the post ICASS (International Cooperative Administrative Support Services) council.
- Utility Cost - estimates depend on local climate data; number, type, and size of the compound’s buildings; includes heating and cooling loads, water use. Calculated to include variables such as inflation; utility rates, and average power and water consumption by NEC occupants.

After the NEC opens, the actual operating costs are tracked by the post, the regional bureau, and ICASS. However, limitations on the availability of actual cost data, due in part to the complexities of the multi-agency ICASS structure, makes the tracking of actual operating costs a challenge. The Department is reviewing options for efficiently capturing these costs currently resident in multiple data systems.

6. Develop a human resource plan that addresses the requirements and cost implications for hiring required NEC facilities maintenance staff and sufficiently training the local maintenance staff.

Response: The Department agrees with this recommendation. The Department has not been as diligent as necessary in hiring and training local maintenance staff. For NECs, OBO develops a staffing plan that details the number of staff and type of skills needed, which is provided to post and the Regional Bureau 15 to 18

<sup>3</sup> 6 FAH-5 H-405.1-11 defines BOE as “Expenses incident to occupying buildings and grounds, but not including improvements, repair or maintenance costs beyond those minor operating system repairs and preventive maintenance identified in the ICASS Handbook.”

<sup>4</sup> To obtain a total post operations and maintenance (O&M) cost, additional maintenance labor costs, utility costs, and maintenance spare parts costs *must be added* to the O&M cost estimates listed for all posts that have GO and LTL properties outside the NEC/NCC walls.

See comment 7.

months before the NEC opens. Post then hires the needed staff, which is funded by ICASS and D&CP funds. Because of resource limitations, staffing needs can go unfulfilled. This issue will be further addressed by OBO, the Regional Bureaus, ICASS, and the Bureau of Resource Management.

In FY 2009, the Senate Appropriations Committee in S. Rept. 110-425, accompanying S. 3288, cited GAO's 2006 report on NEC construction and its finding that State does not clearly identify the projected operations and maintenance costs for NECs. The Committee directed State to report on this issue, including whether ICASS is effective in supporting post maintenance, given that it is a voluntary system. The Committee also considered how a dedicated funding system for maintenance, akin to the cost-sharing program for construction, could be adapted to fully fund necessary maintenance. OMB and the Department have begun working on a possible cost-sharing mechanism for maintenance costs. Such a cost-sharing scheme would necessitate developing a comprehensive human resources plan for hiring and training maintenance staff, as well as the universe of other maintenance requirements.

As GAO reports, OBO has enhanced its qualifications for Foreign Service FMs, requiring them to have an engineering or facility management degree. OBO is making progress in recruiting and hiring new, degreed FMs. Eleven have completed the FM training course at the Foreign Service Institute established in 2009, and six more are currently enrolled. There will be 20 more FMs in the September 2010 training course, 10 expected in the February 2011 course, and 10 per year in the following years. This influx should allow posting FMs at all of our NECs/NCCs and many legacy facilities, with posts not having a resident FM serviced by a regional FM. Addressing increased demands for emerging posts in Iraq and Afghanistan continues to be a challenge in balancing resources.

As GAO reports, OBO has developed and is developing on-line training courses intended to assist maintenance staff at post in carrying out their duties. We are also working with a contractor on a proposal to further augment our training program. As is standard practice, the OBO Project Director on each NEC project will continue to provide system-specific familiarization training for the LE Staff, in addition to basic training on mechanical and electrical principles and systems provided by the engineers on the OBO Project Director's staff.

RIGHTSIZING PROJECTIONS VERSUS JUNE 2010 STAFFING  
(CAPITAL SECURITY PROJECTS COMPLETED AS OF CY-2010)

Post	Rightsizing Review Date	Project Completion Date	U.S. Direct-Hire Positions			All Positions		
			Original Rightsized Projections	Current Positions in Chancery	Percent Difference (+/-)	Original Rightsized Projections	Current Positions in Chancery	Percent Difference (+/-)
Panama*	Oct-03	Jun-07	175	164	-6.3%	412	420	1.9%
Kigali	Mar-05	Jan-08	61	49	-19.7%	244	254	4.1%
Tbilisi	Oct-05	Jul-08	104	112	7.7%	668	641	-4.0%
Brazzaville	Mar-05	Nov-08	11	15	36.4%	145	185	27.6%
Johannesburg	Jan-05	Dec-08	43	30	-30.2%	143	110	-23.1%
Skopje	Nov-05	Mar-09	66	74	12.1%	304	324	6.6%
Ouagadougou****	Nov-06	Jan-10	31	25	-19.4%	146	159	8.9%
Antananarivo**	May-07	Mar-10	49	40	-18.4%	253	249	-1.6%
Khartoum***	Aug-05	Mar-10	82	75	-8.5%	305	322	5.6%
Sarajevo****	Oct-06	May-10	92	102	10.9%	331	346	4.5%
Mumbai**	Oct-06	Jun-10	74	69	-6.8%	340	306	-10.0%
Karachi**	Mar-06	Jun-10	32	49	53.1%	204	247	21.1%
Addis Ababa****	Jul-06	Jul-10	153	147	-3.9%	679	732	7.8%
Riga**	Feb-07	Jul-10	50	39	-22.0%	168	165	-1.8%
Lusaka	Jul-06	Nov-10	76	94	23.7%	359	373	3.9%
Suva**	Apr-05	Nov-10	20	22	10.0%	78	110	41.0%
<b>Totals:</b>			<b>1119</b>	<b>1106</b>	<b>-1.2%</b>	<b>4779</b>	<b>4943</b>	<b>3.4%</b>

Projected completion later in CY-2010, current staffing includes OBO construction managers (Data source: original rightsizing reviews, Jun 2010 post profiles data; rev. 6-23-2010)

\* Rightsizing review done by M/P before current rightsizing program began.

\*\* Temporary OBO construction teams not counted.

\*\*\* Government employee guard force positions not counted (other missions have contract guards.)

\*\*\*\* Temporary OBO construction teams and guard positions not counted.

The above figures do not include Peace Corps, whose offices are never co-located in the chancery.

Standard deviation (posts with staffing overages): 17.1%

Standard deviation (all posts): 22.8%

12.5%

14.8%

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The following are GAO's comments to the Department of State's letter dated June 28, 2010.

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## GAO comments

1. We do not dispute that NEC maintenance costs may be in line with those for similar facilities as suggested by OBO's analysis. Rather, our intent in comparing operations and maintenance costs of NECs to those at the facilities they replaced is to show that because of their larger size and the increased complexity of building systems, among other factors, NEC operations and maintenance costs are higher. Our analysis of utility costs indicates, for example, that NECs have a comparatively higher utility demand than previous facilities and pay correspondingly higher amounts for utilities. As the higher costs to operate and maintain NECs present long-term budget implications, we believe it is important for State to continue its efforts, as it has begun to do with the recent development of its Long Range Overseas Maintenance Plan (LROMP), to comprehensively plan for the long-term resource requirements necessary for protecting its investment in NECs.
2. We acknowledge that NECs provide an improved level of safety compared to the facilities they replaced. However, the intent of our discussion is to convey that safety concerns, particularly concerning the operation of fire protection systems, were apparent at some of the earlier NECs as a result of deficiencies with the commissioning process. For example, OBO's Office of Fire Protection reported that some early NECs were occupied without the correction of critical deficiencies affecting operation of their fire protection systems, a situation that we believe would not have occurred if commissioning had been properly conducted. Because of the paramount importance of safety, we believe it is necessary to report on issues that potentially result in reduced safety levels.
3. We support State's intention to place greater emphasis on proactive analysis and objective comparison. State concludes that its analysis of the 16 NECs planned since the inception of M/PRI, many of which are still under construction, indicates that "the problem of inadequate office space is gradually being resolved." However, State's analysis does not clearly demonstrate whether these NECs match the space needs of overseas posts. For example, State's analysis includes all positions at overseas posts and does not distinguish between those positions that require office space in the NEC (referred to in our report as "desk" positions) and those, such as warehouse or maintenance personnel, that do not. While such an analysis could be appropriate for

determining whether the rightsizing process is resulting in greater accuracy projecting overall staffing levels, it does not provide a clear picture of whether the amount of office space that was planned for the NECs is adequate for current office space needs.

In addition to having concerns that State's analysis may not provide a clear assessment of space requirements, we also believe that the results of State's analysis do not indicate that NECs planned under rightsizing will face fewer space challenges than their predecessors. For example, State's analysis of all positions shows that 7 of the 16 (44 percent) NECs planned under rightsizing have at least 5 percent more staff than were included in the initial projections, even though none of the NECs planned under rightsizing is more than 3 years old and many are still under construction. Our analysis of 44 completed NECs showed that over half have current desk space needs that exceed the amount of desk space constructed by at least 5 percent. Additionally, we found that 4 of the 6 NECs completed since the inception of M/PRI had current staffing levels that exceeded constructed desk space by more than 20 percent. We believe that both our analysis and State's analysis support our finding that many NECs have already run out of desk space and, therefore, the planning process might benefit from additional analysis of the relationship between post-specific characteristics and staffing growth.

4. We acknowledge OBO's intention to revise the growth factor formula, which would provide additional space in NECs. However, this does not address our concern that OBO has not provided any analytical basis to demonstrate that a growth factor of 10 percent, applied uniformly across all projects, is appropriate.
5. We support State's initial effort in taking action to identify and prioritize its maintenance needs as documented in its first edition of the LROMP. Establishing a timeline concurrent with availability of funds would provide greater transparency for projects to be initiated during a specific funding period. However, we also believe State should consider outlining notional implementation time frames for requirements identified over each of the future budget years covered by the LROMP, including those years for which future funding is not certain. By identifying notional time frames, based on forecasted budget scenarios and not solely on available funds, we believe State will be better able to demonstrate whether the plan can effectively be resourced by future anticipated budget scenarios or whether maintenance requirements potentially exceed likely funding scenarios. We believe such an approach would strengthen State's efforts to show

how timely investments in maintenance can protect the multibillion dollar investment State is making in constructing NECs.

6. We support OBO's efforts in developing first-year operating cost estimates for NECs when they open. However, we still maintain State needs to develop an assessment of future operating costs that is included in the LROMP. A plan that outlines future operating costs is particularly important since, as our analysis shows, the operating costs at NEC posts have clearly increased relative to the facilities they replaced. By developing estimates of future years' operating costs and combining those with estimates of future maintenance costs that State has already outlined in its LROMP, we believe State will have a more complete assessment of the financial resources that State and other contributing agencies will need in future budget years to operate and maintain overseas facilities.
7. We maintain that State needs a human resources plan for NEC facilities maintenance staff, regardless of the funding mechanism. Such a plan, that addresses cost implications for hiring and training necessary staff, could assist State in better identifying the necessary financial resources and planning to address resource limitations.

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# Appendix III: GAO Contacts and Staff Acknowledgments

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## Staff Acknowledgments

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