Retrospective Analysis of the 2007 Chemical Facility Anti-Terrorism Standards

Cybersecurity and Infrastructure Security Agency
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Acronym/Abbreviation	Definition
ASP	Alternative Security Program
BLS	U.S. Bureau of Labor Statistics
CAV	Compliance Assistance Visit
CCTV	Closed-Circuit Television
CFATS	Chemical Facility Anti-Terrorism Standards
CFR	Code of Federal Regulations
CISA	Cybersecurity and Infrastructure Security Agency
COI	Chemicals of Interest
CSAT	Chemical Security Assessment Tool
DHS	Department of Homeland Security
EAP	Expedited Approval Program
E.O.	Executive Order
FTE	Full-Time Equivalent
FY	Fiscal Year
GDP	Gross Domestic Product
GSA	General Services Administration
ICR	Information Collection Request
IDS	Intrusion Detection System
IFR	Interim Final Rule
ISD	Infrastructure Security Division
O&M	Operations and Maintenance
OECD	Organisation for Economic Co-Operation and Development
OMB	Office of Management and Budget
PSP	Personnel Surety Program
Pub. L.	Public Law
RBPS	Risk-Based Performance Standards
RIA	Regulatory Impact Analysis
SSO	Site Security Officer
SSP	Site Security Plan
SVA	Security Vulnerability Assessment

Acronym/Abbreviation	Definition
TSDB	Terrorist Screening Database
U.S.	United States
U.S.C.	United States Code

Executive Summary

The purpose of this retrospective analysis is to provide an updated and accurate assessment of the costs and burdens on regulated facilities created by the Chemical Facility Anti-Terrorism Standards (CFATS) program.[1] To that end, the Cybersecurity and Infrastructure Security Agency (CISA) Office of the Chief Economist has reviewed the data, assumptions, and methodology used in the 2007 Interim Final Rule (IFR) regulatory impact analysis (RIA) to either confirm or update previous estimates based on observed data from the implementation and operation of CFATS since 2007. Through this retrospective analysis, CISA updated the costs associated with CFATS based on observed data from over 10 years of CFATS compliance. This improved cost assessment will provide a more accurate baseline for analysis of potential changes to CFATS through future rulemaking or regulatory efforts (for example, guidance documents), including a more precise cumulative impact analysis when considering the full cost of CFATS as the program evolves.

This retrospective analysis shows that the 2007 RIA considerably overestimated the costs imposed on chemical facilities by CFATS. In 2007, prior to the implementation of CFATS, the data available were insufficient to forecast cost estimates accurately. Table ES-1 presents a comparison of the changes in the affected population of chemical facilities and the estimated cost of CFATS in 2017 dollars discounted at 7 percent, based on a 10-year period of analysis.

Table ES-1: Comparison Summary

	2007 RIA	**Retrospective Analysis**
Number of Chemical Facilities[a]	65,000	38,273
Number of Covered Chemical Facilities	5,000	3,216
Total 10-Year Cost (7% Discount, Millions of 2017$)[b]	$9,838.5	$1,682.4

[a] The 2007 RIA is based on an estimated 50,000 chemical facilities registering under or submitting information to the Department of Homeland Security (DHS) as part of CFATS over the first 3 years of implementation. That number of facilities does not account for new entrants or other facilities projected to submit information over the 10-year analysis period. Therefore, for this table, we based the 10-year comparison on an estimated 65,000 facilities, as per Table 6 in the 2007 RIA.

[b] The 2007 RIA estimated costs from 2006 to 2015, with an estimated cost of $0 for 2006. For the retrospective analysis, the period of analysis was shifted to cover the first 10 years post-CFATS implementation in April 2007 (2017–2016). While a retrospective analysis would typically look at the same period of analysis as the prospective analysis, CISA believes it is justified in shifting the period of analysis for the retrospective to begin in the year of CFATS promulgation to account for the full first 10 years of CFATS-related costs. To calculate the present value of the total 10-year cost discounted at 7 percent, we use the first year of the analysis as the base year. We use 2006 and 2007 as the base year for the 2007 RIA and the retrospective analysis, respectively.

CISA estimates that the actual cost of CFATS on chemical facilities is 83 percent lower than what was estimated in the 2007 RIA. The reduction in estimated cost stems from changes to key assumptions made in the 2007 RIA. We replaced these assumptions with new estimates based on CFATS data, observed for 2007 through 2016. The two main drivers of the reduced cost estimate in Table ES-1 are as follows:

[1] This retrospective reassesses the costs initially estimated in the 2007 RIA, which did not account for costs to the government or costs to entities other than chemical facilities and their owners and operators.

1. **More accurate assessment of affected population.** As presented in Table ES-1, using the best available data at the time, 2007 RIA estimated that the number of facilities that CFATS would cover was 36 percent higher than estimated in the retrospective analysis. By adjusting the affected population based on the data collected through the Chemical Security Assessment Tool (CSAT) online portal, CISA corrected the overestimation.

   CSAT data also allowed CISA to correct other data uncertainty problems in the 2007 RIA. The overestimation of the affected population led to overestimated costs for Site Security Officer (SSO) labor, CSAT, security measures, and personnel and readiness, as discussed in Section 5.

   Another flaw in the affected population for the 2007 RIA was the assumptions of the percentages of facilities that would deal with specific types of security threats. The 2007 RIA assumed that 62 percent of covered facilities would be regulated due to a release security issue, while CSAT data showed that 24 percent of covered facilities were regulated due to a release security issue. Because facilities needing to address a release security issue have a higher per-facility cost than facilities regulated due to theft/diversion concerns, correcting for the makeup of the affected population also resulted in a lower cost estimate.

   To highlight the impact of the changes in the affected population on the overall cost of CFATS, we recalculated the estimated 10-year cost of CFATS from the 2007 RIA using the affected population from the retrospective analysis. Table ES-2 compares the 10-year undiscounted cost of the 2007 RIA using the original population to the cost that would have resulted if the updated population from the retrospective analysis were used. The totals shown result from summing the values for each cost component. Correcting only for the affected population would have resulted in a 10-year undiscounted cost reduction of $4.6 billion in the 2007 RIA.

Table ES-2: 2007 RIA 10-Year Cost Comparison, Based on Affected Population (Millions of 2017$)

Cost Component	2007 RIA Cost		Difference
	2007 RIA Population	Retrospective Population	
Security Measure Cost	$9,111	$5,860	$3,251
SSO Labor Cost	$3,463	$2,651	$812
Personnel & Readiness Cost	$1,514	$1,159	$355
CSAT Cost	$544	$417	$128
Post-Security-Plan Cost	$17	$13	$4
Total 10-Year Undiscounted Cost	**$14,649**	**$10,100**	**$4,550**

Note: Values may not total due to rounding.

2. **More accurate assessment of security measure costs.** The 2007 RIA overestimated costs for security measures because of great uncertainty regarding what security measures a facility would need to implement to comply with CFATS. Relative to the later observed data, the 2007 RIA assumed higher per-facility costs for certain security measures and a higher proportion of facilities implementing security measures in response to CFATS.

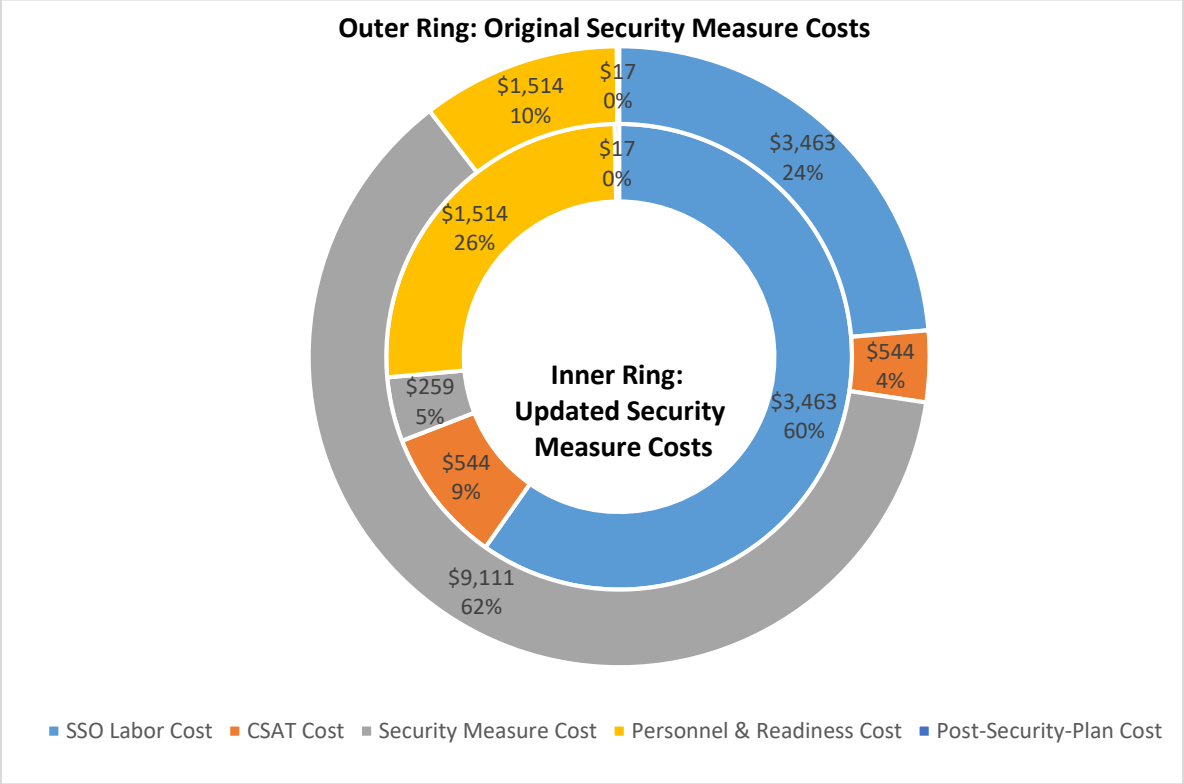
In this retrospective analysis, CISA used actual data collected from regulated facilities on planned security investments to estimate the costs for CFATS compliance. Based on the data collected, the investment in security measures necessary to meet the Risk-Based Performance Standards (RBPSs)[2] was far lower than estimated in 2007. The data indicated that the number of facilities needing to invest in security measures was lower than estimated in 2007, either because some measures, such as intrusion detection systems (IDSs) or fencing, were already in place as part of business practices, or because facilities employed less costly measures to comply with the RBPS than was assumed in 2007.

To demonstrate the impact of the overestimated security measure costs, we applied the per-facility cost for security measures used in the retrospective analysis to the affected population used in the 2007 RIA. Holding all other variables constant, correcting the per-facility cost for security measures in the 2007 RIA would have decreased the 10-year undiscounted cost for CFATS from $14.6 billion to $5.8 billion, a difference of nearly $9 billion or a decrease of 60 percent.

Figure ES-1 presents the comparison of the estimated 10-year undiscounted cost in the 2007 RIA when only security measure costs are corrected. The outer ring shows the costs by component as originally estimated in the 2007 RIA, and the inner ring shows those costs adjusted for the updated security measure costs. The figure shows how significantly the decrease in security measure costs affects the overall cost estimate, with security measures originally accounting for 62 percent of the 10-year undiscounted costs in the 2007 RIA. Once adjusted, those costs only account for 5 percent of the total cost, holding all other cost components constant.

[2] DHS developed these standards to create a framework for assessing whether the security plans or programs of covered facilities comply with CFATS.

Figure ES-1: 2007 RIA 10-Year Undiscounted Cost Comparison, Based on Security Measure Costs (Millions of 2017$)



Security measure costs are the main driver of the reduction in the estimated cost burden of CFATS on chemical facilities. In 2007, these costs were estimated based on limited information about what measures were already in place at facilities and what measures facilities would choose to install to comply with the RBPSs. All covered chemical facilities are required to submit a Site Security Plan (SSP) to describe existing or planned security measures that will meet the requirements put forth in the RBPSs. Based on existing measures in submitted SSPs,[3] CISA determined that facilities had installed many security measures before CFATS took effect. As such, many security measure costs accounted for in the 2007 RIA had already been incurred and, hence, were not a result of CFATS.[4] Additionally, because CFATS is a performance-based program, facilities could implement the most cost-effective and responsive security measures. In 2007, DHS did not have data on what the most cost-effective measures would be, so we used a more conservative approach, assuming more costly measures and higher rates of investment among facilities, in the analysis.

[3] Each SSP consist of a series of questions for each of the following security topics: Detection; Delay; Response; Cyber; Security Management. For each of these topics, respondents are asked to provide information about a number of existing security measures. In addition to the questions about existing measures, there are questions regarding planned and proposed measures.

[4] It is unclear as to whether these security measures were implemented due to normal business practices or in anticipation of CFATS.

Comparing the undiscounted impact of isolated changes to the 2007 RIA cost estimates allowed CISA to identify the main drivers of the reduction in cost. CISA then applied all the changed assumptions and inputs to the model to develop a complete cost comparison of the 2007 RIA and the retrospective analysis discounted at 7 percent using 2017 dollars.[5] CISA compared the estimates for each cost component to identify the key drivers of the change in the cost estimate from the 2007 RIA to the retrospective analysis. Table ES-3 presents a comparison of the estimates by cost component, which shows how the estimate for each cost component changed. The largest driver of the change in cost estimate from the 2007 RIA to the retrospective analysis is the reduction in security measure costs. As presented in Table ES-3, these costs accounted for 62 percent of the total 10-year costs in the 2007 RIA, as compared to 7 percent in the retrospective analysis. The decreased estimate of security measure costs, driven by correcting for the number of facilities investing in security measures and the types of measures implemented, accounts for 74 percent of the overall cost difference from the 2007 RIA.[6]

Table ES-3: Comparison of the Estimated 10-Year CFATS Costs in the 2007 RIA and Retrospective Analysis (Primary Estimate), by Cost Component (7% Discount, Millions of 2017$)

Cost Component	2007 RIA (A)	Retrospective Analysis (B)	Difference (C) = (A) - (B)
Security Measure Cost	$6,126	$112	$6,014
SSO Labor Cost	$2,322	$953	$1,369
Personnel & Readiness Cost	$977	$458	$519
CSAT Cost	$401	$115	$286
Post-Security-Plan Cost	$12	$8	$4
Request to DHS Cost		$1	-$1
Recordkeeping Cost		$36	-$36
Total Cost	**$9,838**	**$1,682**	**$8,156**

Note: Values may not total due to rounding.

CISA also compared the costs by tier[7] and the average cost per facility over the 10-year analysis period. Table ES-4 presents the comparison of the average 10-year cost per facility discounted at 7 percent by tier. This shows the 10-year costs per facility were greatly overestimated in the 2007 RIA, with the average 10-year cost for a tiered facility in the retrospective analysis estimated at 71 percent lower than the cost estimated in the 2007 RIA.[8]

[5] CISA conducted the analysis using present value discounting with a base year of 2007. Present value discounting was used to be consistent with the 2007 RIA and Office of Management and Budget Circulars A-4 and A-94.

[6] Using the estimates in Table ES-3, the difference between the 2007 RIA and the retrospective 10-year cost is $8,156 million ($9,838 million – $1,682 million). The difference in security measure cost is $6,014 million ($6,126 million – $112 million). Dividing the two differences provides the percentage of the overall difference ($6,014 million ÷ $8,156 million = 74 percent).

[7] DHS assigns each covered chemical facility a tier level of 1, 2, 3, or 4, with Tier 1 representing the highest-risk facilities.

[8] We estimated the percent change in cost from the 2007 RIA to the retrospective analysis by subtracting the retrospective analysis cost from the 2007 RIA cost and then dividing that difference by the 2007 RIA cost: ($487,239 – $1,656,073) ÷ $1,656,073= -71%.

Table ES-4: Comparison of Average 10-Year Cost per Facility, by Tier (7% Discount, 2017$)

	2007 RIA	Retrospective Analysis
Tier 1	$7,003,071	$1,389,308
Tier 2	$4,591,255	$1,198,443
Tier 3	$1,714,639	$417,858
Tier 4	$600,705	$422,328
Not Tiered	$3,621	$3,293
Total	**$168,866**	**$43,958**
Tiered Only	**$1,656,073**	**$487,239**

Note: Both the Total and Tiered Only rows are weighted averages that present the average per-facility cost for the 10-year analysis period. The Total row includes all facilities, while the Tiered Only row includes just Tiers 1–4.

This retrospective analysis presents an estimated cost to chemical facilities for the first 10 years of the CFATS program that is rooted in observed data collected through the CSAT system and reflects the actual burdens borne by the affected population. Improving the estimate for the cost of CFATS will allow CISA to more accurately estimate costs associated with future changes to CFATS as it continues to evolve.

1 Introduction

On October 4, 2006, the President signed the Department of Homeland Security (the Department or DHS) Appropriations Act of 2007, which provided DHS with the authority to regulate the security of high-risk chemical facilities.[9] On April 9, 2007, DHS issued the Chemical Facility Anti-Terrorism Standards (CFATS) Interim Final Rule (IFR)[10] and published an accompanying regulatory impact analysis (RIA)[11] that estimated the costs associated with the CFATS program. In 2014, Congress enacted and the President signed the Protecting and Securing Chemical Facilities from Terrorist Attacks Act of 2014 ("CFATS Act of 2014),[12] which codified the CFATS program into the Homeland Security Act and extended the program for 4 years. The CFATS Act of 2014 also established an Expedited Approval Program for Tier 3 and 4 facilities and improved the vetting process through the Personnel Surety Program for Tier 1 and 2 facilities. In 2019, the program was extended again for a period of 15 months by the Chemical Facility Anti-Terrorism Standards Program Extension Act.[13]

On January 18, 2011, the President issued Executive Order (E.O.) 13563, "Improving Regulation and Regulatory Review."[14] One of the main objectives of this order was to encourage agencies to review existing significant regulations: "To facilitate the periodic review of existing significant regulations, agencies shall consider how best to promote retrospective analysis of rules that may be outmoded, ineffective, insufficient, or excessively burdensome, and to modify, streamline, expand, or repeal them in accordance with what has been learned."[15]

In an effort to assess regulatory programs in the spirit of E.O. 13563 and to ensure that the Department has an accurate understanding of the burdens CFATS imposed on industry, the Cybersecurity and Infrastructure Security Agency (CISA)[16] has conducted a retrospective analysis of the 2007 CFATS IFR. This retrospective analysis: (1) provides the most accurate assessment of the historical burden placed on industry because of the CFATS program, and (2) informs future RIAs in the event CISA proposes regulatory revisions to the CFATS program.

Beginning in October 2016, DHS updated its Chemical Security Assessment Tool (CSAT)—the online gateway for regulated chemical facilities to interact with the Department. The implementation of the updated system, referred to as CSAT 2.0, provided a reasonable point in time from which to conduct a retrospective analysis of the CFATS program because CFATS had been operating for nearly 10 years by then.

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[9] See Pub L. 109-295, sec. 550. Retrieved from https://www.congress.gov/109/plaws/publ295/PLAW-109publ295.pdf.

[10] Retrieved from https://www.federalregister.gov/documents/2007/04/09/E7-6363/chemical-facility-anti-terrorism-standards.

[11] Retrieved from https://www.regulations.gov/document?D=DHS-2006-0073-0116.

[12] Pub. L. 113-254, December 18, 2014. Retrieved from https://www.congress.gov/113/plaws/publ254/PLAW-113publ254.pdf.

[13] Pub. L. 116-2, January 18, 2019. Retrieved from https://www.congress.gov/116/plaws/publ2/PLAW-116publ2.pdf.

[14] Retrieved from https://www.govinfo.gov/content/pkg/FR-2011-01-21/pdf/2011-1385.pdf.

[15] Excerpt from E.O. 13563, sec. 6, "Retrospective Analyses of Existing Rules."

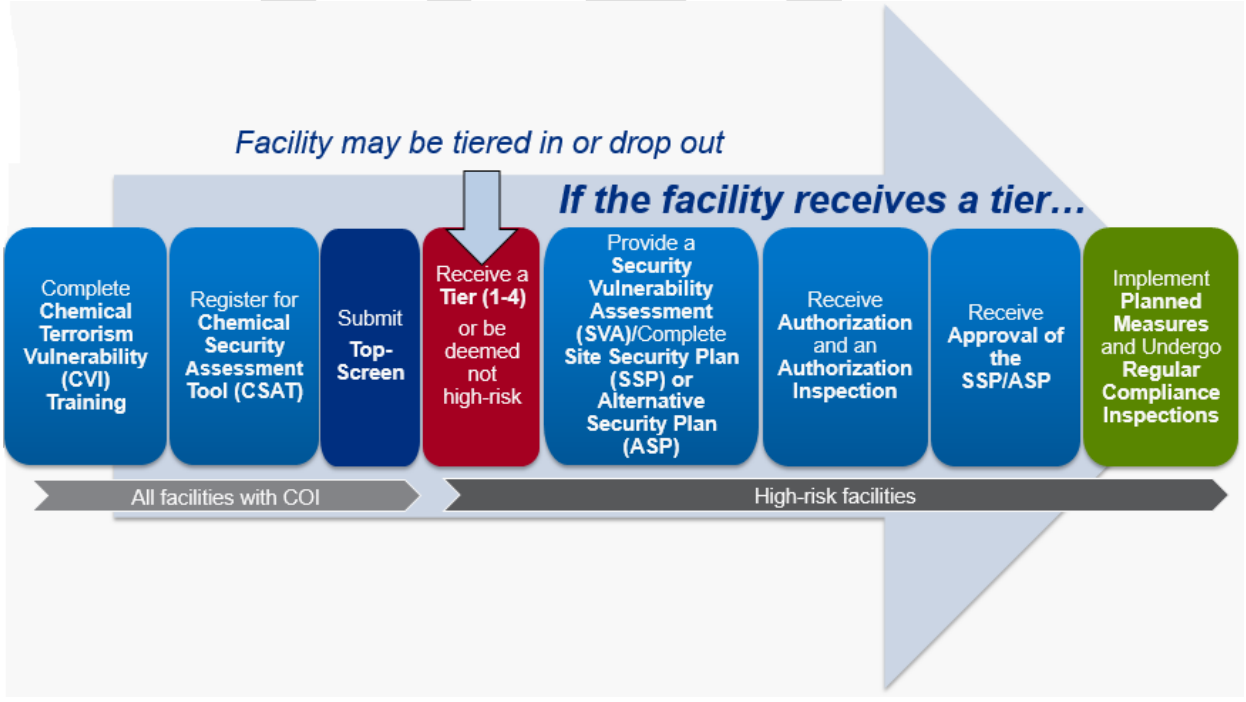
[16] On November 16, 2018, the President signed into law the Cybersecurity and Infrastructure Security Agency Act of 2018 (Pub. L. 115-278). This act elevated the mission of the former DHS National Protection and Programs Directorate and established CISA. CISA is a standalone Federal agency under DHS oversight. CISA is responsible for protecting the Nation's critical infrastructure from physical and cyber threats, a mission that requires effective coordination and collaboration among a broad spectrum of government and private-sector organizations.

For this retrospective analysis, CISA updated the cost estimates used in the 2007 RIA with historical data to calculate an accurate cost to impacted chemical facilities due to implementing the CFATS program over the past 10 years. Because CFATS was a new regulatory program at the time, the 2007 RIA relied heavily on the solicitation of subject-matter expertise to develop the estimated cost of the regulation. Now, CISA has fully implemented CFATS and can use historical data provided by industry through CSAT, CISA compliance data, and lessons learned.

2 The Chemical Facility Anti-Terrorism Standards Program

The purpose of the CFATS program is to enhance the security of our Nation by lowering the risk of a terrorist attack, compromise, infiltration, or exploitation at chemical facilities not statutorily excluded from the CFATS program. The CFATS program accomplishes this objective through a risk-based approach in which the Department's expectations with regard to appropriate security measures at a chemical facility increase as the level of assessed risk increases. The Department has published a list of chemicals of interest (COI), which if possessed in certain amounts and concentrations requires the completion of a Top-Screen[17] that is submitted to the Department through the free online system CSAT. The presence or amount of COI is not an indicator of coverage under the CFATS program—it is merely a baseline threshold requiring chemical facilities to complete and submit a Top-Screen for a security risk assessment. Figure 2-1 presents the CFATS process.[18]

Figure 2-1: CFATS Process



[17] The Top-Screen is a survey instrument that collects information about the facility and the type and quantity of chemicals located, used, stored, or manufactured therein. If the facility is deemed a high-risk chemical facility, CISA requires the facility to submit a Security Vulnerability Assessment (SVA) and an Alternative Security Program (ASP) or a Site Security Plan (SSP).

[18] Retrieved from https://www.cisa.gov/cfats-process.

The Department evaluates the information submitted in a Top-Screen and determines whether or not the chemical facility is a high-risk chemical facility (i.e., a covered chemical facility) due to its security risk. Most chemical facilities will not be determined to be a high-risk chemical facility. Following the Top-Screen, each high-risk chemical facility will be assigned an initial tier ranging from Tier 1, which represents the upper bound of risk for high-risk chemical facilities, to Tier 4, which represents the lower bound of risk for high-risk chemical facilities.[19]

Next, covered chemical facilities must complete an SVA and an SSP.[20] The SSP must contain security measures and procedures that address all of the Risk-Based Performance Standards (RBPSs) established by the Department. A Tier 4 facility may submit an ASP[21] in lieu of an SVA, in lieu of an SSP, or both. A Tier 1, 2, or 3 facility may submit an ASP in lieu of an SSP. A Tier 3 or Tier 4 facility may participate in the Expedited Approval Program (EAP).[22]

Following receipt of an SSP or an ASP in lieu of an SSP, the Department conducts an initial review for compliance with the RBPS. If the SSP appears on its face to be mostly satisfactory, the Department will issue a Letter of Authorization to the covered chemical facility and then conduct an authorization inspection at the covered chemical facility.

Following the authorization inspection, if the Department determines that the SSP complies with all CFATS program requirements, the Department will issue a Letter of Approval to the covered chemical facility. Following issuance of a Letter of Approval, the Department will conduct periodic compliance inspections at the covered chemical facility to confirm that it is implementing its approved SSP.

If a covered chemical facility does not submit a satisfactory SSP, the Department offers assistance and consultation to the covered chemical facility, which may include an onsite compliance assistance visit (CAV). As permitted by the Protecting and Securing Chemical Facilities from Terrorist Attacks Act of 2014 (also known as the CFATS Act of 2014),[23] the Department may recommend additional security measures to a facility to enable the approval of an ASP.[24] If a facility fails to comply with the CFATS program, the Department may enforce program requirements as permitted by 6 United States Code (U.S.C.) 624 and 6 Code of Federal Regulations (CFR) part 27, subpart C (e.g., by issuing civil penalties, or in limited

[19] A facility's risk tier will not be finalized until completion of the SVA.
[20] This is the process as initially defined in the CFATS regulations promulgated in 2007. Since then, the program as matured and evolved. At the time of this writing, facilities now submit SVAs and SSPs concurrently, reducing the burden on industry. As the goal of this analysis is to assess the accuracy of the original cost estimate of CFATS, the analysis is based on the process at the time of promulgation. The current process is best described in the CSAT fact sheet. Retrieved from https://www.dhs.gov/sites/default/files/publications/fs-cfats-overview-cisa-508.pdf.
[21] An ASP allows a facility to develop its own template document for addressing CFATS requirements and must describe how the facility's security measures will meet or exceed applicable RBPS. As of October 2016, facilities can only submit an ASP in lieu of an SSP rather than in lieu of an SVA.
[22] The EAP consists of prescriptive guidance from DHS that identifies specific security measures that are sufficient to meet the RPBS. SSPs submitted through the EAP allow a facility to bypass the authorization and authorization inspection steps of the CFATS process.
[23] The CFATS Act of 2014 recodified and reauthorized the CFATS program. See Pub L. 113-254. Retrieved from https://www.govinfo.gov/content/pkg/PLAW-113publ254/pdf/PLAW-113publ254.pdf.
[24] See 6 U.S.C. 622(c)(2)(A)(ii).

circumstances, by ordering the facility to implement appropriate emergency security measures or to shut down some or all operations).[25]

3 Summary of 2007 RIA

The IFR was issued in 2007 and established 6 CFR part 27, which formalized the CFATS program. Along with this IFR, the Department published an RIA, which considered the impact of the IFR on the affected population. The 2007 RIA was in compliance with E.O. 12866, "Regulatory Planning and Review," which directs agencies to assess the costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits.[26]

The 2007 RIA relied predominantly on subject-matter expertise to estimate the impacts of the regulation. At the time, the Department had very little information about the affected population and what security measures would be implemented by high-risk chemical facilities because of the CFATS program. The following sections of this retrospective analysis provide a summary of the key assumptions and conclusions of the 2007 RIA, including a discussion of the uncertainty surrounding the estimates.

The 2007 RIA assumed that 65,000 chemical facilities would submit a Top-Screen to be evaluated for whether or not they should be considered high-risk chemical facilities.[27] Because of the level of uncertainty at the time, the Department developed a range of estimates for the number of chemical facilities that would be determined to be high risk, with a low of 1,500 facilities and a high of 6,500 facilities. The Department settled on a primary estimate of 5,000 high-risk facilities that would be required to complete an SVA and an SSP.

3.1 Model Facility Methodology

The Department distributed the 5,000 high-risk chemical facilities between two security issues: loss of containment (or release) and theft/diversion. The high-risk chemical facilities deemed to have a release security issue were further segmented into three groups based on whether the facility was an open facility or an enclosed building, and also by the number of employees at the facility. The three release groups described in the 2007 RIA were as follows:

- Group A included open facilities with 100 or more employees where release was the primary concern. These facilities were assumed to have five security entrances for the purpose of the cost analysis.

- Group B included open facilities with 99 or fewer employees where release was the primary concern. In addition, facilities that store anhydrous ammonia for commercial refrigeration in outdoor vessels were also considered "open" for the purpose of the 2007 RIA,

[25] 6 CFR part 27, subpart C, "Orders and Adjudications." Retrieved from https://www.ecfr.gov/cgi-bin/text-idx?&mc=true&node=pt6.1.27&rgn=div5#sp6.1.27.c.

[26] *Executive Order 12866 of September 30, 1993: Regulatory Planning and Review*, 58 FR 51735 (Oct. 4, 1993). Retrieved from https://www.archives.gov/files/federal-register/executive-orders/pdf/12866.pdf.

[27] The 2007 RIA estimated an initial affected population of 50,000 chemical facilities that would be impacted in the first three years of the program, 10% of which would be determined high-risk. That number of facilities does not account for new entrants or other facilities projected to submit information over the 10-year analysis period. Therefore, in this analysis, we based the 10-year comparison on an estimated 65,000 facilities, as per Table 6 in the 2007 RIA. The 2007 RIA does maintain the assumption of 5,000 high-risk facilities throughout.

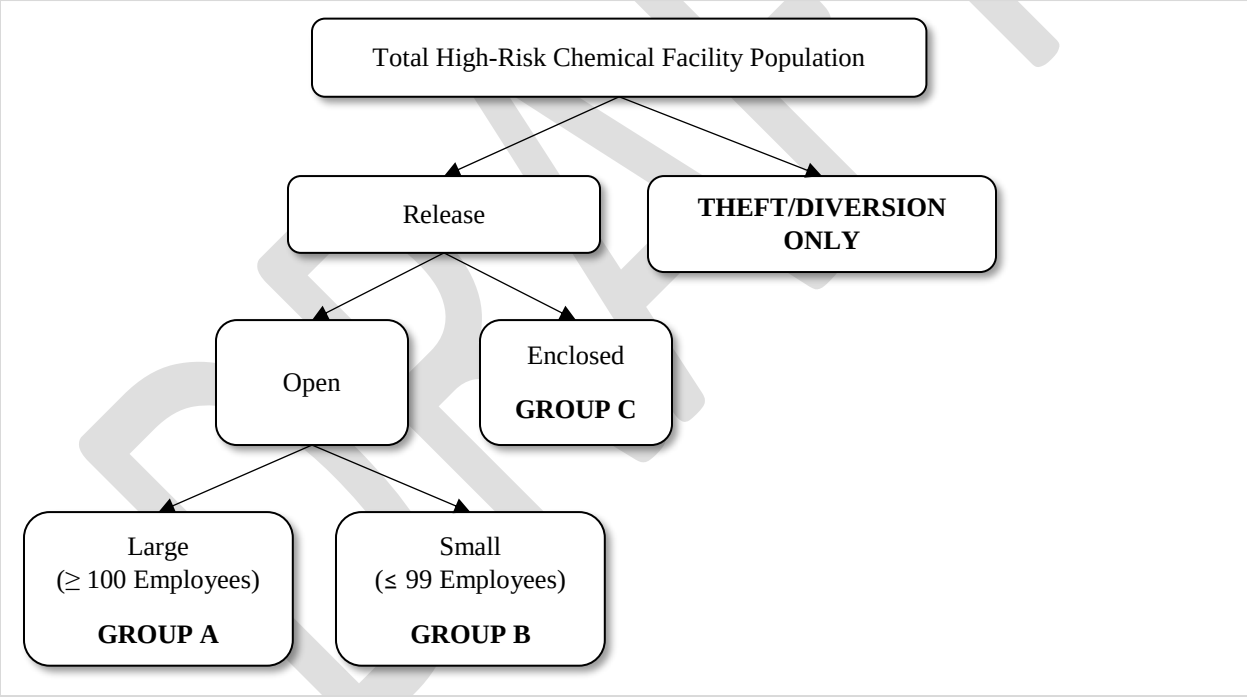
because the outdoor storage of that chemical required protection. These facilities were assumed to have two security entrances for the purpose of the cost analysis.

- Group C included enclosed facilities where release was the primary concern that manufacture, process, use, store, or distribute chemicals (e.g., warehouses and enclosed manufacturing sites). DHS did not segment enclosed facilities by size, because, unlike the variation between a large open facility (e.g., 2,000-acre petrochemical complex) and a small open 3- to 5-acre facility, enclosed facilities are more homogenous. These facilities were assumed to have one security entrance for the purpose of the cost analysis.

The facilities with a theft/diversion security issue were not further broken down based on facility layout or employee size, as these characteristics were not expected to affect the security risk or type of security measures necessary to secure the COI on the facility.

Based on the above breakdown and tier structure, the 2007 RIA estimated the costs of compliance for 16 different model facility groups. For tiers 1 through 4, the Department estimated different costs for theft/diversion facilities, as well as for groups A, B, and C for release facilities. These model facility groups are presented in Figure 3-1.

Figure 3-1: Model Facility Groups in the 2007 RIA



The 2007 RIA assumed that the costs would be significantly different across the model facility groups. As such, estimates for labor costs and security measures differed based on the size, layout, and security risk of the covered chemical facilities.

Based on these key population assumptions, along with subject-matter expert solicitation on the costs and time burdens for specific security measures and compliance activities, the Department developed a conservative estimate of the cost of CFATS to the affected population.

3.2 3-Year Costs from 2007 RIA

Using the point estimate of 5,000 high-risk chemical facilities, from 2006 to 2009, the estimated present value cost of the IFR in 2007 dollars was $3.6 billion and $4.1 billion discounted at 7

percent and 3 percent, respectively.[28] The 3-year costs discounted at 7 percent and 3 percent are presented in Table 3-1.[29]

Table 3-1: Estimated 3-Year Costs in the 2007 RIA, by Population (2006–2009, 7 and 3 Percent Discount Rates, Millions of 2007$)

Cost Category	Primary Population Estimate (5,000 facilities)		Low Population Estimate (1,500 facilities)		High Population Estimate (6,500 facilities)	
Discount Rate	*7%*	*3%*	*7%*	*3%*	*7%*	*3%*
Tier 1	$589	$671	$173	$197	$768	$875
Tier 2	$961	$1,096	$289	$329	$1,252	$1,427
Tier 3	$1,318	$1,510	$396	$454	$1,714	$1,964
Tier 4	$562	$641	$169	$192	$730	$832
Top-Screen[a]	$117	$127	$117	$127	$117	$127
Reclassified High-Risk Facilities[b]	$9	$10	$9	$10	$9	$10
SSP Hearings & Appeals	<$1	<$1	<$1	<$1	<$1	<$1
Terrorist Screening Database (TSDB) Appeals	$6	$7	$2	$2	$8	$9
Total[c]	**$3,562**	**$4,062**	**$1,155**	**$1,312**	**$4,598**	**$5,245**
Annualized Cost	**$1,357**	**$1,436**	**$440**	**$464**	**$1,752**	**$1,854**

[a] This includes the cost of the Top-Screen for the initial 50,000 facilities. This cost does not vary with the different assumptions for the high-risk facility population.
[b] This includes the cost of SVAs conducted by facilities that were preliminarily determined to be high risk after the completion of the Top-Screen, but after completion of the SVA, were determined not to be high risk.
[c] Values may not total due to rounding.

As presented in Table 3-2, the Department estimated the distribution of 3-year costs, by category, in 2007 dollars for high-risk chemical facilities.[30] For the primary population estimate of 5,000 high-risk chemical facilities, the Department estimated an average of 59 percent of the projected cost would be for installing or upgrading equipment, 19 percent for Site Security Officers (or SSOs; this excludes time spent preparing the SVA/SSP or participating in these activities), 11 percent for security guard services, 5 percent for personnel and readiness (e.g., background checks, training, drills, audits, and visitor escorts), 3 percent for completing the screening exercise, and 3 percent for conducting the SVA and preparing the SSP.

[28] The 2007 RIA focuses on the 3-year period from October 2006 to October 2009. A 3-year period of analysis was presented in the 2007 RIA because the initial statutory authorization for the IFR provided by sec. 550(b) of the DHS Appropriations Act of 2007 was to end either 3 years after the date of enactment of the act or if a superseding rulemaking was published under a superseding statutory authority before the 3-year end date.
[29] The 3-year costs discounted at 7 percent and 3 percent are presented in Table 1 and Table 2 of the 2007 RIA, respectively.
[30] The 3-year costs are presented in Table 3 of the 2007 RIA.

Table 3-2: Estimated 3-Year Total Costs in the 2007 RIA, by Type (2006–2009, Undiscounted, Millions of 2007$)

Cost Category	Primary Population Estimate (5,000 facilities)		Low Population Estimate (1,500 facilities)		High Population Estimate (6,500 facilities)	
	Estimated Cost	Percentage of Total	Estimated Cost	Percentage of Total	Estimated Cost	Percentage of Total
Capital	$2,674	59%	$800	55%	$3,481	60%
Guards	$473	11%	$141	10%	$617	11%
SVAs/SSPs	$114	3%	$34	2%	$148	3%
SSOs	$838	19%	$252	17%	$1,090	19%
Personnel & Readiness	$245	5%	$73	5%	$318	5%
Top-Screen[a]	$136	3%	$136	9%	$136	2%
Reclassified High-Risk Facilities[b]	$11	0.30%	$11	0.80%	$11	0.20%
SSP Hearings & Appeals	$0	0.00%	$0	0.01%	$0	0.00%
TSDB Appeals	$8	0.20%	$2	0.20%	$10	0.20%
Total[c]	**$4,500**	**100%**	**$1,450**	**100%**	**$5,811**	**100%**

[a] This includes the cost of the Top-Screen for the initial 50,000 facilities. This cost does not vary with the different assumptions for the high-risk facility population.
[b] This includes the cost of the SVAs conducted by facilities that were preliminarily determined to be high risk after the completion of the Top-Screen, but after completion of the SVA, were determined not to be high risk.
[c] Values may not total due to rounding.

3.3 10-Year Costs from 2007 RIA

Using the point estimate of 5,000 high-risk chemical facilities, from 2006 to 2015, the estimated present value cost of the IFR in 2007 dollars was $8.4 billion (based on a 7-percent discount rate).

As presented in Table 3-3, the Department estimated the distribution of 10-year costs by category, in 2007 dollars, for high-risk chemical facilities.[31] For the primary population estimate of 5,000 high-risk chemical facilities, the Department estimated an average of 38 percent of the total projected cost would be for equipment installation and maintenance, 24 percent for guards, 24 percent for SSOs, 10 percent for personnel and readiness (e.g., background checks, training, drills, audits, and visitor escorts), 2 percent for SVAs and SSPs, and 1 percent for the Top-Screen process.

[31] The 10-year costs are presented in Table 4 in the 2007 RIA.

Table 3-3: Estimated 10-Year Total Costs in the 2007 RIA, by Type (2006–2015, Undiscounted, Millions of 2007$)

Cost Category	Primary Population Estimate (5,000 facilities)		Low Population Estimate (1,500 facilities)		High Population Estimate (6,500 facilities)	
	Estimated Cost	Percentage of Total	Estimated Cost	Percentage of Total	Estimated Cost	Percentage of Total
Capital	$4,821	38%	$1,443	37%	$6,274	38%
Guards	$2,998	24%	$894	23%	$3,905	24%
SVAs/SSPs	$277	2%	$83	2%	$361	2%
SSOs	$2,972	24%	$893	23%	$3,865	24%
Personnel & Readiness	$1,299	10%	$390	10%	$1,689	10%
Top-Screen[a]	$179	1%	$179	5%	$179	1%
Reclassified High-Risk Facilities[b]	$11	0.10%	$11	0.30%	$11	0.10%
SSP Hearings & Appeals	$0	0.00%	$0	0.00%	$0	0.00%
TSDB Appeals	$15	0.10%	$4	0.10%	$19	0.10%
Total[c]	**$12,572**	**100%**	**$3,898**	**100%**	**$16,303**	**100%**

[a] This includes the cost of the Top-Screen for the initial 50,000 facilities. This cost does not vary with the different assumptions for the high-risk facility population.
[b] This includes the cost of the SVAs conducted by facilities that were preliminarily determined to be high risk after the completion of the Top-Screen, but after completion of the SVA, were determined not to be high risk.
[c] Values may not total due to rounding.

4 Data Sources and Research

This retrospective analysis presents updated cost estimates that are significantly lower than those presented in the 2007 RIA. With the full implementation of CFATS and nearly 10 years of program operation and data as well as studies conducted to assess CFATS compliance and effectiveness, CISA improved its estimate of the actual burden CFATS has imposed on chemical facilities within the United States. The following section discusses the data sources and studies used in this retrospective analysis.

4.1 CSAT Data

Since the inception of CFATS in April of 2007, DHS has required that chemical facilities of interest submit data through CSAT by completing a Top-Screen. The Top-Screen gathers information about the facility and the type and quantity of chemicals located, used, stored, or manufactured therein. If the facility is determined to be a high-risk chemical facility, CISA requires the facility to submit an SVA and an ASP, SSP.[32] Tier 3 and 4 facilities also have the option of submitting an EAP SSP.

[32] An SSP entails information on how security measures implemented at the facility will meet the RBPS.

CISA maintains a separate database called CHEMSEC, which holds a copy of all CFATS-related data collected from industry through CSAT and internal business process documents such as compliance inspection reports completed by chemical security inspectors. CISA used the data in CHEMSEC for this retrospective analysis. Throughout this retrospective analysis, data retrieved from CHEMSEC are referred to as CSAT data, as CSAT is the public-facing portal through which the data are submitted.

The 2007 RIA assessed costs over the 10-year period 2006–2015, although it included no costs for 2006 since the program was not implemented until 2007. To compare the 10-year period assessed in the 2007 RIA with the first 10 years of CFATS implementation, CISA used data submitted between fiscal years (FYs) 2007 and 2016. In FY 2017, DHS transitioned to a new, streamlined system, CSAT 2.0. Because of this substantial change in data collection, merging the two historical sets of CSAT data for the retrospective analysis to compare with the 2007 RIA would not result in an accurate comparison.[33]

4.2 Security Measure Cost Study

CISA conducted a study to understand the costs incurred by high-risk chemical facilities when agreeing to ensure the presence of security measures in their SSPs to comply with the CFATS requirements. For this study, CISA reviewed 1,418 approved SSPs that included security measures that high-risk chemical facilities included as "planned measures." Planned measures detail how a facility would enhance its security posture to become compliant with specific RBPS and are divided into two categories: (1) planned measures that call for additional security equipment and (2) planned measures that describe procedure development or procedural changes.

Planned measures in an approved SSP are specific security measures that are not in place at the facility at the time of submission. More specifically, a planned measure is a measure that:

- Is in the process of being installed;
- Is in the design phase but has an approved and documented capital budget;
- Is in the bid process and has been placed for bid or bids have been received and are under review; or
- Is in a pilot phase or is in execution as a demonstration project, and for which there is a general but documented implementation budget and schedule.

Planned measures are documented in SSPs submitted to CISA's Infrastructure Security Division when a facility has committed to implementing those measures but has not been able to complete the implementation before submitting the SSP. This is done with the assumption that the planned measures will then be implemented in a timely manner. CISA approves SSPs with planned measures with the understanding that without the implementation of the security measure the facility will not be in compliance with CFATS and will be subject to agency action.

[33] For a detailed discussion of the changes to CSAT that began in FY 2017, see the CSAT Information Collection Request (ICR) supporting documentation (Office of Management and Budget [OMB] Control Number 1670-0007). Retrieved from https://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201604-1670-001.

In this retrospective analysis, CISA used planned measures as a proxy for the type of investment that would be necessary for a high-risk chemical facility to come into compliance with CFATS. The study revealed that approximately 60 percent of SSPs reviewed included planned measures that would require facilities to incur additional costs for security measures. CISA used the results of this study in Section 6.4 to estimate the costs associated with the purchase and installation of the security measures specified in the SSPs.[34] This study also supports the change in methodology discussed in Section 5.2 of this retrospective analysis.

To estimate the costs associated with security measures, CISA used the General Services Administration (GSA) website GSA Advantage for capital costs and RSMeans to estimate labor costs.

GSA Advantage (https://www.gsaadvantage.gov) is an online government purchasing service run by GSA that provides descriptions and costs for equipment commonly purchased by United States (U.S.) government agencies. It includes a wide range of equipment necessary to implement security measures like those reported in the SSP planned measures. Although the affected population is composed almost entirely of chemical facilities in the private sector, CISA believes that using GSA Advantage pricing data is appropriate for this analysis, because GSA Advantage provides a wide cross-section of vendors offering similar products at multiple price points that can be used to aggregate an average cost for security measure expenditures. For capital costs associated with the security measures, CISA used pricing information on GSA Advantage to estimate the cost of items such as fencing, intrusion detection systems (IDSs), and closed-circuit televisions (CCTVs).[35]

CISA also estimated the labor costs associated with installing security measures using RSMeans data on labor hours and wages.[36] RSMeans (https://www.rsmeans.com) aggregates construction cost data comprising material, labor, and equipment prices and can be referenced at the unit, assembly, or square-foot level of detail. RSMeans is a dynamic collection of data points actively monitored by experienced cost engineers, and it is used by construction professionals to create budgets, estimate projects, validate their own cost data, and plan for ongoing facilities

[34] Users of the data in this report should recognize that facilities may have spent money implementing security measures earlier in their development of a security risk management program to meet CFATS (i.e., before they documented their SSP). Costs for any security measures implemented but not reported in an SSP as planned measures are not included in the data collected in this effort.

[35] The estimates used in this analysis were referenced from GSA Advantage between January and February 2016. CISA inflated these estimates from 2016 dollars to 2017 dollars using a factor of 1.018 based on the Organisation for Economic Co-Operation and Development (OECD) gross domestic product (GDP) implicit price deflator. OCED. "GDP Implicit Price Deflator in United States [USAGDPDEFAISMEI]." Retrieved from the Federal Reserve Bank of St. Louis at https://fred.stlouisfed.org/series/USAGDPDEFAISMEI (last accessed on May 8, 2018). This factor was calculated by dividing the GDP deflator from 2017 (112.1) by that from 2016 (110.1).

[36] RSMeans provides the construction industry with cost information to help contractors provide accurate estimates and projections for their project costs. ABSG Consulting used RSMeans to identify the number of installers and person-hours necessary to install the equipment comprising the planned security measures. "RSMeans Electrical Cost Data" (38th ed. 2015), Adrian C. Charest, PE, Senior Editor. CISA inflated the RSMeans estimates from 2015 dollars to 2017 dollars using a factor of 1.031 based on the OECD GDP implicit price deflator. OCED. "GDP Implicit Price Deflator in United States [USAGDPDEFAISMEI]." Retrieved from the Federal Reserve Bank of St. Louis at https://fred.stlouisfed.org/series/USAGDPDEFAISMEI (last accessed on May 8, 2018). This factor was calculated by dividing the GDP deflator from 2017 (112.1) by that from 2015 (108.7).

maintenance.[37] RSMeans is a trusted source for industry construction costs, and as such, CISA believes using RSMeans for labor and installation costs for security measures is appropriate in this analysis.

4.3 Regression Analysis

In this retrospective analysis, CISA did not use a methodology that relied on 2007 model facility groups because, based on a regression analysis conducted as a part of the retrospective analysis, CISA determined that there was no statistically significant difference in security measure spending based on the model facility groups. Specifically, there was not a significant difference in spending between small and large facilities, or open and enclosed facilities. The only variable that did have a statistically significant impact on security measure spending was tier. CISA did retain the distinction between release facilities and theft/diversion facilities. This reduction from 16 to 8 facility groups makes the retrospective analysis more concise, and it does not attribute different costs to facility characteristsics that, based on the analysis of planned measure spending, were not predictive of spending on security measures.

CISA used a regression analysis to test the impact of different facility characteristics (i.e., size, layout, security issue, and tier) on security measure spending. To do this, CISA used the same data from the security measure cost study discussed in Section 4.2. Once the security measure costs were estimated, the facilities were binned based on the model facility groups used in the 2007 RIA, and then compared, holding the several variables for tier, security issue, size (large or small),[38] and layout (open or enclosed)[39] constant through t-tests on each of the grouping factors (layout, size, and tier).[40] CISA conducted a multiple regression analysis to determine which, if any, of the variables had an impact on the level of security measure spending. The t-tests determined whether the mean security measure expenditure differed between two data sets based on the variables listed above, for example, by comparing Tier 1 release facilities by layout or size.

CISA conducted multiple regressions to test for statistically significant differences within groups, both in the aggregate and for specific types of security measures.[41] When conducting the regressions, CISA only considered facilities in the sample that had at least one planned measure. That is, CISA removed all "zero-cost facilities" (i.e., facilities that did not plan to purchase any security measures based on planned measures in their SSPs). This increased the average cost for security measures across tiers and resulted in a more conservative cost estimate than would have resulted if the zero-cost facilities had been included. CISA conducted a two-sample t-test assuming equal variance, or a test for a null hypothesis that there would be no significant difference across the variables. If the p-value is greater than 0.05, the null hypothesis is not rejected. As shown in Table 4-1, the p-value for each set of variables is greater than 0.05, which

[37] Retrieved from https://www.rsmeans.com/info/contact/about-us.aspx.
[38] Size in the 2007 RIA was defined as large = 100 or more employees, and small = 99 or fewer employees.
[39] Layout refers to the physical layout of the facility, either an open facility with many points of entry or an enclosed facility with few points of entry.
[40] A t-test is used to determine if the means of two sets of data are significantly different from each other.
[41] CISA grouped like security measures into three categories: perimeter controls, monitoring systems, and security support.

means that the null hypothesis of no statistically significant difference in security measure costs is not rejected.[42]

Table 4-1: Results of the Two-Sample T-Test Assuming Equal Variance, All Facilities

Comparison of the Mean Security Measure Expenditure by Facility Groups	P-Value
Theft/Diversion vs. Release	0.421
Open vs. Enclosed	0.322
Large vs. Small	0.212

This regression analysis showed that there was no statistically significant difference in security measure spending based on the model facility groups, i.e., there was not a significant difference in spending between: Theft/Diversion vs. Release, small and large facilities, or open and enclosed facilities. The only variable that did have a statistically significant impact on security measure spending was tier. CISA used the results of this analysis to update and improve the methodology used in the 2007 RIA as discussed in Section 5.2.

5 Changes to Assumptions and Methodology

This retrospective analysis provides the most accurate assessment of the historical burden placed on the industry because of the CFATS program. To that end, CISA's Office of the Chief Economist has gone through the data, assumptions, and methodology used in the 2007 RIA to either confirm or update previous estimates based on observed data from the implementation and operation of the CFATS program since 2007, as well as the research discussed in Section 4. In this section, CISA presents the key changes to the assumptions and methodology used to update the cost estimates.

5.1 Affected Population

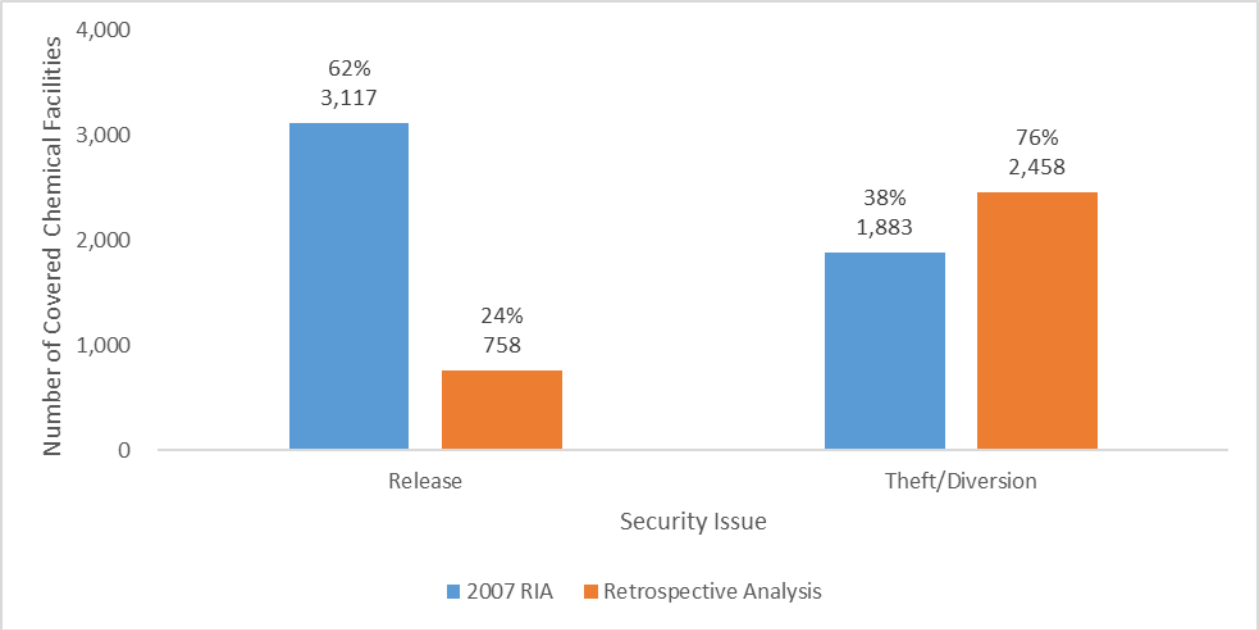
The 2007 RIA estimated that the affected population would consist of 65,000 chemical facilities that would be required by DHS to submit a Top-Screen under the CFATS program, of which 5,000 would be determined high risk.[43] The high-risk chemical facilities would then be subject to additional CFATS requirements. Based on actual Top-Screen submission data during FY 2007 through FY 2016, the Department received Top-Screens from 38,273 unique chemical facilities. Of these 38,273 unique chemical facilities, the Department subsequently determined 3,216 unique chemical facilities to be high risk.

[42] Table 4-1 shows the p-value results of the t-tests done for the full sample. T-tests were also done for each tier for all three sets of variables and showed similar results. That is, we failed to reject the null hypothesis of equal variance across variables. Despite the results showing no statistically significant difference due to security issue, we retain this differentiation in our analysis to better inform the affected population.

[43] The 2007 RIA is based on an estimated 50,000 chemical facilities registering under or submitting information to DHS as part of CFATS over the first 3 years of implementation. That number of facilities does not account for new entrants or other facilities projected to submit information over the 10-year analysis period. Therefore, we based the 10-year population comparison on an estimated 65,000 facilities, as per Table 6 in the 2007 RIA.

The 2007 RIA also assumed that approximately 62 percent (i.e., 3,117 of 5,000) of high-risk chemical facilities were at risk of a release, and 38 percent (i.e., 1,883 of 5,000) had a theft/diversion risk. Based on historical data, the Top-Screen data show that the breakdown by security issue was actually 24 percent release (i.e., 758 of 3,216) and 76 percent theft/diversion (i.e., 2,458 of 3,216). Figure 5-1 presents the breakdown of the number and percentage of estimated covered chemical facilities by security issue.

Figure 5-1: Comparison of the Affected Population in the 2007 RIA and Retrospective Analysis, by Security Issue



The affected population of chemical facilities and high-risk chemical facilities used in the retrospective analysis were respectively 41 percent and 36 percent lower than the affected populations estimated in 2007 RIA. By adjusting the affected population based on the data collected through the CSAT, CISA corrected the overestimations in the 2007 RIA. Also, correcting for the distribution of high-risk chemical facilities by security issue improves the methodology by realigning the costs associated with facilities based on security issue.

5.2 Security Measure Costs

Security measure costs for the 2007 RIA were based predominantly on subject-matter expertise on the type of measures implemented and the rate at which they would be implemented at high-risk chemical facilities. This included a reliance on the assumption that the different model facility groups would have substantially different security measure costs.

This retrospective analysis determined that the security measure costs in the 2007 RIA were significantly overestimated and, therefore, this analysis relied on more accurate data to determine the costs incurred by high-risk chemical facilties when implementing planned security measures.

The retrospective analysis compared the 2007 RIA security measure costs (inflated to 2017 dollars) against the costs of the planned measures contained in approved SSPs.

5.2.1 2007 RIA security measure costs (inflated to 2017 dollars)

Table 5-1 presents the 2007 RIA costs estimated by the Department for the model facility groups inflated to 2017 dollars. The Department calculated the average cost per facility by multiplying the unit start-up cost (i.e., the cost to purchase or install a particular security measure) by the number of units needed and the percentage of facilities expected to implement that security measure.[44] The Department then added the average costs for all security measures to be purchased by each model facility group to get the average start-up cost per model facility group. For the purposes of this retrospective analysis, CISA inflated the 2007 RIA costs to 2017 dollars using a GDP implicit price deflator.[45]

Table 5-1: Estimated Average Start-Up Cost for Security Measures per Facility, by Tier and Initial Grouping, Based on Data from 2007 RIA (2017$)

Tier	Release			Theft/Diversion
	Group A	Group B	Group C	
1	$5,517,111	$2,106,844	$1,282,723	$1,730,262
2	$4,260,402	$1,807,168	$1,020,253	$1,264,167
3	$2,013,764	$705,901	$443,752	$518,764
4	$262,761	$138,081	$82,164	$138,081

To compare the 2007 RIA projected estimates against the cost of planned security measures contained in approved SSPs, CISA updated the data contained in the 2007 model facility groups to only consider security issue and tier. Table 5-2 presents the revised 2007 RIA average start-up costs by tier when considering security issue only.[46]

[44] The estimated initial unit costs, the number of units to be purchased, and the percentage of facilities expected to purchase those units were taken from Tables 27 through 42 in the 2007 RIA.

[45] OECD. "GDP Implicit Price Deflator in United States [USAGDPDEFAISMEI]." Retrieved from the Federal Reserve Bank of St. Louis at https://fred.stlouisfed.org/series/USAGDPDEFAISMEI (last accessed on May 8, 2018). To convert the estimates from the 2007 RIA, which were in 2007 dollars, CISA multiplied the 2007 values by 1.165, which was calculated by dividing the GDP deflator from 2017 (112.1) by that from 2007 (96.2).

[46] The average values for facilities with the release security issue in Table 5-2 are based on the average of the start-up costs for Groups A, B, and C in Table 5-1. These averages are not weighted by the number of facilities in each group and, thus, do not represent the actual average cost per facility with a release security issue. Table 5-2 is more for demonstration purposes of how the average initial costs would change.

Table 5-2: Estimated Average Start-Up Cost for Security Measures per Facility, by Tier and Security Issue, Based on Data from 2007 RIA (2017$)

Tier	Release	Theft/Diversion	Average
1	$2,968,893	$1,730,262	**$2,659,235**
2	$2,362,608	$1,264,167	**$2,087,997**
3	$1,054,472	$518,764	**$920,545**
4	$161,002	$138,081	**$155,272**
Average	**$1,636,744**	**$912,818**	**$1,455,762**

Security measures for the 2007 RIA and the planned security measures contained in approved SSPs were grouped into the following three categories based on their primary function: perimeter controls, monitoring systems, and security support. These groupings are presented in Table 5-3.

Table 5-3: Security Measures, Grouped by Category

Category	Specific Security Measures
Perimeter Controls	Chain-Link Fencing, Chain-Link Cages Pedestrian Gates, Vehicle Gates Chains, Signage
Monitoring Systems	Indoor IDSs Outdoor IDSs Access Control Systems, Locks Indoor Cameras, Outdoor Cameras Indoor CCTV, Outdoor CCTV
Security Support	Monitoring, Lighting Concrete Barriers Planter-Style Barriers Other (e.g., security guards)

Table 5-4 presents in 2017 dollars the average start-up cost for security measures by tier, security issue, and security measure type as estimated in the 2007 RIA.

Table 5-4: Estimated Average Start-Up Cost for Security Measures per Facility, by Tier, Security Issue, and Security Measure Type, Based on Data from 2007 RIA (2017$)

Tier	Release			Theft/Diversion		
	Perimeter Controls	Monitoring Systems	Security Support	Perimeter Controls	Monitoring Systems	Security Support
1	$1,194,206	$748,665	$1,026,021	$642,512	$459,104	$628,646
2	$830,193	$765,561	$766,853	$176,417	$459,104	$628,646
3	$435,508	$413,174	$205,791	$88,791	$300,631	$129,341
4	$24,276	$84,261	$52,465	$29,131	$72,390	$36,559

5.2.2 Determination of Planned Measure Costs Contained in Approved SSPs

To calculate an accurate cost to covered chemical facilities due to implementing the CFATS program over the past 10 years, CISA used the costs of the planned measures contained in approved SSPs. CISA estimated the cost for planned security measures contained in approved SSPs by reviewing 1,418 SSPs that were submitted to CISA, 854 of which reported one or more planned security measures.

Using GSA Advantage to estimate the capital cost of security measures and RSMeans for labor and installation costs, CISA estimated the total cost to purchase and install the planned measures for each SSP. These costs were then averaged by tier and security issue to provide an estimate to be applied to all facilities across all tiers. When calculating the average for each security measure category, any zero-cost entries were removed to provide a more conservative estimate and to account for facilities that may have invested in security measures prior to submitting their SSP. Because a number of facilities did not report planned measures, CISA considered only the planned measure costs for those facilities reporting at least one planned measure in their SSP.

Table 5-5 presents the average start-up cost for security measures by planned measure type, facility tier, and security issue in 2017 dollars. The full methodology for estimating these costs can be found in Appendix A.

Table 5-5: Estimated Average Start-Up Cost for Planned Measures from Approved SSPs per Facility, by Tier, Security Issue, and Security Measure Type (2017$)

Tier	Release			Theft/Diversion		
	Perimeter Controls	Monitoring Systems	Security Support	Perimeter Controls	Monitoring Systems	Security Support
1	$23,207	$17,843	$1,981	$10,476	$35,167	$15,567
2	$31,473	$27,334	$12,962	$9,107	$31,906	$3,104
3	$12,259	$27,616	$3,131	$13,178	$23,357	$7,575
4	$12,143	$23,011	$3,279	$8,433	$22,930	$12,929

5.2.3 Comparision of 2007 RIA Projected Estimates versus Estimated Costs Incurred by Chemical Facilities Based on Planned Measures Contained in Approved SSPs

To determine the difference between the 2007 RIA projected estimates and estimates based on data from chemical facilities over the past 10 years, CISA compared the 2007 RIA security measure costs inflated to 2017 dollars (see Table 5-4 above) against the costs of the planned measures contained in approved SSPs (see Table 5-5 above). These tables break down the data by security measure type and tier for each security issue. Not every facility incurred the full average start-up cost for each planned measure, but CISA used the average planned measure start-up costs to compare with the data obtained from the planned measures in the SSPs. As can be seen from the tables, the average start-up cost for each security issue and security measure type was much higher in the 2007 RIA than it was in the retrospective analysis. In fact this difference between the 2007 RIA and the retrospective analysis represents an overestimation of nearly $10 billion.

5.3 Other Changes

This retrospective analysis updated a number of other assumptions that resulted in an accurate assessment of the historical burden placed on the industry because of CFATS. While the updates were not as significant as those described above, they also resulted in a measurable decrease in the cost CFATS has placed on chemical facilities.

5.3.1 Personnel Costs

For this retrospective analysis, CISA updated the time burden necessary for personnel to comply with CFATS requirements. In the 2007 RIA, as in the retrospective analysis, the burden for most CFATS requirements falls on SSOs. Based on data collected over the course of the CFATS program through ICRs, CISA has been able to show that the time burdens estimated in the 2007 RIA were overestimates of the actual burdens incurred by facility SSOs. As such, CISA has been able to reduce the time burdens associated with several aspects of the CFATS program, such as time necessary to complete Top-Screens, SVAs, and SSPs.

5.3.2 Personnel Surety Program Costs

Under CFATS, high-risk chemical facilities are required to submit information about individuals to CISA for vetting against the TSDB. The number of employees that would be vetted was overestimated in the 2007 RIA. By correcting for this overestimate using actual submission data, CISA is able to present a more accurate Personnel Surety Program (PSP) cost as part of this retrospective analysis.

5.3.3 Visitor Escort Costs

Under CFATS, high-risk chemical facilities may opt to avoid background check costs by escorting visitors when they require access to restricted areas. The 2007 RIA estimated that Group A facilities in Tiers 1 through 3 would need approximately 12 hours of administrative staff time per day to escort visitors, with the remaining facilities in Tiers 1 through 3 needing 4 hours of administrative staff time per day. Tier 4 facilities were estimated to need approximately 25 percent of the time needed for Tiers 1 through 3.

After several years of operations at CFATS facilities, CISA has observed that these time burdens were significantly overestimated, and that escorts are provided as a collateral duty by staff that do not require additional time over their day-to-day responsibilities. As such, CISA has removed the costs associated with visitor escorts from this retrospective analysis.

6 Updated CFATS Cost Estimates

Using the updated methodology and assumptions described in Section 5, CISA has developed an estimated cost for the first 10 years of CFATS that more accurately reflects the burdens incurred by the chemical facilities.[47] The costs associated with CFATS implementation and compliance are broken down into six main components:

1. CSAT costs
2. Security measure costs
3. Personnel and readiness costs
4. Post-security plan costs
5. Requests to DHS costs
6. Recordkeeping costs

The sections that follow explain what these costs include and how CISA estimated the costs for these components.

6.1 Affected Population

The CFATS program requires facilities that possess certain chemicals to submit information to CISA to: (1) determine if those chemical holdings pose a potential risk, and (2) comply with certain RBPS, if CISA determines them necessary. For this retrospective analysis, CISA looked at actual data compiled by the CFATS program to determine the number of chemical facilities that have submitted such information, the number of high-risk chemical facilities regulated under the program, and how frequently chemical facilities submitted information from FYs 2007 to 2016. For the purposes of this retrospective analysis, the population is broken down by chemical facilities and high-risk chemical facilities. High-risk chemical facilities are then broken down further by tier and security issue (i.e., release or theft/diversion). The following tables present the affected population as recorded in CSAT.

Table 6-1 presents the number of unique chemical facilities that submitted a Top-Screen to the CFATS program but were ultimately determined not to be high risk. That is, their chemical holdings did not result in them being given a Tier 1 through 4 designation.

[47] The 10-year period from 2007 to 2016 was chosen to best align with standard regulatory analysis practice of presenting costs over a 10-year time horizon. Additionally, starting in FY 2017, DHS released CSAT 2.0—an update to the CSAT system and surveys, which reduced the burden on the affected population in ways that were unforeseen in 2007 when the RIA was completed. To present a more accurate comparison of the 2007 RIA, CISA limited its retrospective review to the period before the rollout of CSAT 2.0.

Table 6-1: Count of Initial Top-Screen Submissions by Chemical Facilities Not Determined to be High Risk, by FY

FY	Number of Chemical Facilities
2007	789
2008	28,626
2009	779
2010	716
2011	548
2012	406
2013	1,221
2014	702
2015	678
2016	592
Total	**35,057**

Table 6-2 presents the number of high-risk chemical facilities that submitted a Top-Screen to the CFATS program, broken down by tier and security issue. This table presents initial Top-Screen submissions, which was used to count the number of unique facilities that submitted a Top-Screen and does not account for subsequent submissions.

Table 6-2: Count of Initial Top-Screen Submissions by Covered Chemical Facilities, by FY, Tier, and Security Issue

FY	Tier 1		Tier 2		Tier 3		Tier 4		Total
	Release	Theft/ Diversion	Release	Theft/ Diversion	Release	Theft/ Diversion	Release	Theft/ Diversion	
2007	25	3	8	1	12	53	14	51	**167**
2008	61	45	40	21	82	855	418	774	**2,296**
2009	0	5	0	3	3	57	11	41	**120**
2010	1	0	0	2	1	48	8	39	**99**
2011	3	2	0	2	1	41	7	18	**74**
2012	1	1	0	1	1	19	8	25	**56**
2013	2	2	0	1	7	26	13	49	**100**
2014	0	1	0	0	0	41	12	37	**91**
2015	3	0	0	1	1	52	10	78	**145**
2016	1	1	0	1	2	24	2	37	**68**
Total	**97**	**60**	**48**	**33**	**110**	**1,216**	**503**	**1,149**	**3,216**

In total, as presented in Table 6-1 and Table 6-2, since FY 2007, the CFATS program has received initial Top-Screens from 38,273 chemical facilities of which 3,216 are currently considered high-risk chemical facilities.

6.2 Wage Rates

CISA estimates the cost of certain provisions and requirements by calculating the cost associated with facility personnel performing a required function. These estimated costs are based on time burden estimates and average hourly compensation rates.

To calculate the average compensation rates, CISA uses U.S. Bureau of Labor Statistics (BLS) Occupational Employment Statistics data on hourly wage rates for eight employment types multiplied by a benefits multiplier that is derived from the ratio of total compensation over salaries and wages.[48,49] Table 6-3 presents the employee types used in this analysis along with the corresponding occupation title from BLS, the hourly wage rates, and the hourly compensation rates.

[48] Mean hourly wage data are obtained from U.S. Department of Labor, BLS; May 2017 Occupational Profiles, United States. Retrieved from https://www.bls.gov/oes/2017/may/oes_stru.htm.

[49] The load factor is based on BLS Employer Cost for Employee Compensation - December 2017. Released March 20, 2018. Table 1. Employer costs per hour worked for employee compensation and costs as a percent of total compensation: civilian workers, by major occupational and industry group, December 2017. Retrieved from https://www.bls.gov/news.release/archives/ecec_03202018.pdf. Load factor = Employer cost for employee compensation ($35.87) ÷ wages and salaries ($24.49) = 1.4647.

Table 6-3: Hourly Wage Rates, by Employment Type (2017$)

Labor Category	BLS Occupation Title (occupation code in parentheses)	Average Hourly Wage Rate (A)	Average Hourly Compensation Rate (B) = (A) × 1.46
Site Security Officers (SSOs)	Managers, All Other (11-9199)	$54.41	$79.69
Corporate Security Officers	Chief Executives (11-1011)	$94.25	$138.05
Engineering/Technical Staff	Chemical Engineers (17-2041)	$54.05	$79.17
Environmental, Health, & Safety Professionals	Environmental Science & Protection Technicians, Including Health (19-4091)	$23.71	$34.73
Clerical Staff	First-Line Supervisors of Office & Administrative Support Workers (43-1011)	$28.14	$41.22
Senior Management	General & Operations Managers (11-1021)	$59.35	$86.93
Lawyers	Lawyers (23-1011)	$68.22	$99.92
Employees in the Chemical Manufacturing Industry	All Occupations in Chemical Manufacturing Industry[a] (00-0000)	$57.23	$83.82

[a] To estimate the hourly wage rate for employees in the chemical manufacturing industry, CISA uses BLS's 90th percentile hourly wage for all occupations (00-0000) in the Chemical Manufacturing industry under the North American Industry Classification System code 325. Retrieved from https://www.bls.gov/oes/2017/may/naics3_325000.htm. CISA used the 90th percentile hourly wage as a conservative baseline wage, because subject-matter experts in the 2007 RIA assumed that those who would perform the required activities would have higher wages than other occupations in the industry.

6.3 Chemical Security Assessment Tool Costs

CSAT is the online portal that chemical facilities are required to use when submitting information to CISA. In particular, CSAT allows chemical facilities to submit information so that CISA can determine which chemical facilities are considered high risk under CFATS. CSAT costs consist primarily of the time necessary for an SSO to prepare and submit required information into CSAT (e.g., user registration with CSAT, a Top-Screen, SVA, and ASP or SSP).[50] In addition, CISA calculates the costs associated with a facility's time spent contacting the CSAT Help Desk for assistance in complying with CFATS.

[50] In this retrospective analysis, we estimate the costs associated with the submission of SVAs, ASPs, and SSPs separately, based on the submission records in CSAT. ASP submissions were considered ASPs in lieu of SSPs for the purpose of this analysis. CFATS also offers an EAP for Tier 3 and Tier 4 facilities that choose to comply with predetermined security measures. For this analysis, we do not include costs associated with EAP, as there were only two facilities that submitted an EAP during the analysis period. This does not imply that all facilities completed every submission.

While the methodology for calculating these costs has not changed since the 2007 RIA, the assumptions regarding the time necessary for an SSO to prepare and submit information in compliance with CFATS has been updated to reflect observed data from chemical facilities. Costs associated with an SSO's time are based on the hourly compensation rate of an SSO, which is estimated to be $79.69 (see Table 6-3).

6.3.1 Chemical Security Assessment Tool User Registration

To calculate the cost of CSAT user registration, CISA multiplied the expected time burden of an SSO by the hourly compensation rate of an SSO. Based on publicly reviewed and verified time burdens presented in ICR supporting documentation, CISA estimated that CSAT user registration would take 2 hours of an SSO's time to complete.[51] As such, the estimated cost to complete the CSAT user registration is $159.39 per facility (= 2 hours × $79.69/hour).

Because this burden is the same for all chemical facilities, we apply this cost to each instance of a CSAT registration over the 10-year analysis period, regardless of facility type and regulated status, including those facilities not considered to be high risk at the time of this analysis. As presented in Table 6-4, the estimated 10-year cost for CSAT user registration is $6.1 million in 2017 dollars.

Table 6-4: Estimated 10-Year CSAT User Registration Costs, by FY (2017$)

FY	Number of Facilities (A)	CSAT User Registration Cost (B) = (A) × $159.39
2007	956	$152,373
2008	30,922	$4,928,547
2009	899	$143,288
2010	815	$129,900
2011	622	$99,138
2012	462	$73,637
2013	1,321	$210,549
2014	793	$126,393
2015	823	$131,175
2016	660	$105,195
Total	**38,273**	**$6,100,196**

Note: Values may not total due to rounding.

[51] The time burden was obtained from the supporting statement for the Paperwork Reduction Act CSAT ICR (OMB Control Number 1670-0007), as approved on October 11, 2014. Retrieved from https://www.reginfo.gov/public/do/PRAViewDocument?ref_nbr=201303-1670-001. This ICR details the time burdens necessary to complete SVA/ASP and ASP/SSP submissions. Although there is not a specific ICR instrument for ASPs, for this analysis, the ASP in lieu of SSP is separated from the SSP.

6.3.2 Chemical Security Assessment Tool Top-Screen

As with the CSAT user registration costs, Top-Screen costs are based on the time necessary for an SSO to complete and submit a Top-Screen survey to CISA. Based on data from the same ICR package referenced in Section 6.3.1, CISA estimates the time necessary to complete a Top-Screen to be 11.25 hours per submission. The hourly compensation rate of $79.69 multiplied by 11.25 hours gives us a cost of $896.55 per Top-Screen (= 11.25 hours × $79.69/hour). We apply this cost to each instance of a Top-Screen submission over the 10-year analysis period. The number of Top-Screen submissions is greater than the number of CSAT user registrations because some facilities submit more than one Top-Screen. As presented in Table 6-5, the 10-year cost for Top-Screen submissions is $47.4 million in 2017 dollars.

Table 6-5: Estimated 10-Year CSAT Top-Screen Costs, by FY (2017$)

FY	Number of Top-Screen Submissions (A)	CSAT Top-Screen Cost (B) = (A) × $896.55
2007	957	$857,997
2008	32,636	$29,259,760
2009	3,711	$3,327,092
2010	3,068	$2,750,611
2011	1,879	$1,684,615
2012	1,295	$1,161,030
2013	2,381	$2,134,682
2014	2,288	$2,051,303
2015	2,718	$2,436,819
2016	1,990	$1,784,132
Total	**52,923**	**$47,448,042**

Note: Values may not total due to rounding.

6.3.3 Preparation and Submission of Security Vulnerability Assessments

As with Top-Screens and CSAT user registrations, for this analysis, CISA bases the cost of SVA preparation and submission on the time necessary for an SSO to complete the submission. Based on data from the same ICR package referenced in Section 6.3.1, we estimate that 65 hours of an SSO's time are necessary to prepare and submit an SVA, at an hourly compensation rate of $79.69, which results in a cost per SVA of $5,180 (= 65 hours × $79.69/hour). Table 6-6 presents the number of SVAs submitted by fiscal year and the total cost of SVA preparation and submission. Note that the costs presented in this section are only for those facilities that were designated as high risk. The estimated 10-year cost for SVA preparation and submission for Tier 1 through 4 high-risk facilities is $22.2 million in 2017 dollars.

Table 6-6: Estimated 10-Year SVA Preparation and Submission Costs for Tier 1–4 Facilities, by FY (2017$)

FY	Number of Submissions (A)	SVA Cost (B) = (A) × $5,180
2007	0	$0
2008	194	$1,004,931
2009	1,896	$9,821,391
2010	233	$1,206,954
2011	157	$813,269
2012	144	$745,928
2013	408	$2,113,464
2014	360	$1,864,821
2015	500	$2,590,029
2016	396	$2,051,303
Total	**4,288**	**$22,212,091**

Note: Values may not total due to rounding.

6.3.4 Alternative Security Program Preparation and Submission for Tier 1 through 4 Facilities

Under the CFATS program, the Department allows for facilities to complete an ASP in lieu of an SSP. CISA bases the cost of ASP preparation and submission on the time necessary for an SSO to complete a submission. CISA estimates that the time necessary for an ASP is the same for all facilities submitting, regardless of tier and security issue. Based on data from the same ICR package referenced in Section 6.3.1, we estimate that 65 hours of an SSO's time are necessary to prepare and submit an ASP. With an hourly compensation rate of $79.69, the cost per ASP is estimated to be $5,180 (= 65 hours × $79.69/hour).[52] Table 6-7 presents the number of ASPs submitted by fiscal year and the total cost of ASP preparation and submission. Note that the costs presented in this section are only for those facilities that were designated as high risk. The estimated 10-year cost for ASP preparation and submission for Tier 1 through 4 high-risk facilities is $7.5 million in 2017 dollars.

[52] The CSAT ICR (OMB Control Number 1670-0007) that was approved on October 11, 2014, provides time burden estimates for SVA/ASPs (65 hours) and SSP/ASPs (225 hours). For the purpose of this analysis, CISA used 65 hours as the burden estimate for ASPs, based on the assumption that completing an ASP would be less burdensome than completing an SSP.

Table 6-7: Estimated 10-Year ASP Preparation and Submission Costs for Tier 1–4 Facilities, by FY (2017$)

FY	Number of Facilities (A)	ASP Cost (B) = (A) × $5,180
2007	0	$0
2008	0	$0
2009	5	$25,900
2010	183	$947,951
2011	37	$191,662
2012	11	$56,981
2013	59	$305,623
2014	227	$1,175,873
2015	525	$2,719,531
2016	400	$2,072,023
Total	**1,447**	**$7,495,545**

Note: Values may not total due to rounding.

6.3.5 Preparation and Submission of Site Security Plan

Costs for SSP preparation and submission are based on the time necessary for an SSO to complete the process. Based on data from the same ICR package referenced in Section 6.3.1, CISA estimates that an SSP will need 225 hours of an SSO's time at an hourly compensation rate of $79.69, for a cost per SSP of $17,931 (= 225 hours × $79.69/hour). Table 6-8 presents the number of SSPs submitted per fiscal year and the total cost of SSP preparation and submission. Note that the costs presented in this section are only for those facilities that were designated as high risk. The estimated 10-year cost for SSP preparation and submission for Tier 1 through 4 high-risk facilities is $97.0 million in 2017 dollars.

Table 6-8: Estimated 10-Year SSP Preparation and Submission Costs for Tier 1–4 Facilities, by FY (2017$)

FY	Number of Facilities (A)	SSP Cost (B) = (A) × $17,931
2007	0	$0
2008	0	$0
2009	107	$1,918,614
2010	1,453	$26,053,703
2011	347	$6,222,047
2012	72	$1,291,030
2013	672	$12,049,613
2014	1,006	$18,038,558
2015	999	$17,913,041
2016	751	$13,466,160
Total	**5,407**	**$96,952,766**

Note: Values may not total due to rounding.

6.3.6 Preparation and Submission Costs to Complete SVAs and SSPs for Chemical Facilities No Longer Considered High Risk

Since implementation of CFATS over 10 years ago, a number of high-risk chemical facilities have had their regulatory status change, either due to changes in the CFATS program or changes to the chemical facility's business operations. In Sections 6.3.3 through 6.3.5 of this analysis, CISA presents the costs associated with SVAs and SSPs at high-risk chemical facilities at the time of this analysis. There are a number of chemical facilities, however, that completed one of these submissions because they were previously considered to be high risk, the costs of which are not accounted for in Sections 6.3.3 through 6.3.5. In addition, this analysis accounts for the cost of SVAs completed by facilities in order to determine their risk status; whereas now this cost is not incurred as the overall tier determination is completed at the Top-Screen and is then confirmed at the SVA stage.

CISA estimates the costs of SVAs and SSPs for these chemical facilities using the same time burden hours and hourly compensation rates presented in Sections 6.3.3 through 6.3.5. Table 6-9 presents the costs to chemical facilities considered high risk at the time of submission but that were later determined not to be high risk. The estimated 10-year cost for SVA and SSP preparation and submission by facilities no longer considered high risk is $103.1 million in 2017 dollars.

Table 6-9: Estimated 10-Year SVA, ASP, and SSP Preparation and Submission Costs for Not Currently Covered Facilities, by FY (2017$)

FY	SVA		ASP		SSP		Total
	Facility Count (A)	**Cost (B) = (A) × $5,180**	**Facility Count (C)**	**Cost (D) = (C) × $5,180**	**Facility Count (E)**	**Cost (F) = (E) × $17,931**	**Cost (G) = (B) + (D) + (F)**
2007	0	$0	0	$0	0	$0	**$0**
2008	330	$1,709,419	0	$0	0	$0	**$1,709,419**
2009	5,190	$26,884,504	2	$10,360	49	$878,618	**$27,773,482**
2010	682	$3,532,800	131	$678,588	1,857	$33,297,815	**$37,509,203**
2011	349	$1,807,840	32	$165,762	323	$5,791,704	**$7,765,306**
2012	166	$859,890	5	$25,900	21	$376,550	**$1,262,340**
2013	395	$2,046,123	29	$150,222	246	$4,411,019	**$6,607,364**
2014	267	$1,383,076	75	$388,504	335	$6,006,876	**$7,778,456**
2015	318	$1,647,259	176	$911,690	344	$6,168,254	**$8,727,203**
2016	212	$1,098,172	72	$372,964	139	$2,492,405	**$3,963,542**
Total	**7,909**	**$40,969,084**	**522**	**$2,703,991**	**3,314**	**$59,423,242**	**$103,096,316**

Note: Values may not total due to rounding.

6.3.7 Help Desk

CISA provides a Help Desk for facilities to call when they require assistance in completing their CSAT submissions. To estimate the costs of Help Desk usage for facilities, CISA looked at historical Help Desk call center data by fiscal year, which included information on the number and duration of calls. Based on these data, we determined that calls placed in FYs 2007 and 2008 took an average of 20 minutes and calls thereafter took an average of 10 minutes. These time burdens were then multiplied by the SSO hourly compensation rate of $79.69 to get average Help Desk costs of $27 per call from FYs 2007 to 2008 and $13 per call from FYs 2009 to 2016. Table 6-10 presents the costs of Help Desk calls, which is estimated to total $2.2 million in 2017 dollars over the 10-year analysis period.

Table 6-10: Estimated 10-Year Help Desk Costs, by FY (2017$)

FY	Number of Help Desk Support Cases (A)	Average Cost per Case (B)	Help Desk Cost (C) = (A) × (B)
2007	3,423	$27	$90,930
2008	24,487	$27	$650,483
2009	18,106	$13	$240,488
2010	16,070	$13	$213,445
2011	9,825	$13	$130,498
2012	9,116	$13	$121,081
2013	15,166	$13	$201,438
2014	16,406	$13	$217,908
2015	15,774	$13	$209,513
2016	12,505	$13	$166,094
Total	**140,878**		**$2,241,876**

Note: Values may not total due to rounding.

6.3.8 Chemical Security Assessment Tool Cost Summary

Table 6-11 presents the undiscounted 10-year cost summary for CSAT costs, which CISA estimates at $285.5 million in 2017 dollars.

Table 6-11: CSAT Cost Summary, by FY (Thousands of 2017$)

FY	CSAT Registration	Top-Screen	SVA[a]	ASP[b]	SSP[c]	SVA, ASP, & SSP[d]	Help Desk	Total	
								(Undiscounted)	(7% Discount)
2007	$152	$858	$0	$0	$0	$0	$91	**$1,101**	**$1,029**
2008	$4,929	$29,260	$1,005	$0	$0	$1,709	$650	**$37,553**	**$32,800**
2009	$143	$3,327	$9,821	$26	$1,919	$27,773	$240	**$43,250**	**$35,305**
2010	$130	$2,751	$1,207	$948	$26,054	$37,509	$213	**$68,812**	**$52,496**
2011	$99	$1,685	$813	$192	$6,222	$7,765	$130	**$16,907**	**$12,054**
2012	$74	$1,161	$746	$57	$1,291	$1,262	$121	**$4,712**	**$3,140**
2013	$211	$2,135	$2,113	$306	$12,050	$6,607	$201	**$23,623**	**$14,711**
2014	$126	$2,051	$1,865	$1,176	$18,039	$7,778	$218	**$31,253**	**$18,190**
2015	$131	$2,437	$2,590	$2,720	$17,913	$8,727	$210	**$34,727**	**$18,889**
2016	$105	$1,784	$2,051	$2,072	$13,466	$3,964	$166	**$23,608**	**$12,001**
Total[e]	**$6,100**	**$47,448**	**$22,212**	**$7,496**	**$96,953**	**$103,096**	**$2,242**	**$285,547**	**$92,153**

[a] This includes SVA costs only for Tier 1–4 facilities (as discussed in Section 6.3.3).
[b] This includes ASP costs only for Tier 1–4 facilities (as discussed in Section 6.3.4).
[c] This includes SSP costs only for Tier 1–4 facilities (as discussed in Section 6.3.5).
[d] This includes SVA, ASP, and SSP costs only for not currently covered (i.e., formerly high-risk) facilities (as discussed in Section 6.3.6).
[e] Values may not total due to rounding.

6.4 Security Measure Costs

This section discusses the cost to implement security measures to comply with the RBPSs. We assume that all facilities that have submitted an ASP or SSP would incur costs to implement security measures. Table 6-12 presents the number of submitted ASPs and SSPs by tier and security issue.

Table 6-12: Count of Initial ASP and SSP Submissions by Covered Chemical Facilities, by FY, Tier, and Security Issue

FY	Tier 1		Tier 2		Tier 3		Tier 4	
	Release	Theft/ Diversion	Release	Theft/ Diversion	Release	Theft/ Diversion	Release	Theft/ Diversion
2007	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0
2009	25	30	6	4	1	30	1	15
2010	58	17	30	8	46	704	137	576
2011	6	2	3	2	3	96	22	97
2012	0	0	0	0	0	1	0	2
2013	1	3	0	3	1	12	1	13
2014	3	0	0	1	1	47	6	63
2015	3	2	1	1	1	74	9	77
2016	3	1	0	2	2	64	4	78
Total	**99**	**55**	**40**	**21**	**55**	**1,028**	**180**	**921**

As discussed in Section 5.2, the methodology used in this retrospective analysis differs significantly from that used in the 2007 RIA. The retrospective analysis methodology relies on data collected from approved SSPs to estimate the level of security measure investment at CFATS facilities rather than subject-matter expertise as used in the 2007 RIA.

In this analysis, security measures are broken down into three categories: perimeter controls, monitoring systems, and security support. Using the planned measure data, as discussed in Section 5.2, CISA grouped the different measures into the three categories and costs were averaged across facilities, based on tier and security issue. This grouping allows CISA to apply the costs of all measures more broadly to each covered chemical facility and to account for cases where a small number of facilities listed particular measures as planned measures in their SSPs.

These estimated security measure costs are based on GSA Advantage pricing, as discussed in Appendix A. Costs for some security measures include a 25-percent multiplier that was added to account for the costs of miscellaneous material needs. Table 6-13 and Table 6-14 present the average cost in 2017 dollars for the security measures listed in the SSPs for release and theft/diversion facilities, respectively.[53] These tables demonstrate some of the differences in the average cost of security measures at facilities based on tier and security issue.

[53] The costs presented in Tables 6-12 and 6-13 represent the average of the equipment and labor costs reported for each facility SSP in the sample that was analyzed, averaging only non-zero costs for each security measure.

Table 6-13: Average Security Measure Start-Up Costs for Release Facilities, by Security Measure Category, Security Measure, and Tier (2017$)

Security Measure Category	Security Measure	Tier 1	Tier 2	Tier 3	Tier 4	Weighted Average[a]
Perimeter Controls	Chain-Link Fencing	$27,518	$20,384	$15,833	$18,653	**$18,334**
	Chain-Link Cages	$2,695	$4,492	$3,593	$2,695	**$3,675**
	Pedestrian Gates	$7,397	$36,986	$9,246	$11,096	**$19,502**
	Vehicle Gates	$17,144	$28,105	$19,929	$16,863	**$20,443**
	Chains	-	$407	$153	$127	**$205**
	Signage	$160	$821	$620	$527	**$555**
Monitoring Systems	Indoor IDSs	-	$15,732	$15,732	$15,732	**$15,732**
	Outdoor IDSs	$23,793	$23,793	$23,793	$23,793	**$23,793**
	Access Control Systems	-	$27,674	$25,884	$27,013	**$26,389**
	Indoor Cameras	-	$2,046	$1,297	$3,065	**$2,025**
	Outdoor Cameras	$9,334	$18,621	$10,581	$9,976	**$12,204**
	Indoor CCTV Systems	$10,073	$10,072	$10,072	$10,072	**$10,073**
	Outdoor CCTV Systems	$23,793	$23,793	$23,793	$23,793	**$23,793**
	Locks	$80	$110	$94	$116	**$100**
	Doors	-	$4,350	$2,900	$1,740	**$3,190**
Security Support	Monitoring 3rd Party	$1,222	$1,222	$1,222	$1,222	**$1,222**
	Lighting	$2,147	$2,147	$2,147	$2,147	**$2,147**
	Concrete Barriers	-	$11,320	$8,254	$3,980	**$7,075**
	Planter-Style Barriers	-	$6,540	-	-	**$6,540**
	Other	-	$13,256	$1,961	$2,814	**$4,492**

[a] The average security measure cost is weighted by the number of facilities with security measure cost data in each tier.

Table 6-14: Average Initial Security Measure Start-Up Costs for Theft/Diversion Facilities, by Security Measure Category, Security Measure, and Tier (2017$)

Security Measure Category	Security Measure	Tier 1	Tier 2	Tier 3	Tier 4	Weighted Average[a]
Perimeter Controls	Chain-Link Fencing	$22,764	$14,910	$15,724	$15,917	**$15,832**
	Chain-Link Cage	$4,492	$4,397	$3,423	$2,999	**$3,386**
	Pedestrian Gates	$7,397	$8,454	$7,397	$11,624	**$9,078**
	Vehicle Gates	$16,863	$16,863	$24,358	$17,917	**$21,079**
	Chain	$241	$136	$110	$130	**$128**
	Signage	$335	$444	$351	$342	**$360**
Monitoring Systems	Indoor IDS	$15,733	$15,732	$15,732	$15,732	**$15,732**
	Outdoor IDS	$23,793	$23,793	$23,793	$23,793	**$23,793**
	Access Control Systems	$27,248	$27,517	$26,439	$26,793	**$26,962**
	Indoor Cameras	$12,975	$4,157	$2,337	$21,062	**$12,020**
	Outdoor Cameras	$10,654	$21,060	$13,675	$16,294	**$15,989**
	Indoor CCTV System	$10,073	$10,072	$10,072	$10,072	**$10,072**
	Outdoor CCTV System	$23,793	$23,793	$23,793	$23,793	**$23,793**
	Locks	$152	$130	$129	$111	**$123**
	Doors	$3,480	$2,436	$3,480	$2,755	**$2,923**
Security Support	Monitoring 3rd Party	$1,222	$1,222	$1,222	$1,222	**$1,222**
	Lighting	$2,147	$2,147	$2,147	$2,147	**$2,147**
	Concrete Barriers	-	$3,538	$3,538	$3,538	**$3,538**
	Planter-Style Barriers	-	-	-	-	**-**
	Other	$28,416	$3,439	$23,137	$31,849	**$22,572**

[a] The average security measure cost is weighted by the number of facilities with security measure cost data in each tier.

In Sections 6.4.1 through 6.4.3, CISA estimates one-time, start-up costs for security measures, which include costs for purchase and installation of equipment and infrastructure, as well as annual costs, which include costs associated with operations and maintenance (O&M) and the replacement of equipment.[54] These costs include labor costs associated with implementing each security measure, as discussed in Section 5.2.3 and Appendix A.

6.4.1 Perimeter Controls

Chain-link fencing, chain-link cages, pedestrian gates, vehicle gates, chains, and signage are the main components of the costs associated with perimeter controls. As discussed in detail in

[54] This includes replacement costs for equipment with an estimated useful life shorter than the period of analysis.

Section 5.2, CISA estimates costs for the security measures by calculating the average capital and labor costs for each tier and security issue based on the planned measures contained in the approved SSPs that were submitted to CISA. Table 6-15 presents the average start-up cost in 2017 dollars for the perimeter controls used in this retrospective analysis.[55]

Table 6-15: Average Start-Up Costs for Perimeter Controls, by Tier, Security Issue, and Cost Type (2017$)

Tier	Release			Theft/Diversion		
	Equipment	Labor	Total	Equipment	Labor	Total
1	$13,012	$10,195	**$23,207**	$6,105	$4,371	**$10,476**
2	$20,353	$11,120	**$31,473**	$4,977	$4,130	**$9,107**
3	$6,347	$5,912	**$12,259**	$6,644	$6,533	**$13,178**
4	$6,718	$5,425	**$12,143**	$4,552	$3,881	**$8,433**

Note: Values may not total due to rounding.

CISA also estimates annual costs associated with security measures. Annual costs include costs to replace equipment when necessary,[56] based on the average useful life of any capital expenses, as well as O&M costs, which CISA estimates to be an annual cost equal to 10 percent of the start-up cost.

Applying the above costs per facility to the population of covered chemical facilities that have submitted an ASP or SSP for the 10-year analysis period (see Table 6-12) yields an estimated 10-year total cost of $42.9 million for perimeter controls in 2017 dollars. Table 6-16 presents the breakdown of this cost by start-up costs and annual costs, aggregated for all tiers. Table 6-17 presents the total cost of perimeter controls, including both start-up and annual costs, by tier, over the 10-year analysis period.

[55] Start-up costs include the initial cost of the capital necessary, and the labor and installation costs. It does not include replacement or annual O&M costs. Those are included in annual costs.

[56] For a detailed discussion on replacement costs, including intervals for replacement, see Appendix B.

Table 6-16: Estimated 10-Year Cost of Perimeter Controls, by FY and Cost Type (2017$)

FY	Start-Up Costs	Annual Costs	Total Cost
2007	$0	$0	**$0**
2008	$0	$0	**$0**
2009	$1,665,968	$0	**$1,665,968**
2010	$18,903,231	$166,597	**$19,069,828**
2011	$2,659,821	$2,056,920	**$4,716,741**
2012	$30,044	$2,322,902	**$2,352,946**
2013	$374,122	$2,325,906	**$2,700,029**
2014	$1,314,483	$2,363,319	**$3,677,802**
2015	$1,877,200	$2,494,767	**$4,371,967**
2016	$1,672,558	$2,682,487	**$4,355,045**
Total	**$28,497,428**	**$14,412,898**	**$42,910,326**

Note: Values may not total due to rounding.

Table 6-17: Estimated 10-Year Cost of Perimeter Controls, by FY and Tier (2017$)

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	$0	$0	$0	$0	**$0**
2008	$0	$0	$0	$0	**$0**
2009	$894,472	$225,266	$407,592	$138,639	**$1,665,968**
2010	$1,613,570	$1,039,570	$9,881,813	$6,534,874	**$19,069,828**
2011	$402,056	$236,864	$2,326,707	$1,751,114	**$4,716,741**
2012	$257,879	$135,494	$1,168,227	$791,346	**$2,352,946**
2013	$312,515	$162,815	$1,326,759	$897,939	**$2,700,029**
2014	$332,965	$147,333	$1,805,020	$1,392,484	**$3,677,802**
2015	$360,880	$179,717	$2,223,981	$1,607,390	**$4,371,967**
2016	$359,461	$161,409	$2,203,203	$1,630,972	**$4,355,045**
Total	**$4,533,798**	**$2,288,469**	**$21,343,301**	**$14,744,758**	**$42,910,326**

Note: Values may not total due to rounding.

6.4.2 Monitoring Systems

Indoor and outdoor IDSs, access control systems, indoor and outdoor cameras, indoor and outdoor CCTV systems, locks, and doors are the main components of the costs associated with monitoring systems. As discussed in detail in Section 5.2, CISA estimates costs for these security measures by calculating the average capital and labor costs for each tier and security issue based

on the planned measures contained in the approved SSPs that were submitted to CISA. Table 6-18 presents the average start-up cost in 2017 dollars for monitoring systems used in this retrospective analysis.[57]

Table 6-18: Average Start-Up Costs for Monitoring Systems, by Tier, Security Issue, and Cost Type (2017$)

Tier	Release			Theft/Diversion		
	Equipment	Labor	Total	Equipment	Labor	Total
1	$15,293	$2,550	**$17,843**	$21,467	$13,700	**$35,167**
2	$18,839	$8,495	**$27,334**	$21,744	$10,161	**$31,905**
3	$19,383	$8,233	**$27,616**	$16,130	$7,227	**$23,357**
4	$17,384	$5,627	**$23,011**	$15,176	$7,754	**$22,930**

Note: Values may not total due to rounding.

CISA also estimates annual costs associated with security measures. Annual costs include costs to replace equipment when necessary, based on the average useful life of any capital expenses, as well as O&M costs, which CISA estimates to be an annual cost equal to 10 percent of the start-up cost.

Applying the above costs per facility to the population of covered chemical facilities that have submitted an ASP or SSP for the 10-year analysis period (see Table 6-12) yields an estimated cost of $90.7 million for monitoring systems in 2017 dollars. Table 6-19 presents the breakdown of this cost by start-up costs and annual costs, aggregated for all tiers. Table 6-20 presents the total cost of monitoring systems, including both start-up and annual costs, by tier, over the 10-year analysis period.

[57] Start-up costs include the initial cost of the capital necessary and the labor and installation costs. It does not include replacement or annual O&M costs. Those are included in annual costs.

Table 6-19: Estimated 10-Year Cost of Monitoring Systems, by FY and Cost Type (2017$)

FY	Start-Up Costs	Annual Costs	Total Cost
2007	$0	$0	**$0**
2008	$0	$0	**$0**
2009	$2,888,014	$0	**$2,888,014**
2010	$36,782,244	$288,801	**$37,071,045**
2011	$5,378,837	$3,967,026	**$9,345,863**
2012	$69,218	$4,504,910	**$4,574,127**
2013	$848,069	$4,511,831	**$5,359,901**
2014	$2,793,516	$4,596,638	**$7,390,155**
2015	$3,911,889	$5,398,100	**$9,309,989**
2016	$3,583,210	$11,130,924	**$14,714,134**
Total	**$56,254,997**	**$34,398,231**	**$90,653,228**

Note: Values may not total due to rounding.

Table 6-20: Estimated 10-Year Cost of Monitoring Systems, by FY and Tier (2017$)

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	$0	$0	$0	$0	**$0**
2008	$0	$0	$0	$0	**$0**
2009	$1,501,087	$291,628	$728,334	$366,965	**$2,888,014**
2010	$1,782,839	$1,104,436	$17,786,693	$16,397,077	**$37,071,045**
2011	$490,774	$282,504	$4,169,366	$4,403,219	**$9,345,863**
2012	$331,121	$151,272	$2,100,091	$1,991,643	**$4,574,127**
2013	$454,465	$246,989	$2,386,973	$2,271,474	**$5,359,901**
2014	$396,984	$192,749	$3,235,268	$3,565,153	**$7,390,155**
2015	$778,492	$264,205	$4,114,557	$4,152,735	**$9,309,989**
2016	$920,717	$386,017	$7,233,517	$6,173,882	**$14,714,134**
Total	**$6,656,479**	**$2,919,800**	**$41,754,800**	**$39,322,148**	**$90,653,228**

Note: Values may not total due to rounding.

6.4.3 Security Support

Third-party monitoring, lighting, concrete barriers, planter-style barriers, and other measures such as security guards are the main components of the costs associated with security support. As discussed in detail in Section 5.2, CISA estimates costs for these security measures by calculating the average capital and labor costs for each tier and security issue based on the

planned measures contained in the approved SSPs that were submitted to CISA Table 6-21 presents the average start-up cost in 2017 dollars for security support used in this retrospective analysis.[58]

Table 6-21: Average Start-up Cost for Security Support, by Tier, Security Issue, and Cost Type (2017$)

Tier	Release			Theft/Diversion		
	Equipment	Labor	Total	Equipment	Labor	Total
1	$1,305	$676	**$1,981**	$14,835	$732	**$15,567**
2	$8,701	$4,261	**$12,962**	$2,375	$729	**$3,104**
3	$1,735	$1,396	**$3,131**	$6,786	$789	**$7,575**
4	$2,141	$1,138	**$3,279**	$12,112	$817	**$12,929**

Note: Values may not total due to rounding.

CISA also estimates annual costs associated with security measures. Annual costs include costs to replace equipment when necessary, based on the average useful life of any capital expenses, as well as O&M costs, which CISA estimates to be an annual cost equal to 10 percent of the start-up cost.

Applying the above costs per facility to the population of covered chemical facilities that have submitted an ASP or SSP for the 10-year analysis period (see Table 6-12) yields an estimated cost of $32.9 million for security support in 2017 dollars. Table 6-22 presents the breakdown of this cost by start-up costs and annual costs, aggregated for all tiers. Table 6-23 presents the total cost of security support, including both start-up and annual costs, by tier, over the 10-year analysis period.

[58] Start-up costs include the initial cost of the capital necessary and the labor and installation costs. It does not include replacement or annual O&M costs. Those are included in annual costs.

Table 6-22: Estimated 10-Year Cost of Security Support, by FY and Cost Type (2017$)

FY	Start-Up Costs	Annual Costs	Total
2007	$0	$0	**$0**
2008	$0	$0	**$0**
2009	$1,034,316	$0	**$1,034,316**
2010	$14,165,920	$103,432	**$14,269,351**
2011	$2,150,889	$1,520,024	**$3,670,912**
2012	$33,432	$1,735,112	**$1,768,544**
2013	$323,372	$1,738,456	**$2,061,828**
2014	$1,202,364	$1,770,793	**$2,973,157**
2015	$1,641,814	$1,891,029	**$3,532,843**
2016	$1,540,306	$2,055,211	**$3,595,517**
Total	**$22,092,412**	**$10,814,056**	**$32,906,468**

Note: Values may not total due to rounding.

Table 6-23: Estimated 10-Year Cost of Security Support, by FY and Tier (2017$)

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	$0	$0	$0	$0	**$0**
2008	$0	$0	$0	$0	**$0**
2009	$516,551	$90,187	$230,370	$197,208	**$1,034,316**
2010	$431,218	$422,705	$5,499,594	$7,915,835	**$14,269,351**
2011	$132,634	$95,481	$1,307,250	$2,135,547	**$3,670,912**
2012	$93,914	$54,897	$651,923	$967,811	**$1,768,544**
2013	$142,597	$64,208	$739,132	$1,115,891	**$2,061,828**
2014	$104,726	$58,932	$1,013,647	$1,795,852	**$2,973,157**
2015	$136,455	$72,204	$1,254,077	$2,070,107	**$3,532,843**
2016	$124,596	$63,952	$1,237,826	$2,169,142	**$3,595,517**
Total	**$1,682,691**	**$922,564**	**$11,933,819**	**$18,367,393**	**$32,906,468**

Note: Values may not total due to rounding.

6.4.4 Security Measure Summary

For the 10-year analysis period, CISA estimates that facilities spent $166.5 million in 2017 dollars on security measures, including replacement and O&M costs. Table 6-24 presents the 10-year costs for security measures, broken out by tier and security issue, and Table 6-25 presents security measure costs by fiscal year for each tier.

Table 6-24: Estimated 10-Year Cost for Security Measures, by Tier and Security Issue (2017$)

Tier	Release	Theft/Diversion	Total
1	$7,254,806	$5,618,162	**$12,872,968**
2	$4,719,632	$1,411,202	**$6,130,834**
3	$3,863,660	$71,168,260	**$75,031,920**
4	$11,245,818	$61,188,482	**$72,434,300**
Total	**$27,083,917**	**$139,386,105**	**$166,470,022**

Note: Values may not total due to rounding.

Table 6-25: Estimated 10-Year Security Measure Costs, by FY and Tier (2017$)

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total	
					(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	**$0**	**$0**
2008	$0	$0	$0	$0	**$0**	**$0**
2009	$2,912,110	$607,081	$1,366,296	$702,812	**$5,588,299**	**$4,561,716**
2010	$3,827,628	$2,566,711	$33,168,100	$30,847,786	**$70,410,225**	**$53,715,623**
2011	$1,025,464	$614,849	$7,803,323	$8,289,880	**$17,733,516**	**$12,643,752**
2012	$682,914	$341,662	$3,920,241	$3,750,800	**$8,695,618**	**$5,794,257**
2013	$909,577	$474,012	$4,452,864	$4,285,303	**$10,121,757**	**$6,303,321**
2014	$834,675	$399,014	$6,053,935	$6,753,489	**$14,041,114**	**$8,172,056**
2015	$1,275,827	$516,126	$7,592,614	$7,830,232	**$17,214,799**	**$9,363,710**
2016	$1,404,774	$611,379	$10,674,547	$9,973,997	**$22,664,696**	**$11,521,582**
Total	**$12,872,968**	**$6,130,834**	**$75,031,920**	**$72,434,300**	**$166,470,022**	**$112,076,018**

Note: Values may not total due to rounding.

6.5 Personnel and Readiness Costs

This category of costs includes those associated with training staff, conducting security drills, and the PSP. This section also would have included costs associated with visitor escorts, but as discussed in Section 5.3.3, CISA believes that escorting visitors is a collateral duty performed by current facility personnel that does not impose additional costs on a facility. In addition to the removal of the visitor escort costs, the methodology for costs associated with the PSP has been updated for this retrospective analysis.

The estimates for each of the personnel and readiness cost components are based on the time associated with completing trainings, conducting drills, and submitting information under the PSP. The time burdens associated with SSO training, security training, and security drills are the

same as those used in the 2007 RIA.[59] The time burdens for initial and subsequent year PSP submissions are based on the publicly reviewed and verified time burdens presented in ICR supporting documentation.[60]

CISA calculated the cost by multiplying the associated time burden by the hourly compensation rate of the employee expected to incur the burden. Table 6-26 presents the employee types expected to perform the activities, the hourly compensation rate, the hours necessary to complete each activity, and the resulting unit cost for each personnel and readiness cost component.

The unit costs presented in Table 6-26 represent the cost in 2017 dollars for one instance of the cost component. For example, CISA estimates that it would cost $2,330.48 to train one SSO, $41.91 to provide security training per employee. These unit costs combined with the estimated number of employees per facility were used to estimate the cost of personnel and readiness under CFATS.

Table 6-26: Unit Cost for Personnel and Readiness Cost Components (2017$)

Cost Component	Employee Type	Time Burden (hours) (A)	Hourly Compensation Rate (B)	Unit Cost (C) = (A) × (B)
SSO Training[a]	SSO	29.24	$79.69	$2,330.48
Security Training	Employees in the Chemical Manufacturing Industry	0.5	$83.82	$41.91
Annual Security Drills	Employees in the Chemical Manufacturing Industry	2	$83.82	$167.65
PSP - Initial Submissions	SSO	0.17	$79.69	$13.28
PSP - Subsequent Submissions[b]	SSO	0.17	$79.69	$13.28
Visitor Escorts	Clerical Staff	0	$41.22	$0.00

[a] The cost for SSO training is based on the estimate of $4,000 per facility estimated in the 2007 RIA. The 2007 RIA assumed two persons per facility would receive the training, and the estimate included course registration, travel, and per diem. This estimate was converted to 2017 dollars for this analysis using a GDP implicit price deflator of 1.165, giving us an estimate of $4,661 for two SSOs. This was divided by two and then multiplied by the hourly compensation rate of $79.69 to obtain an estimated time burden of 29.24 hours.
[b] DHS began collecting PSP data in 2015. To estimate the number of PSP submissions in FY 2016, CISA applied the 2016 BLS annual hires rate of 48 percent to the number of SSOs in applicable facilities in 2015. BLS. Job Openings and Labor Turnover – January 2017. Table 14. Annual Hires Rates by Industry and Region, Not Seasonally Adjusted. For total private industry. Retrieved from https://www.bls.gov/news.release/archives/jolts_03162017.pdf.

[59] The time burden estimates for SSO training, security training, and security drills can be found in Section 6.3.1, Site Security Officers; Section 6.3.8, Training; and Section 6.3.9, Drills, of the 2007 RIA, respectively.
[60] The burden was obtained from the supporting statement for the Paperwork Reduction Act ICR submission for the CFATS PSP (OMB Control Number 1670-0029), as updated on December 27, 2017. Retrieved from https://www.gpo.gov/fdsys/pkg/FR-2017-12-27/pdf/2017-27519.pdf.

Table 6-27 and Table 6-28 present the cost in 2017 dollars per fiscal year for personnel and readiness, broken down by each cost component, for release and theft/diversion facilities, respectively. These costs were calculated using the unit costs presented in Table 6-26 and observed data on employee counts at covered facilities and actual submissions to the PSP. As presented below, DHS did not start collecting PSP data until 2015, and then, only Tier 1 and Tier 2 facilities were required to submit the PSP data.[61] Also, as discussed in Section 5.3.3, CISA considers visitor escorts to be a collateral duty and not an additional cost of the CFATS program.

[61] DHS did not implement the PSP until 2015, at which time, the Department implemented a partial rollout of PSP, with only Tier 1 and Tier 2 facilities required to meet the PSP requirements. At the time of this analysis, Tier 3 and Tier 4 facilities were not required to submit information under the PSP.

Table 6-27: Estimated 10-Year Personnel and Readiness Costs for Release Facilities, by FY and Component (2017$)

FY	SSO Training	Security Training	Annual Security Drills	PSP - Initial Submissions	PSP - Subsequent Submissions	Total	
						(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	$0	**$0**	**$0**
2008	$0	$0	$0	$0	$0	**$0**	**$0**
2009	$144,490	$442,814	$1,771,257	$0	$0	**$2,358,561**	**$1,925,288**
2010	$554,653	$3,956,772	$15,827,089	$0	$0	**$20,338,515**	**$15,516,155**
2011	$596,602	$4,406,035	$17,624,138	$0	$0	**$22,626,775**	**$16,132,578**
2012	$596,602	$4,406,035	$17,624,138	$0	$0	**$22,626,775**	**$15,077,175**
2013	$601,263	$4,439,373	$17,757,491	$0	$0	**$22,798,127**	**$14,197,527**
2014	$615,246	$4,561,839	$18,247,357	$0	$0	**$23,424,442**	**$13,633,239**
2015	$633,889	$4,745,202	$18,980,808	$191,476	$0	**$24,551,376**	**$13,354,322**
2016	$647,872	$4,849,869	$19,399,477	$4,224	$91,526	**$24,992,968**	**$12,705,158**
Total	**$4,390,617**	**$31,807,939**	**$127,231,756**	**$195,700**	**$91,526**	**$163,717,537**	**$102,541,442**

Note: Values may not total due to rounding.

Table 6-28: Estimated 10-Year Personnel and Readiness Costs for Theft/Diversion Facilities, by FY and Component (2017$)

FY	SSO Training	Security Training	Annual Security Drills	PSP - Initial Submissions	PSP - Subsequent Submissions	Total	
						(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	$0	**$0**	**$0**
2008	$0	$0	$0	$0	$0	**$0**	**$0**
2009	$158,472	$1,617,147	$6,468,589	$0	$0	**$8,244,208**	**$6,729,730**
2010	$274,996	$13,441,275	$53,765,100	$0	$0	**$67,481,372**	**$51,481,215**
2011	$293,640	$15,225,801	$60,903,205	$0	$0	**$76,422,647**	**$54,488,291**
2012	$293,640	$15,252,273	$61,009,093	$0	$0	**$76,555,006**	**$51,011,833**
2013	$321,606	$15,637,665	$62,550,659	$0	$0	**$78,509,929**	**$48,892,038**
2014	$326,267	$16,615,537	$66,462,146	$0	$0	**$83,403,950**	**$48,541,858**
2015	$340,250	$18,019,956	$72,079,823	$102,778	$0	**$90,542,805**	**$49,249,287**
2016	$354,232	$19,330,165	$77,320,659	$4,224	$49,128	**$97,058,408**	**$49,339,573**
Total	**$2,363,103**	**$115,139,819**	**$460,559,275**	**$107,001**	**$49,128**	**$578,218,325**	**$359,733,825**

Note: Values may not total due to rounding.

6.6 Post-Security Plan Costs

This category of costs includes the time necessary to comply with an approved SSP. This includes costs related to inspections, CAVs, and annual internal audits of SSP costs. It also includes costs associated with hearings and appeals, when necessary[62]. While many of the assumptions used to calculate these costs have been updated, the methodology is essentially the same as in the 2007 RIA.

The costs associated with post-SSP activities are based on the time necessary for an SSO and other facility staff to complete the activity. This includes time spent preparing for an inspection, participating in an inspection, and drafting reports after inspections. In addition, it may include the time burden associated with conducting audits and preparing to file appeals, if necessary. Table 6-29 presents the time burdens associated with inspections and CAVs.[63] The time burdens associated with the other activities are detailed in the sections in which their costs are estimated.

Table 6-29: Industry Time Burden (in Hours) for SSOs, by Inspection Part and Activity

Inspection Part	Authorization Inspection	Compliance Inspection	CAV
Pre-Inspection	14.25	9.75	4
Inspection	12.5	8.5	8
Post-Inspection	9	6	2
Total	**35.75**	**24.25**	**14**

In addition to the SSO time burdens, each facility that undergoes a compliance or authorization inspection also will incur 2 hours of interview time for non-SSO facility employees.[64]

6.6.1 Authorization Inspections

Authorization inspections are conducted at a facility prior to approval of an SSP. Table 6-30and Table 6-31 present the number of authorization inspections for release and theft/diversion facilities, respectively.[65]

[62] This section would also include any costs associated with hearings and appeals, however, as of the writing of this analysis, there have been no hearings or appeals. Therefore, this analysis does not include any costs associated with hearings and appeals.
[63] Time burdens for inspections and CAVs were provided by CISA Infrastructure Security Division subject-matter experts and based on an inspector workload model that was created, which detailed the time burden associated with all aspects of conducting inspections. Appendix C presents these burden estimates in greater detail.
[64] This burden is based on CISA subject-matter expertise. See Appendix C.
[65] Authorization inspections are counted by tier at the time of inspection. All facilities receiving an inspection were Tier 1 through 4.

Table 6-30: Count of Authorization Inspections for Release Facilities, by FY and Tier

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	**0**
2008	0	0	0	0	**0**
2009	0	0	0	0	**0**
2010	1	0	0	0	**1**
2011	3	0	0	0	**3**
2012	2	0	0	0	**2**
2013	7	25	38	0	**70**
2014	1	7	103	112	**223**
2015	2	8	44	193	**247**
2016	1	0	10	17	**28**
Total	**17**	**40**	**195**	**322**	**574**

Table 6-31: Count of Authorization Inspections for Theft/Diversion Facilities, by FY and Tier

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	**0**
2008	0	0	0	0	**0**
2009	0	0	0	0	**0**
2010	1	0	0	0	**1**
2011	4	0	0	0	**4**
2012	16	0	0	0	**16**
2013	64	178	154	0	**396**
2014	8	71	303	430	**812**
2015	9	57	165	618	**849**
2016	3	20	49	121	**193**
Total	**105**	**326**	**671**	**1,169**	**2,271**

To estimate the cost to a facility of an authorization inspection, CISA multiplies the hourly compensation rate by the number of hours necessary to complete an inspection. CISA estimates that an authorization inspection will require 35.75 hours of an SSO's time and 2 hours of an average facility employee for interviews. Using the hour burdens discussed in Section 6.6 and the hourly compensation rates presented in Table 6-3, CISA estimates the unit cost of an

authorization inspection to be $3,017 (= 35.75 hours × $79.69/hour + 2 hours × $83.82/hour). CISA applies this unit cost to the number of facilities that underwent an authorization inspection, and presents the total 10-year costs in 2017 dollars in Table 6-32 and Table 6-33.

Table 6-32: Estimated 10-Year Authorization Inspection Costs, by Tier and Security Issue (2017$)

Tier	Release	Theft/Diversion	Total
1	$51,284	$316,751	**$368,035**
2	$120,667	$983,438	**$1,104,105**
3	$588,252	$2,024,192	**$2,612,444**
4	$971,371	$3,526,498	**$4,497,869**
Total	**$1,731,574**	**$6,850,879**	**$8,582,453**

Note: Values may not total due to rounding.

Table 6-33: Estimated 10-Year Authorization Inspection Costs, by FY and Tier (2017$)

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total	
					(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	**$0**	**$0**
2008	$0	$0	$0	$0	**$0**	**$0**
2009	$0	$0	$0	$0	**$0**	**$0**
2010	$6,033	$0	$0	$0	**$6,033**	**$4,603**
2011	$21,117	$0	$0	$0	**$21,117**	**$15,056**
2012	$54,300	$0	$0	$0	**$54,300**	**$36,183**
2013	$214,184	$612,386	$579,202	$0	**$1,405,773**	**$875,445**
2014	$27,150	$235,301	$1,224,772	$1,635,040	**$3,122,263**	**$1,817,186**
2015	$33,183	$196,084	$630,486	$2,446,527	**$3,306,281**	**$1,798,398**
2016	$12,067	$60,334	$177,984	$416,302	**$666,686**	**$338,909**
Total	**$368,035**	**$1,104,105**	**$2,612,444**	**$4,497,869**	**$8,582,453**	**$4,885,779**

Note: Values may not total due to rounding.

6.6.2 Compliance Inspections

Compliance inspections are conducted to ensure that facility security measures are installed in compliance with approved SSPs. Table 6-34 and Table 6-35 present the number of compliance inspections for release and theft/diversion facilities, respectively.[66]

[66] Compliance inspections did not begin until 2013. Compliance inspections are counted by tier at the time of inspection. All facilities receiving an inspection were Tier 1 through 4.

Table 6-34: Count of Compliance Inspections for Release Facilities, by FY and Tier

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	**0**
2008	0	0	0	0	**0**
2009	0	0	0	0	**0**
2010	0	0	0	0	**0**
2011	0	0	0	0	**0**
2012	0	0	0	0	**0**
2013	0	0	0	0	**0**
2014	4	2	0	0	**6**
2015	3	11	4	0	**18**
2016	3	9	81	70	**163**
Total	**10**	**22**	**85**	**70**	**187**

Table 6-35: Count of Compliance Inspections for Theft/Diversion Facilities, by FY and Tier

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	**0**
2008	0	0	0	0	**0**
2009	0	0	0	0	**0**
2010	0	0	0	0	**0**
2011	0	0	0	0	**0**
2012	0	0	0	0	**0**
2013	1	0	0	0	**1**
2014	30	15	0	0	**45**
2015	36	82	16	3	**137**
2016	30	138	345	376	**889**
Total	**97**	**235**	**361**	**379**	**1,072**

To estimate the cost to a facility of a compliance inspection, CISA multiplies the number of hours required to prepare for, host, and complete follow-up actions related to an inspection by the hourly compensation rate. CISA estimates that a compliance inspection will require 24.25 hours of an SSO's time and an average of 2 hours of facility employee time for interviews. Using the hour burdens discussed in Section 6.6 and the hourly compensation rates presented in Table

6-3, CISA estimates the unit cost of an authorization inspection to be $2,100 (= 24.25 hours × $79.69/hour + 2 hours × $83.82/hour). CISA applies this unit cost to the number of facilities that underwent a compliance inspection, and presents the total 10-year costs in 2017 dollars in Table 6-36 and Table 6-37.

Table 6-36: Estimated 10-Year Compliance Inspection Costs, by Tier and Security Issue (2017$)

Tier	Release	Theft/Diversion	Total
1	$21,002	$203,720	**$224,722**
2	$46,205	$493,549	**$539,753**
3	$178,518	$758,175	**$936,693**
4	$147,015	$795,979	**$942,993**
Total	**$392,739**	**$2,251,422**	**$2,644,161**

Note: Values may not total due to rounding.

Table 6-37: Estimated 10-Year Compliance Inspection Costs, by FY and Tier (2017$)

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total	
					(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	**$0**	**$0**
2008	$0	$0	$0	$0	**$0**	**$0**
2009	$0	$0	$0	$0	**$0**	**$0**
2010	$0	$0	$0	$0	**$0**	**$0**
2011	$0	$0	$0	$0	**$0**	**$0**
2012	$0	$0	$0	$0	**$0**	**$0**
2013	$2,100	$0	$0	$0	**$2,100**	**$1,308**
2014	$71,407	$35,704	$0	$0	**$107,111**	**$62,339**
2015	$81,908	$195,319	$42,004	$6,301	**$325,532**	**$177,068**
2016	$69,307	$308,731	$894,688	$936,693	**$2,209,418**	**$1,123,156**
Total	**$224,722**	**$539,753**	**$936,693**	**$942,993**	**$2,644,161**	**$1,363,871**

Note: Values may not total due to rounding.

6.6.3 Compliance Assistance Visits

CAVs are conducted upon request by a chemical facility to assist them in fulfilling their CFATS requirements. Table 6-38 and Table 6-39 present the number of CAVs for release and theft/diversion facilities, respectively.

Table 6-38: Count of CAVs for Release Facilities, by FY and Tier

FY	Not Currently Covered Facilities	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	0	**0**
2008	0	0	0	0	0	**0**
2009	0	0	0	0	0	**0**
2010	1	2	0	2	3	**8**
2011	4	10	22	41	56	**133**
2012	2	3	16	22	35	**78**
2013	4	1	14	15	10	**44**
2014	1	0	2	17	37	**57**
2015	10	0	4	18	70	**102**
2016	100	0	6	18	30	**151**
Total	**122**	**16**	**64**	**133**	**241**	**576**

Table 6-39: Count of CAVs for Theft/Diversion Facilities, by FY and Tier

FY	Not Currently Covered Facilities	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	0	**0**
2008	0	0	0	0	0	**0**
2009	0	0	0	0	0	**0**
2010	3	0	1	5	13	**22**
2011	9	19	81	89	197	**395**
2012	4	15	45	57	86	**207**
2013	2	13	83	48	29	**175**
2014	3	3	18	53	109	**186**
2015	10	7	29	45	254	**345**
2016	42	10	32	66	9790	**247**
Total	**73**	**67**	**289**	**363**	**785**	**1,577**

To estimate the cost to a facility of a CAV, CISA multiplies the number of hours required to prepare for, host, and conduct follow-up actions related to a CAV by the hourly compensation rate. CISA estimates that a CAV will necessitate 24.25 hours of an SSO's time. Using the hour

burden discussed in Section 6.6 and the hourly compensation rates presented in Table 6-3, CISA estimates the unit cost of a CAV to be $1,116 (= 14 hours × $79.69/hour). CISA applies this unit cost to the number of facilities that participated in a CAV, and presents the total 10-year costs in 2017 dollars in Table 6-40.

Table 6-40: Estimated 10-Year CAV Costs, by Tier and Security Issue (2017$)

Tier	Release	Theft/Diversion	Total
1	$17,851	$74,752	**$92,604**
2	$71,405	$322,439	**$393,844**
3	$148,389	$405,001	**$553,390**
4	$268,885	$875,828	**$1,144,713**
Total	**$506,530**	**$1,678,020**	**$2,184,550**

Note: Values may not total due to rounding.

Table 6-41 shows the total 10-year cost for all facilities that requested a CAV during the analysis period. As shown in the table, the total 10-year cost is estimated at $2.4 million in 2017 dollars.

Table 6-41: Estimated 10-Year CAV Costs, by FY and Tier (2017$)

FY	Not Currently Covered Facilities	Tier 1	Tier 2	Tier 3	Tier 4	Total	
						(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	$0	$0	**$0**
2008	$0	$0	$0	$0	$0	$0	**$0**
2009	$0	$0	$0	$0	$0	$0	**$0**
2010	$4,463	$2,231	$1,116	$7,810	$17,851	$33,471	**$25,535**
2011	$14,504	$32,355	$114,918	$145,042	$282,273	$589,092	**$420,015**
2012	$6,694	$20,083	$68,058	$88,141	$135,000	$317,976	**$211,881**
2013	$6,694	$15,620	$108,223	$70,289	$43,512	$244,339	**$152,162**
2014	$4,463	$3,347	$22,314	$78,099	$162,893	$271,116	**$157,792**
2015	$22,314	$7,810	$36,818	$70,289	$361,488	$498,720	**$271,271**
2016	$158,430	$11,157	$42,397	$93,719	$141,695	$447,398	**$227,434**
Total	**$217,562**	**$92,604**	**$393,844**	**$553,390**	**$1,144,713**	**$2,402,113**	**$1,466,090**

Note: Values may not total due to rounding.

6.6.4 Annual Internal Audits of Site Security Plans

Each covered chemical facility is required to conduct an annual internal audit of its compliance with its SSP. We assume that each facility that submitted an initial ASP or SSP would conduct an annual internal audit beginning the year following its initial submission. Table 6-42 and Table 6-43 present the number of annual internal audits for release and theft/diversion facilities, respectively.

Table 6-42: Count of Annual Internal Audits of Security Plan for Release Facilities, by FY and Tier

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	**0**
2008	0	0	0	0	**0**
2009	0	0	0	0	**0**
2010	25	6	1	1	**33**
2011	83	36	47	138	**304**
2012	89	39	50	160	**338**
2013	89	39	50	160	**338**
2014	90	39	51	161	**341**
2015	93	39	52	167	**351**
2016	96	40	53	176	**365**
Total	**565**	**238**	**304**	**963**	**2,070**

Table 6-43: Count of Annual Internal Audits of Security Plan for Theft/Diversion Facilities, by FY and Tier

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total
2007	0	0	0	0	**0**
2008	0	0	0	0	**0**
2009	0	0	0	0	**0**
2010	30	4	30	15	**79**
2011	47	12	734	591	**1,384**
2012	49	14	830	688	**1,581**
2013	49	14	831	690	**1,584**
2014	52	17	843	703	**1,615**
2015	52	18	890	766	**1,726**
2016	54	19	964	843	**1,880**
Total	**333**	**98**	**5,122**	**4,296**	**9,849**

The cost of conducting internal audits includes the costs associated with the time for various facility employees to conduct the audit. To estimate the cost of annual internal audits, CISA multiplies the number of hours necessary to complete an audit by the hourly compensation rate. CISA estimates that an internal audit will require 4 hours of an SSO's time and 2 hours of an administrative employee's time. Using updated hour burdens estimated by CISA subject-matter experts and the hourly compensation rates presented in Table 6-3, CISA estimates the unit cost of an internal audit to be $401.20 (= 4 hours × $79.69/hour + 2 hours × $41.22/hour). CISA applies this unit cost to the number of facilities conducting an audit, and presents the total 10-year cost in 2017 dollars in Table 6-44 and Table 6-45.

Table 6-44: Estimated 10-Year Annual Internal Audit Costs, by Tier and Security Issue (2017$)

Tier	Release	Theft/Diversion	Total
1	$226,681	$133,601	**$360,282**
2	$95,487	$39,318	**$134,805**
3	$121,966	$2,054,972	**$2,176,938**
4	$386,360	$1,723,577	**$2,109,937**
Total	**$830,494**	**$3,951,468**	**$4,781,962**

Note: Values may not total due to rounding.

Table 6-45: Estimated 10-Year Annual Internal Audit Costs, by FY and Tier (2017$)

FY	Tier 1	Tier 2	Tier 3	Tier 4	Total	
					(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	**$0**	**$0**
2008	$0	$0	$0	$0	**$0**	**$0**
2009	$0	$0	$0	$0	**$0**	**$0**
2010	$22,066	$4,012	$12,437	$6,419	**$44,935**	**$34,281**
2011	$52,157	$19,258	$313,341	$292,478	**$677,234**	**$482,859**
2012	$55,366	$21,264	$353,060	$340,222	**$769,912**	**$513,025**
2013	$55,366	$21,264	$353,462	$341,024	**$771,116**	**$480,212**
2014	$56,971	$22,467	$358,677	$346,641	**$784,757**	**$456,736**
2015	$58,175	$22,869	$377,935	$374,324	**$833,303**	**$453,262**
2016	$60,181	$23,671	$408,025	$408,828	**$900,705**	**$457,873**
Total	**$360,282**	**$134,805**	**$2,176,938**	**$2,109,937**	**$4,781,962**	**$2,878,247**

Note: Values may not total due to rounding.

6.6.5 Site Security Plan Hearings and Appeals

Under 6 CFR § 27.310, to review a determination by the Department, a facility has the right to seek an adjudication proceeding and, if applicable, a subsequent appeal. Based on historical data, there were no requests for hearings or appeals by any chemical facilities during the time period for this retrospective analysis. Therefore, CISA does not include any costs for SSP hearings and appeals in this retrospective analysis.

6.6.6 Post-Security Plan Cost Summary

The total cost to industry for post-security plan activities during the first 10 years of CFATS was estimated to be $18.4 million. Table 6-46 presents the costs by activity over the 10-year period for all CFATS facilities in 2017 dollars.

Table 6-46: Estimated 10-Year Cost for Post-Security Plan Activities, by FY (2017$)

FY	Authorization Inspections	Compliance Inspections	CAVs	Annual Internal Audits	Hearings & Appeals	Total	
						(Undiscounted)	(7% Discount)
2007	$0	$0	$0	$0	$0	**$0**	**$0**
2008	$0	$0	$0	$0	$0	**$0**	**$0**
2009	$0	$0	$0	$0	$0	**$0**	**$0**
2010	$6,033	$0	$33,471	$44,935	$0	**$84,439**	**$64,418**
2011	$21,117	$0	$589,092	$677,234	$0	**$1,287,443**	**$917,929**
2012	$54,300	$0	$317,976	$769,912	$0	**$1,142,189**	**$761,088**
2013	$1,405,773	$2,100	$244,339	$771,116	$0	**$2,423,328**	**$1,509,127**
2014	$3,122,263	$107,111	$271,116	$784,757	$0	**$4,285,247**	**$2,494,053**
2015	$3,306,281	$325,532	$498,720	$833,303	$0	**$4,963,836**	**$2,699,998**
2016	$666,686	$2,209,418	$447,398	$900,705	$0	**$4,224,207**	**$2,147,373**
Total	**$8,582,453**	**$2,644,161**	**$2,402,113**	**$4,781,962**	**$0**	**$18,410,689**	**$10,593,986**

Note: Values may not total due to rounding.

6.7 Requests to Department of Homeland Security Costs

This category of costs includes costs associated with a facility's time spent preparing requests to CISA, such as requests for extensions, re-tiering, and technical consultation. While many of the assumptions used to calculate these costs have been updated, the methodology is essentially the same as in the 2007 RIA. For these activities, the cost does not differ by tier or security issue and, as such, the costs are not broken down in this section.

6.7.1 Request for Extension

A facility may request an extension for submitting a Top-Screen, SVA, ASP, or SSP. To determine the number of extensions applied for, CISA calculated a percentage based on the number of extensions estimated in the CFATS ICR (OMB Control Number 1670-0014) and the average number of actual submissions from 2012 to 2014.[67] CISA then applied the 15.66 percent extension request rate to the total number of annual submissions to estimate the number of extension requests.

Based on publicly reviewed and verified time burdens presented in the OMB-approved CFATS ICR (OMB Control Number 1670-0014), CISA estimates that it would take 0.25 hours (15 minutes) of an SSO's time to submit an extension request. Using 0.25 hours per request and an SSO's hourly compensation rate of $79.69, we estimate a cost per request of $19.92 (= 0.25 hours × $79.69/hour), and a total 10-year cost of $236,597 in 2017 dollars, as presented in Table 6-47.

Table 6-47: Estimated 10-Year Cost for Requests for Extensions, by FY (2017$)

FY	Number of Requests for Extensions (A)	Total Cost (B) = (A) × $19.92
2007	150	**$2,987**
2008	5,194	**$103,490**
2009	1,717	**$34,205**
2010	1,192	**$23,741**
2011	489	**$9,750**
2012	268	**$5,349**
2013	656	**$13,077**
2014	714	**$14,225**
2015	874	**$17,415**
2016	620	**$12,359**
Total	**11,875**	**$236,597**

Note: Values may not total due to rounding.

[67] The number of submissions is obtained from the CSAT 30-day notice and request for comments regarding the revision of ICR 1670-0014. *Chemical Facility Anti-Terrorism Standards (CFATS)*, 78 FR 16692 3/18/2013). Retrieved from https://www.federalregister.gov/documents/2013/03/18/2013-06097/chemical-facility-anti-terrorism-standards-cfats.

6.7.2 Request for Material Modification

A facility can submit a request for material modification if it believes there have been changes to its chemical holdings or operations that would result in it receiving a different tier placement. CISA records all such requests within the CSAT 2.0 reporting tool within CISA's Infrastructure Security Division Portal. To estimate the costs to facilities associated with requests for material modification, CISA multiplied the number of actual material modification requests from FYs 2007 through 2016 and multiplied them by $19.92 (= 0.25 hours × $79.69/hour), which is the estimated cost per request.[68] Table 6-48 presents the 10-year cost of $219,156 in 2017 dollars for material modification requests.

Table 6-48: Estimated 10-Year Cost for Requests of Material Modification, by FY (2017$)

FY	Number of Requests for Material Modification (A)	Total Cost (B) = (A) × $20
2007	0	**$0**
2008	584	**$11,635**
2009	2,575	**$51,303**
2010	1,797	**$35,802**
2011	757	**$15,082**
2012	604	**$12,034**
2013	842	**$16,775**
2014	1,255	**$25,004**
2015	1,591	**$31,698**
2016	995	**$19,824**
Total	**11,000**	**$219,156**

Note: Values may not total due to rounding.

6.7.3 Request for Technical Consultation

Under 6 CFR § 27.120, facilities may request a technical consultation to assist in its compliance with the CFATS program. To estimate the number of requests, CISA uses the same request rate of 15.66 percent as discussed in Section 6.7.1. Unlike requests for extension, which assumed one request per facility, based on historical data and past ICR filings, we estimate that each facility that submits a request for technical consultation would submit 1.5 requests, on average. As with the requests for extension and material modification, we estimate that these requests would require 0.25 hours of an SSO's time per request for a cost of $19.92 (= 0.25 hours × $79.69/hour). Table 6-49 presents the 10-year cost of $354,896 in 2017 dollars for technical consultation requests.

[68] The cost per request is based on the same calculation as the cost per request for an extension; that is, an estimated 0.25 hours of an SSO's time at an hourly compensation rate of $79.69.

Table 6-49: Estimated 10-Year Cost for Requests for Technical Consultation, by FY (2017$)

FY	Number of Requests for Technical Consultation (A)	Total Cost (B) = (A) × $20
2007	225	**$4,480**
2008	7,792	**$155,235**
2009	2,575	**$51,308**
2010	1,787	**$35,611**
2011	734	**$14,625**
2012	403	**$8,024**
2013	985	**$19,615**
2014	1,071	**$21,338**
2015	1,311	**$26,122**
2016	930	**$18,538**
Total	**17,813**	**$354,896**

Note: Values may not total due to rounding.

6.7.4 Requests to Department of Homeland Security Summary

Table 6-50 summarizes the costs associated with requests to DHS, which were an estimated $810,649 in 2017 dollars for the first 10 years of the CFATS program.

Table 6-50: Estimated 10-Year Requests to DHS Costs, by FY (2017$)

FY	Request for Extension	Request for Material Modification	Request for Technical Consultation	Total	
				(Undiscounted)	(7% Discount)
2007	$2,987	$0	$4,480	**$7,467**	**$6,978**
2008	$103,490	$11,635	$155,235	**$270,360**	**$236,143**
2009	$34,205	$51,303	$51,308	**$136,816**	**$111,682**
2010	$23,741	$35,802	$35,611	**$95,154**	**$72,593**
2011	$9,750	$15,082	$14,625	**$39,456**	**$28,132**
2012	$5,349	$12,034	$8,024	**$25,407**	**$16,930**
2013	$13,077	$16,775	$19,615	**$49,467**	**$30,806**
2014	$14,225	$25,004	$21,338	**$60,567**	**$35,250**
2015	$17,415	$31,698	$26,122	**$75,235**	**$40,923**
2016	$12,359	$19,824	$18,538	**$50,721**	**$25,784**
Total	**$236,597**	**$219,156**	**$354,896**	**$810,649**	**$605,220**

Note: Values may not total due to rounding.

6.8 Recordkeeping Costs

Recordkeeping costs include the time and materials needed to maintain and store proper records, either paper or electronic. This includes annual labor costs and start-up and annual costs for capital, which vary by recordkeeping type. Labor costs for recordkeeping are based on the time spent by administrative staff to compile and maintain records. Capital costs are based on the price to purchase locking file cabinets, paper, printer toner, and other supplies, as necessary.

CISA has not received any input in response to the 2007 RIA nor the subsequent ICR renewals that suggest the methodology used in the 2007 RIA is problematic. As a result, in this retrospective analysis, CISA maintained the 2007 RIA methodology to estimate recordkeeping costs.

Table 6-51 presents the unit costs for different aspects of the recordkeeping burden in 2017 dollars. Labor costs are based on an administrative worker's hourly compensation rate of $41.22, and 48 hours for paper-based recordkeeping and 72 hours for electronic recordkeeping.[69] Start-up capital costs are based on the price of purchasing a locking filing cabinet, and annual capital costs for electronic-based recordkeeping include the annual purchase price of printer paper, ink, and toner.[70]

[69] Recordkeeping labor burdens are based on estimates put forth in the CSAT ICR (OMB Control Number 1670-0007) supporting documentation, as approved by OMB on July 14, 2016. Retrieved from https://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201604-1670-001.

[70] Recordkeeping capital burdens are based on estimates put forth in the CSAT ICR (OMB Control Number 1670-0007) supporting documentation, as approved by OMB on July 14, 2016, which have been inflated from 2015 to 2017 dollars using a GDP implicit price deflator of 1.031. Retrieved from https://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201604-1670-001.

Table 6-51: Estimated Recordkeeping Unit Costs, by Cost Type and Recordkeeping Type (2017$)

Cost Type	Paper Based	Electronic Based
Annual Labor Costs	$1,978	$2,968
Start-up Capital Costs	$361	$361
Annual Capital Costs	$0	$258

Recordkeeping costs do not differ across facilities based on tier or security issue, so we do not break out the costs for paper- or electronic-based recordkeeping by tier or security issue in the sections below.

6.8.1 Paper-Based Recordkeeping

For paper-based recordkeeping, CISA accounts for annual labor and start-up capital costs. There are no annual capital costs for paper-based recordkeeping. Table 6-52 presents the cost for paper-based recordkeeping, which CISA estimates to be $49.5 million in 2017 dollars over 10 years.

Table 6-52: Estimated 10-Year Paper-Based Recordkeeping Cost, by FY and Cost Type (2017$)

FY	Annual Labor Costs	Start-Up Capital Costs	Annual Capital Costs	Total	
				(Undiscounted)	(7% Discount)
2007	$313,869	$57,248	$0	**$371,116**	**$346,838**
2008	$4,629,093	$787,071	$0	**$5,416,165**	**$4,730,688**
2009	$4,854,628	$41,136	$0	**$4,895,764**	**$3,996,402**
2010	$5,040,694	$33,937	$0	**$5,074,631**	**$3,871,412**
2011	$5,179,773	$25,367	$0	**$5,205,140**	**$3,711,193**
2012	$5,285,023	$19,197	$0	**$5,304,219**	**$3,534,425**
2013	$5,472,968	$34,280	$0	**$5,507,248**	**$3,429,637**
2014	$5,643,998	$31,195	$0	**$5,675,193**	**$3,303,014**
2015	$5,916,519	$49,706	$0	**$5,966,225**	**$3,245,231**
2016	$6,044,322	$23,310	$0	**$6,067,632**	**$3,084,476**
Total	**$48,380,886**	**$1,102,448**	**$0**	**$49,483,334**	**$33,253,317**

Note: Values may not total due to rounding.

6.8.2 Electronic-Based Recordkeeping

For electronic-based recordkeeping, CISA accounts for annual labor, start-up capital, and annual capital costs. Table 6-53 presents the costs for electronic-based recordkeeping, which CISA estimates to be $4.2 million in 2017 dollars over 10 years.

Table 6-53: Estimated 10-Year Electronic-Based Recordkeeping Costs, by FY and Cost Type (2017$)

FY	Annual Labor Costs	Start-Up Capital Costs	Annual Capital Costs	Total	
				(Undiscounted)	(7% Discount)
2007	$24,779	$3,013	$2,154	**$29,946**	**$27,987**
2008	$365,455	$41,425	$31,773	**$438,652**	**$383,136**
2009	$383,260	$2,165	$33,321	**$418,746**	**$341,821**
2010	$397,949	$1,786	$34,598	**$434,333**	**$331,351**
2011	$408,929	$1,335	$35,552	**$445,817**	**$317,861**
2012	$417,239	$1,010	$36,275	**$454,524**	**$302,868**
2013	$432,076	$1,804	$37,565	**$471,445**	**$293,593**
2014	$445,579	$1,642	$38,739	**$485,959**	**$282,833**
2015	$467,094	$2,616	$40,609	**$510,319**	**$277,580**
2016	$477,183	$1,227	$41,486	**$519,897**	**$264,289**
Total	**$3,819,544**	**$58,024**	**$332,072**	**$4,209,639**	**$2,823,319**

Note: Values may not total due to rounding.

6.8.3 Recordkeeping Summary

CISA estimates the total 10-year cost of recordkeeping for all facilities to be $53.7 million in 2017 dollars, as presented in Table 6-54.

Table 6-54: Estimated Total 10-Year Recordkeeping Cost, by FY and Cost Type (2017$)

FY	Annual Labor Costs	Start-Up Capital Costs	Annual Capital Costs	Total	
				(Undiscounted)	(7% Discount)
2007	$338,648	$60,261	$2,154	**$401,063**	**$374,825**
2008	$4,994,548	$828,496	$31,773	**$5,854,817**	**$5,113,824**
2009	$5,237,888	$43,301	$33,321	**$5,314,510**	**$4,338,223**
2010	$5,438,643	$35,723	$34,598	**$5,508,964**	**$4,202,763**
2011	$5,588,703	$26,702	$35,552	**$5,650,957**	**$4,029,055**
2012	$5,702,261	$20,207	$36,275	**$5,758,743**	**$3,837,294**
2013	$5,905,044	$36,084	$37,565	**$5,978,693**	**$3,723,230**
2014	$6,089,577	$32,837	$38,739	**$6,161,152**	**$3,585,847**
2015	$6,383,612	$52,322	$40,609	**$6,476,544**	**$3,522,811**
2016	$6,521,505	$24,537	$41,486	**$6,587,529**	**$3,348,766**
Total	**$52,200,429**	**$1,160,472**	**$332,072**	**$53,692,973**	**$36,076,636**

Note: Values may not total due to rounding.

6.9 Cost Summary

To provide a more conservative estimate of the cost of CFATS, CISA examined several different levels of SSO labor that would be necessary to comply. These range from the low-range estimate, which used the costs estimated in Sections 6.3 through 6.8, which all include the time burden for SSOs specifically for those tasks. This approach presents an accurate representation of the CFATS costs per provision.

CISA also considered two other options that included facilities employing an SSO based on a percentage of a full-time equivalent (FTE). The percentages used for the mid-range estimate were based on the percentages used in the 2007 RIA, while for the high-range estimates, we assumed one SSO FTE for all covered chemical facilities. While this may represent an overestimate of an SSO's burden, it was done to ensure we did not underestimate the costs, as we do not have data specifying hiring decisions made by CFATS facilities to cover their SSO requirements. This Section 0 presents the range of cost estimates for this retrospective analysis.

6.9.1 Low-Range Estimate

At the low end of the cost estimate range, CISA estimates that the cost to industry for the first 10 years of CFATS has been $1.3 billion in 2017 dollars, as presented in Table 6-55. This estimate accounts only for SSO time directly associated with completing the requirements specified in Sections 6.3 through 6.8.[71]

[71] CISA estimated that over the first 10 years of CFATS, SSO labor accounted for $143.6 million under the low-range scenario.

Table 6-55: Estimated 10-Year Low-Range CFATS Cost (Undiscounted, Millions of 2017$)

FY	CSAT	Security Measure	Personnel & Readiness	Post-Security Plan	Request to DHS	Recordkeeping	Total	
							(Undiscounted)	(7% Discount)
2007	$1.1	$0.0	$0.0	$0.0	$0.0	$0.4	**$1.5**	**$1.4**
2008	$37.6	$0.0	$0.0	$0.0	$0.3	$5.9	**$43.7**	**$38.2**
2009	$43.3	$5.6	$10.6	$0.0	$0.1	$5.3	**$64.9**	**$53.0**
2010	$68.8	$70.4	$87.8	$0.1	$0.1	$5.5	**$232.7**	**$177.5**
2011	$16.9	$17.7	$99.0	$1.3	$0.0	$5.7	**$140.7**	**$100.3**
2012	$4.7	$8.7	$99.2	$1.1	$0.0	$5.8	**$119.5**	**$79.6**
2013	$23.6	$10.1	$101.3	$2.4	$0.0	$6.0	**$143.5**	**$89.4**
2014	$31.3	$14.0	$106.8	$4.3	$0.1	$6.2	**$162.6**	**$94.7**
2015	$34.7	$17.2	$115.1	$5.0	$0.1	$6.5	**$178.6**	**$97.1**
2016	$23.6	$22.7	$122.1	$4.2	$0.1	$6.6	**$179.2**	**$91.1**
Total	**$285.5**	**$166.5**	**$741.9**	**$18.4**	**$0.8**	**$53.7**	**$1,266.9**	**$822.2**

Note: Values may not total due to rounding.

6.9.2 Mid-Range Estimate

For the mid-range estimate, CISA removes the SSO labor costs from the specific provisions discussed in Sections 6.3 through 6.8, and instead includes a separate cost for an SSO as a percentage of an FTE. Table 6-56 presents the percentage of an FTE assigned to an SSO at each facility by tier and security issue.[72]

Table 6-56: Percentage of FTE Assigned to an SSO for Mid-Range Estimates, by Tier and Security Issue

Tier	Release	Theft/Diversion
1	97%	75%
2	88%	75%
3	50%	25%
4	40%	25%

To estimate the annual SSO labor cost per facility, CISA multiplied the hours worked per year by an FTE SSO by the percentage of FTE assigned to an SSO (see Table 6-56) and the hourly compensation rate for an SSO. The annual SSO labor cost for each group and tier are presented in Table 6-57.

Table 6-57: Estimated Annual Mid-Range SSO Labor Cost per Facility

Group/Tier	Hours per Year (A)	Percentage of Time Spent on CFATS (B)	Average Hourly Compensation Rate for SSO (C)	Annual SSO Labor Cost per Affected Facility (D) = (A) × (B) × (C)
Release Facilities				
Tier 1	2,080	97%	$79.69	$160,635
Tier 2		88%		$146,512
Tier 3		50%		$82,345
Tier 4		40%		$66,667
Theft/Diversion Facilities				
Tier 1	2,080	75%	$79.69	$124,321
Tier 2		75%		$124,321
Tier 3		25%		$41,440
Tier 4		25%		$41,440

[72] CISA uses the same percentages for theft/diversion as the 2007 RIA. The release percentages are based on those from the 2007 RIA, but the averages for Groups A, B, and C are weighted by the number of facilities in each group.

Applying these annual SSO labor costs to the population of covered chemical facilities results in an SSO labor cost of $1.4 billion over 10 years, and a total 10-year cost of $2.5 billion in 2017 dollars, as presented in Table 6-58.

Table 6-58: Estimated 10-Year Mid-Range CFATS Cost (Undiscounted, Millions of 2017$)

FY	SSO Labor	CSAT	Security Measure	Personnel & Readiness	Post-Security Plan	Request to DHS	Record-keeping	Total	
								(Undiscounted)	(7% Discount)
2007	$11.9	$0.9	$0.0	$0.0	$0.0	$0.0	$0.4	**$13.3**	**$12.4**
2008	$137.9	$33.9	$0.0	$0.0	$0.0	$0.3	$5.9	**$177.9**	**$155.4**
2009	$143.9	$31.1	$5.6	$10.3	$0.0	$0.1	$5.3	**$196.4**	**$160.3**
2010	$148.6	$40.3	$70.4	$87.0	$0.0	$0.1	$5.5	**$351.9**	**$268.4**
2011	$152.5	$9.4	$17.7	$98.2	$0.7	$0.0	$5.7	**$284.3**	**$202.7**
2012	$155.4	$2.4	$8.7	$98.3	$0.5	$0.0	$5.8	**$271.1**	**$180.7**
2013	$160.6	$8.8	$10.1	$100.4	$1.8	$0.0	$6.0	**$287.8**	**$179.2**
2014	$164.8	$9.8	$14.0	$105.9	$3.7	$0.1	$6.2	**$304.4**	**$177.1**
2015	$171.5	$10.9	$17.2	$113.8	$4.3	$0.1	$6.5	**$324.3**	**$176.4**
2016	$174.8	$5.6	$22.7	$120.9	$3.5	$0.1	$6.6	**$334.1**	**$169.8**
Total	**$1,422**	**$152.9**	**$166.5**	**$734.7**	**$14.6**	**$0.8**	**$53.7**	**$2,545.3**	**$1,682.4**

Note: Values may not total due to rounding.

6.9.3 High-Range Estimate

For the high-range estimate, CISA used the same methodology as the mid-range estimate, but applied 100 percent of an SSO FTE to all facilities, resulting in an SSO labor cost of $4.3 billion over 10 years, and a total 10-year cost of $5.4 billion in 2017 dollars, as presented in **Table 6-59**.

Table 6-59: Estimated 10-Year High-Range CFATS Cost (Undiscounted, Millions of 2017$)

FY	SSO Labor	CSAT	Security Measure	Personnel & Readiness	Post-Security Plan	Request to DHS	Record-keeping	Total	
								(Undiscounted)	(7% Discount)
2007	$27.7	$0.9	$0.0	$0.0	$0.0	$0.0	$0.4	**$29.0**	**$27.1**
2008	$408.3	$33.9	$0.0	$0.0	$0.0	$0.3	$5.9	**$448.3**	**$391.5**
2009	$428.2	$31.1	$5.6	$10.3	$0.0	$0.1	$5.3	**$480.6**	**$392.3**
2010	$444.6	$40.3	$70.4	$87.0	$0.0	$0.1	$5.5	**$647.9**	**$494.3**
2011	$456.8	$9.4	$17.7	$98.2	$0.7	$0.0	$5.7	**$588.6**	**$419.6**
2012	$466.1	$2.4	$8.7	$98.3	$0.5	$0.0	$5.8	**$581.9**	**$387.7**
2013	$482.7	$8.8	$10.1	$100.4	$1.8	$0.0	$6.0	**$609.8**	**$379.8**
2014	$497.8	$9.8	$14.0	$105.9	$3.7	$0.1	$6.2	**$637.3**	**$370.9**
2015	$521.8	$10.9	$17.2	$113.8	$4.3	$0.1	$6.5	**$674.6**	**$366.9**
2016	$533.1	$5.6	$22.7	$120.9	$3.5	$0.1	$6.6	**$692.4**	**$352.0**
Total	**$4,267.0**	**$152.9**	**$166.5**	**$734.7**	**$14.6**	**$0.8**	**$53.7**	**$5,390.3**	**$3,582.2**

Note: Values may not total due to rounding.

Table **6-60** presents a comparison of the 10-year undiscounted cost ranges discussed in this section. Table **6-61** presents the 10-year costs discounted at 7%.

Table 6-60: Estimated 10-Year CFATS Cost Comparison (Undiscounted, Millions of 2017$)

FY	Low-Range	Mid-Range	High-Range
2007	$1.5	$13.3	$29.0
2008	$43.7	$177.9	$448.3
2009	$64.9	$196.4	$480.6
2010	$232.7	$351.9	$647.9
2011	$140.7	$284.3	$588.6
2012	$119.5	$271.1	$581.9
2013	$143.5	$287.8	$609.8
2014	$162.6	$304.4	$637.4
2015	$178.6	$324.3	$674.6
2016	$179.2	$334.1	$692.4
Total	**$1,266.9**	**$2,545.3**	**$5,390.3**

Note: Values may not total due to rounding.

Table 6-61: Estimated 10-Year CFATS Cost Comparison (7% Discount, Millions of 2017$)

FY	Low-Range	Mid-Range	High-Range
2007	$1.4	$12.4	$27.1
2008	$38.2	$155.4	$391.5
2009	$53.0	$160.3	$392.3
2010	$177.5	$268.4	$494.3
2011	$100.3	$202.7	$419.6
2012	$79.6	$180.7	$387.7
2013	$89.4	$179.2	$379.8
2014	$94.7	$177.1	$370.9
2015	$97.1	$176.4	$366.9
2016	$91.1	$169.8	$352.0
Total	**$822.2**	**$1,682.4**	**$3,582.2**

7 Comparison

The purpose of this retrospective analysis is to revisit the cost estimated in the 2007 RIA. When the 2007 RIA was initially completed, the CFATS program was not operational and much of the

analysis was based on assumptions and subject-matter expertise at the time. Since then, DHS has successfully administered the CFATS program for over 10 years, collecting information from over 38,000 chemical facilities and determining over 3,000 of those facilities as high-risk chemical facilities subject to the full burden of the CFATS regulatory program. This history has afforded us with the data necessary to significantly improve the accuracy of the estimated costs of CFATS.

As discussed in Section 4, this retrospective analysis made three substantial changes to the methodology and assumptions contained in the 2007 RIA. Throughout this section, CISA compares the costs associated with those three substantial changes and provides an overall comparison of the estimated costs associated with CFATS in the 2007 RIA with the costs estimated in this retrospective analysis.

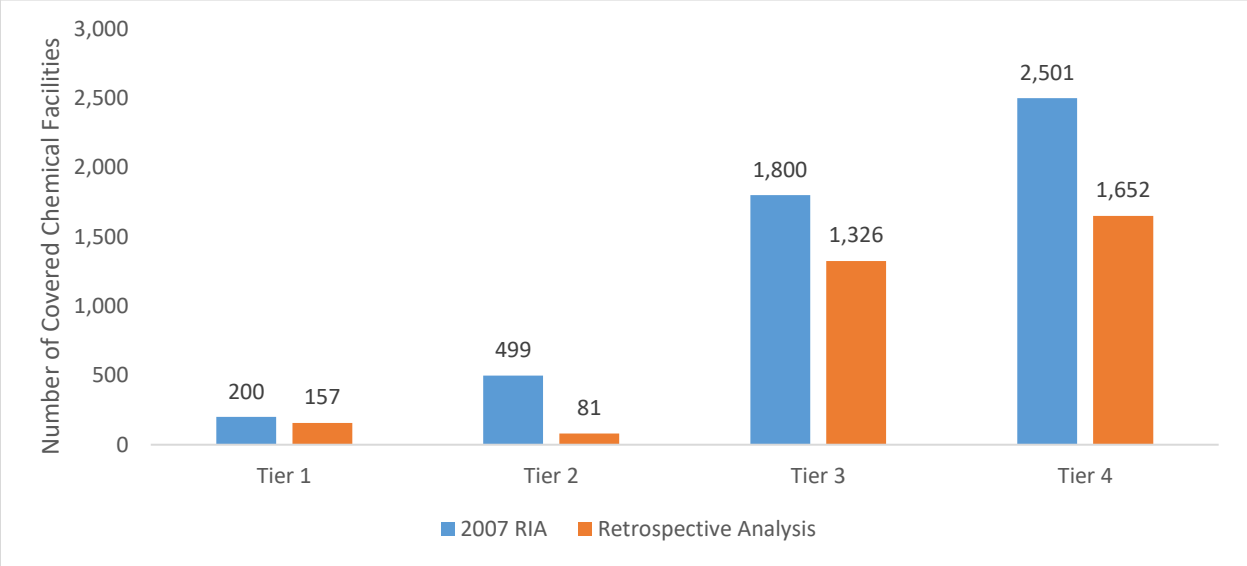
7.1 Overestimation of the Affected Population

At the time of the 2007 RIA, DHS projected that 50,000 chemical facilities would be initially impacted by CFATS and be required to submit a Top-Screen. DHS also projected that 5,000 (i.e., 10 percent) of those chemical facilities would be deemed high-risk chemical facilities[73]. Based on historical data, CISA found that the affected population, both in terms of chemical facilities and those subsequently determined to be high-risk chemical facilities, was much smaller than expected. Rather than 65,000 chemical facilities over 10 years, CISA found that only 38,237 chemical facilities have been impacted by CFATS. The 2007 RIA was close in its assessment that 10 percent of chemical facilities would become high-risk chemical facilities. CISA found that the actual rate was 8.4 percent (i.e., 3,216 high-risk chemical facilities of 38,723 chemical facilities).

The 2007 RIA estimated 5,000 high-risk chemical facilities, which is approximately 155 percent more than the 3,216 high-risk chemical facilities that are actually covered at the time of this retrospective analysis. This overestimate of the affected population is a key factor contributing to the overestimation the costs of the CFATS program presented in the 2007 RIA. In Figure 7-1, CISA compares the population of covered chemical facilities by tier from the 2007 RIA to the retrospective analysis.

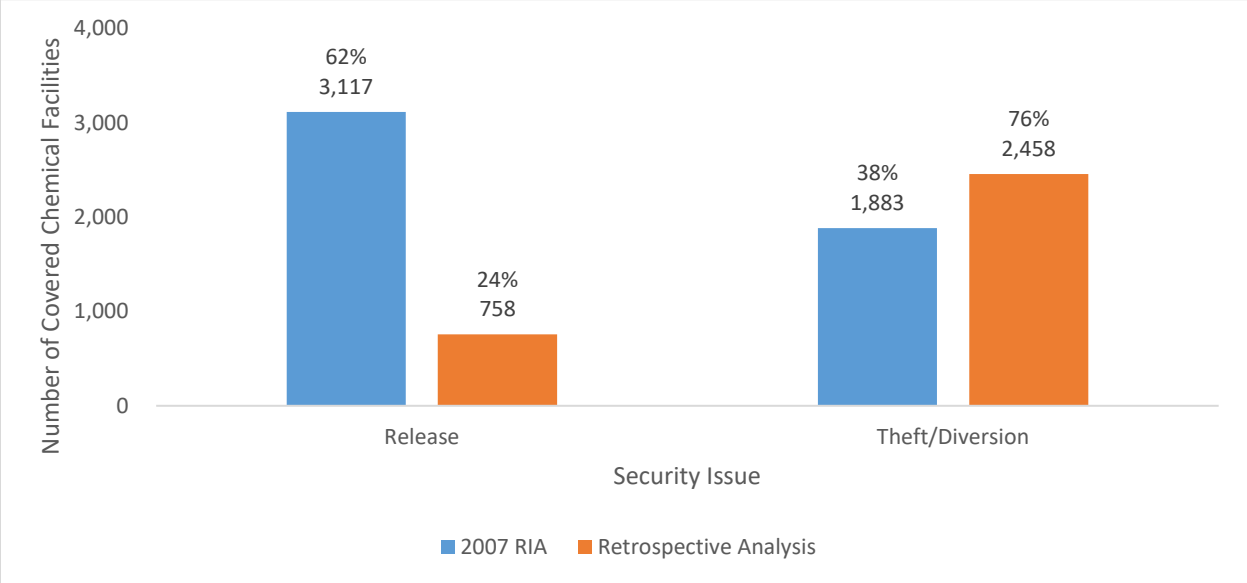
[73] The 2007 RIA estimated an initial affected population of 50,000 chemical facilities that would be impacted in the first three years of the program, 10% of which would be determined high-risk. That number of facilities does not account for new entrants or other facilities projected to submit information over the 10-year analysis period. Therefore, in this analysis, we based the 10-year comparison on an estimated 65,000 facilities, as per Table 6 in the 2007 RIA. The 2007 RIA does maintains the assumption of 5,000 high-risk facilities throughout.

Figure 7-1: Comparison of the Affected Population in the 2007 RIA and Retrospective Analysis, by Tier



Another aspect of the population that has been refined was the breakdown of facilities based on security issue. The 2007 RIA assumed that 62 percent of high-risk chemical facilities would be regulated due to a release security issue, with the remaining 38 percent at risk for theft/diversion. However, CISA found in this retrospective analysis that only 24 percent of high-risk chemical facilities were regulated due to a release security issue and 76 percent regulated due to theft/diversion concerns. Figure 7-2 presents the population comparison by security issue.

Figure 7-2: Comparison of the Affected Population in the 2007 RIA and Retrospective Analysis, by Security Issue



The breakdown by security issue is significant because both the 2007 RIA projected and this retrospective analysis confirmed that the compliance costs for theft/diversion facilities are lower

than the compliance costs for release facilities. Thus, reversing the percentage make-up of the population of affected facilities so that the majority are in the lower-cost theft/diversion category rather than the higher-cost release category is another factor contributing to the substantial overestimate of costs in the 2007 RIA.

To highlight the impact of the change in the affected population on the overall cost of CFATS, we recalculated the estimated 10-year cost of CFATS in the 2007 RIA using the affected population from the retrospective analysis. Table 7-1 compares the 10-year cost of the 2007 RIA using the original population from 2007 to the cost that would have resulted if the updated population from the retrospective analysis were used. Correcting only for the population would have resulted in a 10-year cost reduction of nearly $4.6 billion in the 2007 RIA.[74]

[74] These cost estimates were calculated by obtaining a per-facility cost for the 2007 RIA and applying those costs to the affected population used in the retrospective analysis as compared to the 2007 RIA population.

Table 7-1: 2007 RIA 10-Year Cost Comparison, Based on Affected Population (Undiscounted, Millions of 2017$)

Cost Component	2007 RIA Cost		Difference
	2007 RIA Population	Retrospective Population	
Security Measure Cost	$9,111	$5,860	$3,251
SSO Labor Cost	$3,463	$2,651	$812
Personnel & Readiness Cost	$1,514	$1,159	$355
CSAT Cost	$544	$417	$128
Post-Security-Plan Cost	$17	$13	$4
Total 10-Year Undiscounted Cost	**$14,650**	**$10,100**	**$4,550**

Note: Values may not total due to rounding.

7.2 Improved Estimates for Security Measure Costs

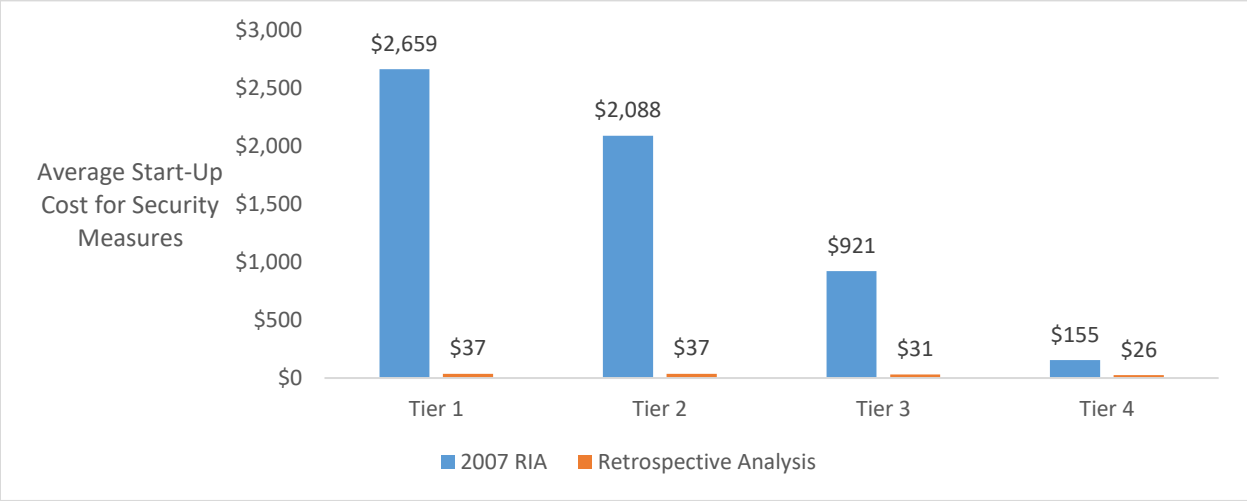
As discussed in Section 5.2, the 2007 RIA projected security measure capital start-up costs on subject-matter expertise that came from DHS institutional knowledge of the chemical industry. This retrospective analysis leveraged the data provided by high-risk chemical facilities about their capital expenditures. CISA used the planned security measures committed to by high-risk chemical facilities in their approved SSPs. As a result, CISA is able to more accurately approximate the type of capital start-up costs incurred by high-risk chemical facilities to comply with CFATS. As explained in Section 5.2, to provide a more conservative estimate, CISA removed from consideration all SSPs with zero planned measures, and then applied the average capital costs for each security measure category to all facilities. As shown in Table 7-2, the 2007 RIA greatly overestimated the capital start-up costs per facility for security measures (all costs shown are in 2017 dollars).

Table 7-2: Comparison of Average Start-Up Costs for Security Measures in the 2007 RIA and Retrospective Analysis, by Tier and Security Issue (Undiscounted, Thousands of 2017$)

Tier	2007 RIA		Retrospective Analysis	
	Release	Theft/Diversion	Release	Theft/Diversion
1	$2,969	$1,730	$38	$44
2	$2,363	$1,264	$58	$40
3	$1,054	$519	$36	$36
4	$161	$138	$28	$30

The substantial over-estimation of the 2007 RIA when compared to this retrospective analysis in average capital start-up cost per tier in 2017 dollars is illustrated in Figure 7-3.

Figure 7-3: Comparison of the Average Start-Up Cost for Security Measures for All Facilities in the 2007 RIA and Retrospective Analysis, by Tier (Undiscounted, Thousands of 2017$)



In addition, CISA did not observe the wide variation in per-facility spending that was anticipated at the time of the 2007 RIA. Table **7-3** presents the average capital start-up cost per facility for security measures by tier in 2017 dollars in the 2007 RIA and the retrospective analysis. The 2007 RIA anticipated that Tiers 1 and 2 would have much higher costs than Tiers 3 and 4. The retrospective analysis, however, presents a more uniform distribution of security measure spending.

Table 7-3: Comparison of Average Start-Up Costs for Security Measures (Undiscounted, 2017$)

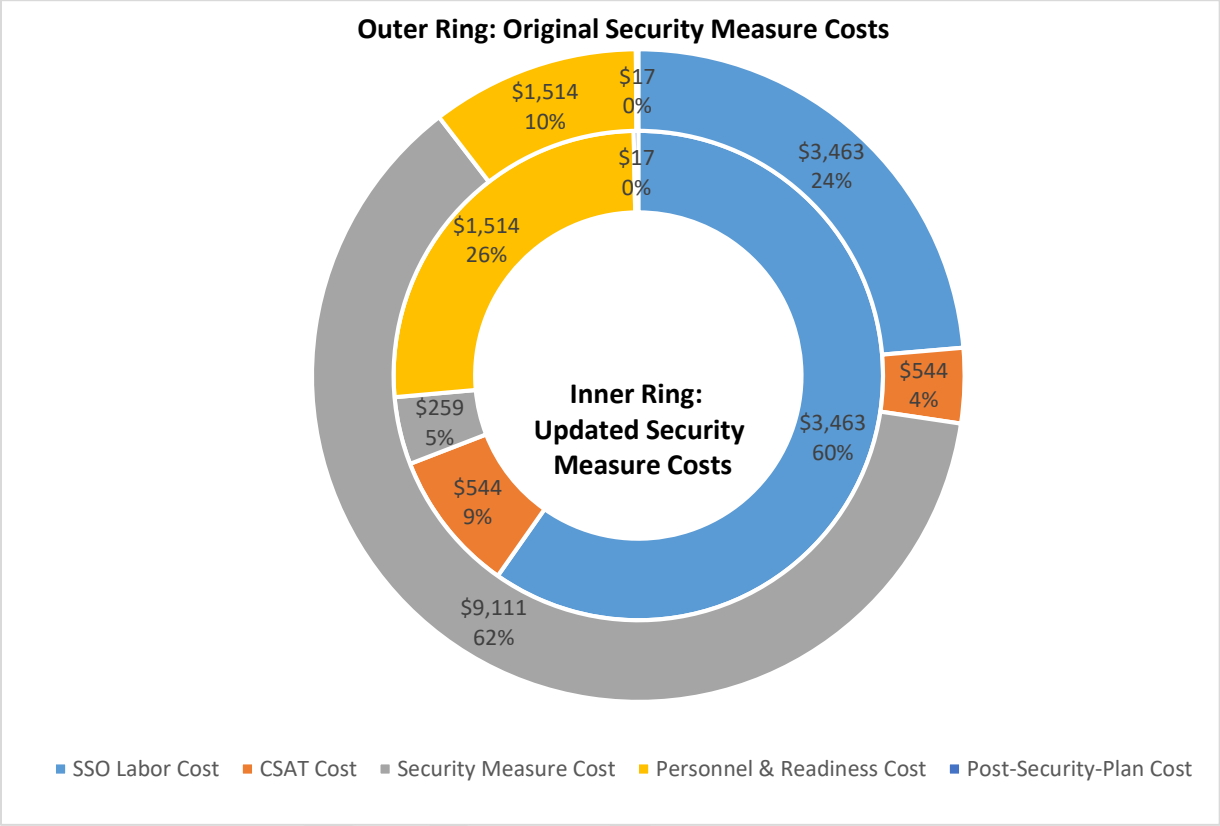
Tier	2007 RIA	Retrospective Analysis
1	$2,659	$43
2	$2,088	$43
3	$921	$36
4	$155	$30

To demonstrate the impact of the overestimated security measure costs, we applied the per-facility cost for security measures used in the retrospective analysis to the affected population used in the 2007 RIA. Holding all other variables constant, correcting the per-facility cost for security measures in the 2007 RIA would have decreased the projected 10-year cost for CFATS from $14.6 billion to $5.8 billion, a difference of nearly $9 billion.

Figure 7-4 presents the comparison of the estimated 10-year cost in the 2007 RIA when only the cost for security measures is corrected. The outer ring shows the costs by component as originally estimated in the 2007 RIA, and the inner ring shows the costs from the 2007 RIA using the updated security measure costs. The figure shows how significantly the decrease in security measure costs impacts the overall cost estimate, with security measures originally

accounting for 62 percent of the 10-year costs in the 2007 RIA. Once adjusted, security measure costs only account for 5 percent of the total cost, holding all other cost components constant.

Figure 7-4: 2007 RIA 10-Year Cost Comparison, Based on Security Measure Costs (Undiscounted, Millions of 2017$)



Security measure costs are the main driver of the reduction in the estimated burden for CFATS. In 2007, security measure costs were estimated based on very limited information on what security measures were already in place at facilities and what measures facilities would choose to install to comply with the RBPS. Based on submitted SSPs, CISA determined that facilities had already installed many security measures prior to the promulgation of CFATS. As such, many security measure costs that were accounted for in the 2007 RIA had already been incurred and, hence, were not a result of CFATS. Additionally, because CFATS is a performance-based standard, facilities were able to implement the most cost-effective and responsive security measures. In 2007, we did not have data on what the most cost-effective measures would be, so a more conservative approach, assuming more costly measures and higher rates of investment among facilities, was used in the 2007 RIA.

7.3 Reduction of the Number of Model Facility Groups

The 2007 RIA relied heavily on the assumption that facility costs would be impacted not only by tier and security issue, but also by size, layout, and number of employees. To this end, the 2007 RIA laid out a detailed explanation of the costs across 16 model facility groups, each with their own unique set of assumptions for personnel and security measure costs. As discussed in Section 4.3, CISA performed a regression analysis and determined that the 16 model facility groups were not necessary based on the observed level of spending on security measures reported as planned measures in SSPs.

This change from 16 to 8 model facility groups streamlined the CFATS cost analysis, thereby improving clarity and transparency in how the estimates are calculated. Additionally, by halving the number of model facility groups, CISA was able to reduce possible overestimates created by differentiating costs and spending for CFATS compliance across such a wide array of categories.

7.4 Other Changes

As discussed in Section 5.3, CISA made a number of smaller changes to the way the costs were estimated as compared to the 2007 RIA. In this Section 7.4, we discuss a number of these changes and present a comparison between the 2007 RIA and the retrospective analysis.

7.4.1 Labor hours

Personnel costs are based on labor hours and hourly compensation rates. Before the implementation of the CFATS program, there was a great deal of uncertainty surrounding the time burden associated with certain aspects of CFATS compliance. Table 7-4 presents the time burdens used to estimate the cost of certain CSAT activities in the 2007 RIA and those used for this retrospective analysis. For the 2007 RIA and the retrospective analysis, these burden estimates reflect the estimates contained in the CFATS-related ICR packages approved at the end of the period of time considered in this retrospective analysis.[75,76]

Table 7-4: Burden Hour Comparison for CSAT Activities

CSAT Activity	Time Burden per Submission (hours)	
	2007 RIA	Retrospective Analysis
CFATS Help Desk Support (FYs 2007–2008)	0.25	0.33
CFATS Help Desk Support (FYs 2009–2016)	0.25	0.17
CSAT User Registration	1	2
Top-Screen	30.3	11.25
SVA Preparation & Submission	250	65
ASP Preparation & Submission[a]	250	65
SSP Preparation & Submission	200	225

[a] The supporting statement from 2007 did not report a time burden for an ASP. CISA assumes the time burden would be the same as for an SVA.

7.4.2 Personnel Surety Program

The 2007 RIA presented a very conservative estimate for the cost of personnel surety by estimating the cost based on all employees and resident contractors at all affected facilities

[75] CSAT ICR Supporting Statement (OMB Control Number 1670-0007), July 19, 2007. Retrieved from https://reginfo.gov/public/do/PRAViewDocument?ref_nbr=200707-1670-002.
[76] CSAT ICR Supporting Statement (OMB Control Number 1670-0007), October 11, 2014. Retrieved from https://reginfo.gov/public/do/PRAViewICR?ref_nbr=201303-1670-001.

undergoing vetting.[77] This resulted in an estimated initial cost of $444 million and an annual cost of $72 million for personnel surety in the 2007 RIA (in 2017 dollars).[78]

Due to delays in implementation of the PSP, high-risk chemical facilities did not begin complying with 6 CFR § 27.230(a)(12)(iv) until late in FY 2016. Based on the number of high-risk facilities that have submitted PSP submissions and the number of records about affected individuals submitted to the PSP, CISA estimates that each affected facility would submit 106 names initially in 2015 and, on average, an additional 51 submissions in FY 2016.[79,80] We estimate the cost per submission by multiplying the time burden to prepare and submit personnel information by the SSO hourly compensation rate. Based on this, CISA estimates that each facility would incur an initial cost of $1,408 in FY 2015 for the PSP, and an annual cost of $673 in FY 2016. CISA estimates a total PSP cost of $302,700 through FY 2016 for all Tier 1 and Tier 2 facilities.[81]

7.4.3 Visitor Escorts

The 2007 RIA assumed that high-risk chemical facilities would escort visitors to comply with CFATS, ranging from 12 hours per day at Group A facilities in Tiers 1 through 3; to 4 hours at Group B, Group C, and theft/diversion facilities in Tiers 1 through 3, with Tier 4 facilities estimated to have 25 percent of the burden of Tiers 1 through 3. The estimated annual visitor escort costs presented in Table 7-5 were estimated in the 2007 RIA based on the hour burdens above.[82] CISA inflated these costs to 2017 dollars using a GDP implicit price deflator.[83]

[77] The 2007 RIA estimated personnel surety costs for all tiered facilities.

[78] The start-up and annual costs are presented in Table 19, Personnel Surety Costs, of the 2007 RIA. CISA inflated the 2007 RIA values from 2007 dollars to 2017 dollars using a GDP deflator equal to 1.165. OECD. "GDP Implicit Price Deflator in United States [USAGDPDEFAISMEI]." Retrieved from the Federal Reserve Bank of St. Louis at https://fred.stlouisfed.org/series/USAGDPDEFAISMEI. Last accessed on May 8, 2018.

[79] The number of submissions in FY 2015 was obtained from the supporting statement for the t ICR submission for the CFATS PSP (OMB Control Number 1670-0029), as updated on December 27, 2017. Retrieved from https://www.gpo.gov/fdsys/pkg/FR-2017-12-27/pdf/2017-27519.pdf.

[80] To estimate the number of PSP submissions in FY 2016, CISA applied the 2016 BLS annual hires rate of 48 percent to the number of SSOs in applicable facilities in 2015. BLS. Job Openings and Labor Turnover – January 2017. Table 14. Annual Hires Rates by Industry and Region, Not Seasonally Adjusted, For total private industry. Retrieved from https://www.bls.gov/news.release/archives/jolts_03162017.pdf.

[81] For this analysis, CISA has accounted only for Tier 1 and Tier 2 facilities submitting the PSP, because Tier 3 and Tier 4 facilities were not required to submit until 2019.

[82] Cost estimates are based on the visitor escort unit cost estimates presented in Tables 27 through 42 of the 2007 RIA.

[83] OECD. "GDP Implicit Price Deflator in United States [USAGDPDEFAISMEI]." Retrieved from the Federal Reserve Bank of St. Louis at https://fred.stlouisfed.org/series/USAGDPDEFAISMEI. Last accessed on May 8, 2018. To convert the estimates from the 2007 RIA, which were in 2007 dollars, CISA multiplied the 2007 values by 1.165, which was calculated by dividing the GDP deflator from 2017 (112.1) by that from 2007 (96.2).

Table 7-5: Estimated Annual Visitor Escort Unit Costs in 2007 RIA, by Tier and Model Facility Group (2017$)

Tier	Release			Theft/Diversion
	Group A	Group B	Group C	
1	$116,524	$40,783	$40,783	$40,783
2	$116,524	$40,783	$40,783	$40,783
3	$116,524	$40,783	$40,783	$40,783
4	$29,131	$10,196	$10,196	$10,196

Over the course of the CFATS program, we have observed that the level of additional labor specified under the 2007 RIA was overestimated. For the retrospective analysis, CISA does not include any costs for visitor escorts, as we have observed that visitor escorts are handled as a collateral duty for administrative staff.

7.5 Overall Cost Comparison

The 2007 RIA presented a 3-year undiscounted cost estimate (2006–2009) of $5.2 billion, and a 10-year undiscounted estimate (2006–2015) of $14.6 billion.[84] Both estimates have been inflated to 2017 dollars using a GDP deflator. Using assumptions from the 2007 RIA, which assume that all facilities will complete their initial requirements by 2009, CISA recreates the 10-year costs of CFATS based on initial and annual costs in 2017 dollars, which are presented in Table 7-6. Not all cost categories were estimated in the 2007 RIA, and some costs were calculated differently than what was done for the retrospective analysis, or not estimated at all.

[84] The 2007 RIA focuses on the 3-year period from October 2006 to October 2009, because the initial statutory authorization for the interim final rule provided by Section 550(b) of the DHS Appropriations Act of 2007 was to end no later than 3 years after the date of enactment of the Act. The $5.2 billion and the $14.6 billion estimates are in 2007 dollars.

Table 7-6: Comparison of the Estimated 10-Year CFATS Costs in the 2007 RIA and Retrospective Analysis (Primary Estimate), by Cost Component (7% discount, Millions of 2017$)

Cost Component	2007 RIA (A)	Retrospective Analysis (B)	Difference (C) = (A) - (B)
Security Measure Cost	$6,126	$112	$6,014
SSO Labor Cost	$2,322	$953	$1,369
Personnel & Readiness Cost	$977	$458	$519
CSAT Cost	$401	$115	$286
Post-Security-Plan Cost	$12	$8	$4
Request to DHS Cost		$1	-$1
Recordkeeping Cost		$36	-$36
Total Cost	**$9,838**	**$1,682**	**$8,156**

Note: Values may not total due to rounding.

CISA also compared the costs by tier and the average cost per facility over the 10-year analysis period. Table 7-7 presents the comparison of the average 10-year cost per facility by tier. This shows the 10-year costs per facility were greatly overestimated in the 2007 RIA, with the average 10-year cost for a tiered facility estimated in the retrospective analysis estimated at 71 percent lower than the cost estimated in the 2007 RIA.[85]

Table 7-7: Comparison of Average 10-Year Cost Per Facility, by Tier (7% Discount, 2017$)

	2007 RIA	Retrospective Analysis
Tier 1	$7,003,071	$1,389,308
Tier 2	$4,591,255	$1,198,443
Tier 3	$1,714,639	$417,858
Tier 4	$600,705	$422,328
Not Tiered	$3,621	$3,293
Total	$168,866	$43,958
Tiered Only	$1,656,073	$487,239

Note: Both the Total and Tiered Only rows are weighted averages that present the average per-facility cost for the 10-year analysis period. The Total row includes all facilities, while the Tiered Only row includes just Tiers 1–4.

[85] We estimated the percent change in cost from the 2007 RIA to the retrospective analysis by subtracting the retrospective analysis cost from the 2007 RIA cost and then dividing that difference by the 2007 RIA cost: ($487,239 – $1,656,073) ÷ $1,656,073 = -71%.

8 Summary/Conclusion

This retrospective analysis shows that the 2007 RIA greatly overestimated the costs associated with the CFATS program. Table 8-1 presents a comparison between the 2007 RIA projected estimates and the findings from this retrospective analysis for the changes in the affected population and the cost of the CFATS program in 2017 dollars.

Table 8-1: Comparison Summary

	2007 RIA	Retrospective Analysis
Number of Chemical Facilities of Interest[a]	65,000	38,273
Number of Covered Chemical Facilities	5,000	3,216
Total 10-Year Cost (Undiscounted, Millions of 2017$)[b]	$14,649.4	$2,545.3
Total 10-Year Cost (7% Discount, Millions of 2017$)	$9,838.5	$1,682.4
Total 10-Year Cost for Covered Chemical Facilities (Undiscounted, Millions of 2017$)[c,d]	$2.93	$0.74

[a] The 2007 RIA is based on an estimated 50,000 chemical facilities registering for or submitting information to DHS as part of CFATS over the first 3 years of implementation. That number of facilities does not account for new entrants or other facilities projected to submit information over the 10-year analysis period. Therefore, for this table, we based the 10-year comparison on an estimated 65,000 facilities, as per Table 6 in the 2007 RIA.
[b] The 2007 RIA estimated costs from 2006 to 2015, with an estimated cost of $0 for 2006. For the retrospective analysis, the period of analysis was shifted to cover the first 10 years post-CFATS implementation in April 2007 (2017–2016). While a retrospective analysis would typically look at the same period of analysis as the prospective analysis, CISA believes it is justified in shifting the period of analysis for the retrospective to begin in the year of CFATS promulgation to account for the full first 10 years of CFATS-related costs. To calculate the present value of the total 10-year cost discounted at 7 percent, we use the first year of the analysis as the base year. We use 2006 and 2007 as the base year for the 2007 RIA and the retrospective analysis, respectively.
[c] The 2007 value divides the total cost by the number of covered chemical facilities, as the costs for not covered chemical facilities were not separated in that analysis. For the retrospective analysis, CISA separated the costs for not covered chemical facilities. The total cost for covered chemical facilities is $2.4 billion, which is divided by 3,216 covered chemical facilities to obtain the per facility cost of $0.74 million.
[d] The 10-year undiscounted cost is an average cost across all covered chemical facilities. The 10-year costs actually incurred by a chemical facility depends on when it began complying with CFATS, its tier and security issue, and the specific measures taken at the facility.

This retrospective analysis presents an estimated cost for the first 10 years of the CFATS program rooted in observed data collected from chemical facilities and reflects the actual burdens borne by the affected population.

CISA has continued to make improvements to streamline the program that occurred after the time period considered in this retrospective analysis and that created cost savings not captured in this analysis. With the rollout of CSAT 2.0 in October 2016, we have reduced the burden on CFATS regulated facilities by making the process of completing Top-Screens and SSPs more efficient. These cost savings were first accounted for in the CSAT ICR package (OMB Control Number 1670-0007).[86]

[86] ICR 1670-0007 CSAT, 30-Day Notice and requests for comments; Revision of Information Collection Request, issued on April 13, 2016. Retrieved from https://www.federalregister.gov/documents/2016/04/13/2016-08495/chemical-security-assessment-tool-csat.

Appendix A: Security Measure Cost Methodology Report

Estimated Equipment Costs for Planned Security Measures Reported in Approved Site Security Plans for Chemical Facility Anti-Terrorism Standards Facilities

A.1 Introduction

The Infrastructure Security Division (ISD) sought to update the security measure cost data in support of the regulatory impact analysis (RIA) for the Chemical Facility Anti-Terrorism Standards (CFATS) Interim Final Rule.

This report provides the results of the evaluation of 1,418 approved Site Security Plans (SSPs), specifically, the approved SSPs that contained "planned measures." At the end of each Risk-Based Performance Standards (RBPS) section, the facility is able to provide information on any planned security measures for the facility and any other assets the facility may identify. DHS may consider a planned security measure in determining whether an SSP satisfies applicable RBPS if the measure:

- Is in the process of being installed;
- Is in the design phase but has an approved and documented capital budget;
- Is in the bid process and has been placed for bid or bids have been received and are under review; or
- Is in a pilot phase or is in execution as a demonstration project, and for which there is a general but documented implementation budget and schedule.

If a facility provides information about a planned security measure for consideration by DHS, the facility should also expect to produce documentation that supports the planned measure, such as evidence there is funding. DHS will consider planned measures during the SSP approval process.

Planned measures are documented in SSPs submitted to ISD when a facility has committed to implementing those measures but has not been able to complete the implementation before submitting the SSP with the assumption that the planned measures will then be implemented in a timely manner. Users of the data in this report should recognize that facilities may have spent money implementing security measures earlier in their development of a security risk management program to meet CFATS (i.e., before they documented their SSP). Costs for any security measures implemented but not reported in an SSP as "planned measures" are not included in the data collected in this effort.

Planned measures detail how a facility would enhance its security posture to become compliant with specific RBPS and are divided into two categories: (1) planned measures that call for additional security equipment, and (2) planned measures that describe procedure development or procedural changes.

Of the 1,418 SSPs that had planned measures, 563 (40 percent) did not include any security equipment costs. This report focuses on the implementation costs associated with procuring security technologies for planned security measures. The costs presented are highly subjective and only deal with how a typical facility would implement stated security technology equipment, strategies, and components.

This document was prepared by ABSG Consulting (ABSG) under contract to and with input from and review by the Cybersecurity and Infrastructure Security Agency, United States (U.S.) Department of Homeland Security (the Department or DHS).

A.2 Methodology

The following reference sources were used to define estimated costs for the identified security equipment and labor hours for the components required to implement the reported planned security measures:

- **GSA Advantage** – An online government purchasing service run by the General Services Administration (GSA) that provides descriptions and costs for equipment commonly purchased by U.S. government agencies. It includes a wide range of equipment necessary to implement security measures like those reported in the SSP planned measures.[87]

- **RSMeans –** A division of Gordian that provides cost information to the construction industry to help contractors provide accurate estimates and projections for their project costs. RSMeans was used to identify the number of installers required and the person-hours necessary to install the equipment comprising the planned security measures.[88]

When a specific security technology type was not found on GSA Advantage, alternative websites were used for costing information related to security equipment. After the items were located and costing information identified, the costs were presented at team meetings among the physical security subject-matter experts. The project team discussed the costing information and agreed on cost assumptions. The intent was to estimate costs in a manner and approach that was consistent with costs and approach found in GSA Advantage. The specific web addresses for these additional sources are identified in Section 4, Table A.

A.3 Cost Estimate Limitations

Readers of this report should understand the types of uncertainty associated with estimating planned measure costs. Below is a list of these uncertainties.

- **Lack of planned measure detail in the SSP.** In many of the SSPs reviewed, the planned measures lacked sufficient detail regarding location of the installation and total numbers to be installed (e.g., number of security cameras or sensors). This lack of detail limited the ability to estimate actual costs incurred.[89]

- **Uncertainty in estimating required labor hours.** Although the team relied on RSMeans to determine installation times, lack of detail in the planned measures made determining installation time estimates difficult. The hours presented in Section 4, Table B reflects the team's best estimates for each specific security technology type.

[87] https://www.gsaadvantage.gov/ (accessed January-February, 2016).
[88] "RSMeans Electrical Cost Data" (38th ed. 2015), Adrian C. Charest, PE, Senior Editor.
[89] Section 5.2.2 of this analysis explains how CISA addressed the uncertainty inherent in the SSP data.

- **Use of GSA Advantage.** GSA Advantage's purpose is to provide government organizations with favorable pricing. The team recognized that GSA Advantage is not a source that CFATS facilities could or would use to acquire equipment for implementing security measures; however, it provided a consistent source for a wide range of security equipment. The team assumed that commercial firms could locate the required equipment at comparable prices. Use of this source was discussed with the National Protection and Programs Directorate task manager and ultimately the use of GSA Advantage was approved for this task. It allowed the required costs to be estimated consistently in the short timeframe available for this task.

A.4 Planned Measure Cost Estimates

A.4.1 Estimated Cost Summary

The estimates reported here are associated with 854 facilities (of the 1,418 facilities examined) that reported one or more planned security measures that would require purchase and installation of equipment.

The following projected costs represent the total costs for planned measures reported by the facilities:

- Projected Equipment Cost: $16.9M (68 percent of total)
- Projected Labor Cost: $7.9M (32 percent of total)
- Total Projected Facility Cost: $24.8M

A.4.2 Cost Estimates for Each Facility

The cost data associated with the planned measures for each of the facilities considered in this task include the following information:

- Facility Identification Number
- Region (location of facility)
- Overall Tier
- Facility Status (all are approved)
- Planned Measures (all facilities contained at least one)
- Number of Employees (full time only)
- RBPS with Planned Measure
- Analyst Comments (specifies equipment in planned measures)
- Technology Types (associated costs shown)
- Life Cycle Estimates

The life cycle estimates reference the Transit Cooperative Research Program Report 86 document from which the estimates were taken. The life cycle estimates were not used to perform any calculations.

A.4.3 Equipment Unit Cost Estimates and Associated Labor Costs

This section presents the cost estimates for each type of security system/equipment represented in the planned measures reported in the SSPs. The data are provided in two tables for each equipment type.

Table A provides a breakdown of the specific equipment/components that make up each type of security measure. When a system type is described, the components needed to make up a basic system are listed. Because of the lack of specificities in the planned measures, upgrades to a system or increases in components were very difficult to estimate. The web links used to estimate costs are included in Table A for reference purposes. The table provides each component necessary to calculate the equipment costs of the basic security systems presented in the spreadsheet included with this report when it was submitted to ISD.

In addition, certain equipment costs include a 25-percent ancillary cost, which is based on miscellaneous material needs.

Table B addresses labor costs. These tables include estimated wages, an overhead and profit column, total hours to install the equipment, and a reference to where this information was obtained in the RSMeans data source.

A.4.3.1 Intrusion Detection System (Indoor)

Table A. Equipment/Components

Magnetic Switches (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2door+alarm+magnetic+balance+switch&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
Passive Infrared Detectors (2)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2PIR+sensor&db=0&searchType=0 (Accessed January-February, 2016)
Indoor Cameras (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2color+CCTV+camera&q=1:4ADV.BUI*&searchType=0&p=3 (Accessed January-February, 2016)
Digital Video Recorder (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:216+channel+dvr&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
24-Inch Monitors (2)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2cctv+security+monitors&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	84	Page 316 RSMeans, 2 Electricians

A.4.3.2 Intrusion Detection System (Outdoor)

Table A. Equipment/Components

Outdoor Camera (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2outdoor+CCTV+video+motion+detection&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
Digital Video Recorder (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:216+channel+dvr&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
24-Inch Monitors (2)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2cctv+security+monitors&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	36	Page 316 RSMeans, 3 Electricians

Table A. Equipment/Components

Card Readers (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2smart+card+reader&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
Proximity Cards – x100, 200, 400, 1000	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2proximity+cards&db=0&searchType=0 (Accessed January-February, 2016)
Server – 16 Channel (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2secure+access+control+system&db=0&searchType=0 (Accessed January-February, 2016)
Panel (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2symmetry+250k+dbu+board+only&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	192	Page 316 RSMeans, 2 Electricians

Table A. Equipment/Components

Halogen – White	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2low+sodium+lighting&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	8	Page 316 RSMeans, 1 Electrician

A.4.3.3 Chain-Link Fencing

Table A. Equipment/Components

Chain-Link Fencing (varying lengths)	http://www.rempros.com/installation-prices/cost_to_install_fence.html (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$164.90	$33.10	40	Page 336 RS Means, 32-31-13 chain-link fences Page 476 RS Means, Table B80

A.4.3.4 Chain-Link Cage

Table A. Equipment/Components

Chain-Link Cage	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2security+cage&q=1:4ADV.LAW*&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$37.60	$20.25	16	Page 455 RSMeans, 1 Installing Contractor

A.4.3.5 Pedestrian Gate

Table A. Equipment/Components

Pedestrian Gate	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2pedestrian+gate&q=1:4ADV.LAW*&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$37.60	$20.25	16	Page 455 RSMeans, 1 Installing Contractor

A.4.3.6 Vehicle Gate

Table A. Equipment/Components

Vehicle Gate	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2cantilever+gate&q=1:4ADV.LAW*&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$64.95	$33.88	80	Page 455 RSMeans, 1 Standard Laborer Page 318 RSMeans, 1/2 Electrician

A.4.3.7 Locks

Table A. Equipment/Components

Lock	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2medium+security+padlocks&q=1:4ADV.LAW*&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$37.60	$20.25	1	Page 455 RSMeans, 1 Standard Laborer

A.4.3.8 Chain

Table A. Equipment/Components

5,000 Pounds per Square Inch (varying lengths)	http://www.1st-chainsupply.com/chain/gr100_bulk.htm (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$37.60	$20.25	1	Page 455 RSMeans, 1 Standard Laborer

A.4.3.9 Steel Door

Table A. Equipment/Components

Door (includes mortise lock installation)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2fire+rated+single+entry+door&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$46.95	$25.30	8	Page 456 RSMeans, Installing Carpenters Table A-4

A.4.3.10 Indoor Cameras

Table A. Equipment/Components

Indoor Camera	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2color+CCTV+camera&q=1:4ADV.BUI*&searchType=0&p=3 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	6	Page 318 RSMeans, 2 Electricians

A.4.3.11 Indoor Closed-Circuit Television (CCTV) System

Table A. Equipment/Components

Indoor Cameras (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2color+CCTV+camera&q=1:4ADV.BUI*&searchType=0&p=3 (Accessed January-February, 2016)
Digital Video Recorder (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:216+channel+dvr&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
24-Inch Monitor (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2ctv+security+monitors&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	24	Page 318 RSMeans, 2 Electricians

A.4.3.12 Outdoor Camera

Table A. Equipment/Components

Outdoor Camera	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2outdoor+CCTV+video+motion+detection&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	9	Page 318 RSMeans, 3 Electricians

A.4.3.13 Outdoor CCTV System

Table A. Equipment/Components

Outdoor Cameras (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2outdoor+CCTV+video+motion+detection&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
Digital Video Recorder (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:216+channel+dvr&q=1:4ADV.BUI*&searchType=0 (Accessed January-February, 2016)
24-Inch Monitor (1)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2cctv+security+monitors&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$54.70	$27.25	36	Page 318 RSMeans, 3 Electricians

A.4.3.14 Signage

Table A. Equipment/Components

Sign	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2notrespassing+alum+sign&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$37.60	$20.25	1	Page 455 RSMeans, 1 Standard Laborer

A.4.3.15 Concrete Barriers

Table A. Equipment/Components

Concrete Barriers (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2concrete+jersey+barriers&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$48.60	$25.15	16	Page 456 RSMeans, Table -A-3P

A.4.3.16 Planter-Style Barriers

Table A. Equipment/Components

Planter-Style Barrier (4)	https://www.gsaadvantage.gov/advantage/s/search.do?q=0:2concrete+planter+barriers&db=0&searchType=0 (Accessed January-February, 2016)

Table B. Labor Costs

Wage	Overhead/Profit	Total Hours	RSMeans Location
$48.60	$25.15	24	Page 456 RSMeans, Table -A-3P

A.5 Summary

ISD intended to gather both equipment and labor installation costs associated with the implementation of CFATS. In order to gather this information, planned measures from SSPs were analyzed and screened to determine if they contained any projected equipment and labor installation cost expenditures. The equipment and labor installation costs were then placed into a spreadsheet and used to present the data found in this report. This report does not include any information from Alternate Security Plans or ASPs.

Appendix B: Replacement Costs for Security Measures

This appendix provides a more detailed discussion on the estimated replacement costs for security measures implemented to comply with the Chemical Facility Anti-Terrorism Standards (CFATS), as discussed in Section 6.4. Table B-1 presents the average lifespan for the security measures used in this analysis. Of the 20 security measures used in the analysis, the only 2 that have an average lifespan less than 10 years are outdoor cameras and outdoor closed-circuit television (CCTV) systems, which each have a lifespan of 5 to 7 years.

Table B-1: Average Lifespan for Security Measures

Security Measure Category	Security Measure	Average Lifespan (years)
Perimeter Controls	Chain-Link Fencing	25
	Chain-Link Cages	25
	Pedestrian Gates	25
	Vehicle Gates	25
	Chains	15+
	Signage	10+
Monitoring Systems	Indoor Intrusion Detection Systems (IDSs)	10+
	Outdoor IDSs	10+
	Access Control Systems	10+
	Indoor Cameras	10+
	Outdoor Cameras	5 to 7
	Indoor CCTV Systems	10+
	Outdoor CCTV Systems	5 to 7
	Locks	10+
	Doors	15+
Security Support	Monitoring 3rd Party	NA
	Lighting	20 to 25
	Concrete Barriers	15
	Planter-Style Barriers	20
	Other (Security Guards, etc.)	NA

Based on the estimated lifespan of equipment, the calculations for perimeter controls and security support do not include estimated replacement costs. Monitoring systems do include replacement costs for outdoor cameras and outdoor CCTV systems. However, the estimates are based on a 7-year replacement, and as such, replacement costs only apply in fiscal years (FYs) 2015 and 2016 of this analysis. Total replacement costs for monitoring systems are $6.4 million, as presented in Table B-2.

Table B-2: Replacement Costs, by Security Measure Category

FY	Perimeter Controls	Monitoring Systems	Security Support
2007	$0	$0	$0
2008	$0	$0	$0
2009	$0	$0	$0
2010	$0	$0	$0
2011	$0	$0	$0
2012	$0	$0	$0
2013	$0	$0	$0
2014	$0	$0	$0
2015	$0	$522,110	$0
2016	$0	$5,863,745	$0
Total	**$0**	**$6,385,856**	**$0**

Appendix C: Time Burdens for Post-Security Plan Activities

The cost of inspections is based on the time spent preparing for the inspection, being present during the inspection, and engaging in post-inspection activities. For the purposes of this analysis, the Cybersecurity and Infrastructure Security Agency assumes all burden hours for these activities will be borne by the Site Security Officer (SSO). In addition to the burdens presented in Table C-1, each facility undergoing an authorization or compliance inspection will have a 2-hour burden for facility employee interviews.

Table C-1: Burden, in Hours, to Conduct Post-Security Plan Activities

	Authorization Inspection	Compliance Inspection	Compliance Assistance Visit
Pre-Inspection Processes			
Initial Notification and Headquarters Coordination			
Field Operations Notification/Coordination	2	2	
Formation of Inspection Team	0.5	0.5	
Scheduling the Inspection	0.75	0.75	
Inspection Coordination	2	2	
Inspection Preparation	8	4	4
Inspection Plan	1	0.5	
Arrangements for Travel and Accommodations			
Travel to Facility			
TOTAL HOURS	**14.25**	**9.75**	**4**
Execution of the Inspection			
Pre-Arrival	0.5	0.5	
Compliance Inspection	12	8	8
TOTAL HOURS	**12.5**	**8.5**	**8**
Post-Inspection Processes			
Travel from Facility			
Travel Claim			
Formal Reporting	6	4	2
Review/Quality Assurance	0	0	
Rework	3	2	
Final Review	0	0	
TOTAL HOURS	**9**	**6**	**2**
GRAND TOTAL HOURS	**35.75**	**24.25**	**14**