

**Environmental Protection Agency**

**Stratospheric Protection Division of the Office of Air and Radiation/Office of**

**Atmospheric Protection**

**Statement of Objectives**

*for the*

**Development of an SPD Database & Application Warehouse, a Revamped  
Allowance Tracking System, and a Hydrofluorocarbon (HFC) Container Tracking**

**System**

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## 1.0 Background: current programs and technology systems

### 1.1 Programs implemented by the Stratospheric Protection Division

The Stratospheric Protection Division (SPD) within EPA's Office of Atmospheric Protection administers several programs under the Clean Air Act (CAA) and the American Innovation and Manufacturing Act (AIM Act). These programs include,

- The phaseout of ozone depleting substances (ODS), the centerpiece of the United States' efforts leading the global community to heal the ozone hole.<sup>1</sup>
- The phasedown of hydrofluorocarbons (HFCs). This is an allowance allocation and trading program to reduce production, import, and the use of HFCs in the United States (U.S.).<sup>2</sup> HFCs are potent greenhouse gases.
- Subsection (i) of the AIM Act, which allows EPA to “restrict, either fully, partially, or on a graduated schedule, the use of HFCs in sectors or subsectors where they are used.”<sup>3</sup>
- Subsection (h) of the AIM Act, which allows EPA to “promulgate certain regulations for the purposes of maximizing reclamation and minimizing releases of certain hydrofluorocarbons (HFCs) and substitutes from equipment.”<sup>4</sup>
- The Significant New Alternatives Policy (SNAP), which identifies, evaluates, and lists acceptable substitutes for ozone-depleting substances.<sup>5</sup>
- The GreenChill Partnership, in which SPD works collaboratively with the food retail industry to reduce refrigerant emissions and decrease their impact on the ozone layer and climate change.<sup>6</sup>
- The Responsible Appliance Disposal (RAD) program, in which SPD works with stakeholders to dispose of old refrigerated appliances using the best environmental practices available.<sup>7</sup>

The principal regulations supporting these programs can be found in Title 40 Chapter I, Subchapter C, parts 82 and 84 of the Code of Federal Regulations (CFR).<sup>8</sup>

To learn more about SPD operations, please visit <https://www.epa.gov/ozone-layer-protection>, <https://www.epa.gov/ods-phaseout/what-phaseout-ozone-depleting-substances> and <https://www.epa.gov/climate-hfcs-reduction>

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<sup>1</sup> <https://www.epa.gov/ods-phaseout/what-phaseout-ozone-depleting-substances>

<sup>2</sup> <https://www.epa.gov/climate-hfcs-reduction/final-rule-phasedown-hydrofluorocarbons-establishing-allowance-allocation>

<sup>3</sup> <https://www.epa.gov/climate-hfcs-reduction/technology-transition-petitions-under-aim-act>

<sup>4</sup> <https://www.epa.gov/climate-hfcs-reduction/background-management-hfcs-and-substitutes-under-subsection-h-aim-act>

<sup>5</sup> <https://www.epa.gov/snap>

<sup>6</sup> <https://www.epa.gov/greenchill>

<sup>7</sup> <https://www.epa.gov/rad>

<sup>8</sup> <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C>

## 1.2 The IT tools underlying the implementation of SPD's programs

The processes supporting the programs listed above were largely built ad hoc and separately from one another. The programs are largely supported using Microsoft suite tools, like Excel and Word. Submissions to the Significant New Alternatives Policy (SNAP) program, for example, are sent by email as PDF or Word files. SPD staff rely on contractors to analyze GreenChill data, because that data lives in scores of separate Excel files.

The ODS phaseout and HFC phasedown programs are supported by custom IT infrastructure (discussed at length in the next section). But even in these programs, SPD staff largely use Excel to do data processing and analysis.

## 1.3 The IT infrastructure currently supporting the ODS phaseout and HFC phasedown programs

Unlike SPD's other programs, the ODS phaseout and HFC phasedown programs are supported by custom IT infrastructure. This section describes this legacy infrastructure in more detail.

SPD and support contractors currently operate and maintain an application and database (DB) to support the ODS phaseout and HFC phasedown programs. This system has historically been called the "Ozone Depleting Substances Tracking System" (ODSTS); SPD recently expanded ODSTS to incorporate data related to the HFC phasedown.

Allowances for the ODS phaseout program and the HFC phasedown program are tracked in this system. Stakeholders submit forms to the system and EPA reviews them. Some forms, like allowance transfer requests and quarterly importer reports, impact stakeholders' allowance balances; if these forms are approved by EPA, the system updates the relevant stakeholders' allowance balances. The system also stores the original reports and forms.

This reporting system has several components, detailed below. Accessing all of these components requires EPA-issued log in credentials. Stakeholders register and log in using EPA's "Central Data Exchange" (CDX) system. EPA staff use their Agency credentials to log in and to review reports. Here are the components that make up the system:

- An Oracle DB maintained by a contractor. This is where all the underlying reports and data related to the ODS phaseout and HFC phasedown are stored.
- An Oracle "Application Express" (ApEx) front-end. This is a user interface (UI) where:
  - Stakeholders submit certain PDF and excel-based reporting forms, mostly for the ODS phaseout.
  - Stakeholders can view certain past reports and limited information about the status of their reports.
  - EPA staff and contractors can (1) review HFC and ODS reports to accept or reject them, (2) view summaries of reported HFC and ODS data, and (3) download certain HFC and

ODS data.

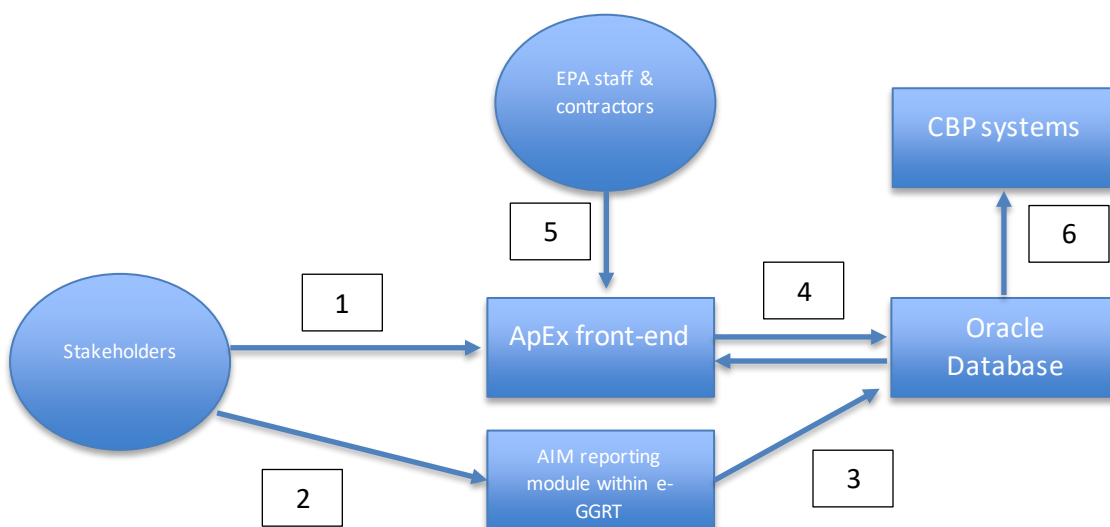
- The reporting system also has a component currently housed within the “electronic Greenhouse Gas Reporting Tool” (e-GGRT).<sup>9</sup> This component is a front-end portal where stakeholders submit their HFC-phasedown-related reports. Those reports are then passed to SPD’s Oracle DB.
- Finally, the Oracle DB has a connection with a node owned by Customs and Border Protection (CBP). SPD uses this connection to tell CBP which importers have HFC phasedown and ODS phaseout allowances. This helps expedite EPA’s regular review of Customs’ import data.

To summarize:

- Stakeholders submit reports to SPD’s Oracle backend via the Apex front-end (for ODS reports) and a separate front-end tool housed within e-GGRT (for HFC reports).
- SPD staff can view this data in an EPA-internal version of the Apex front-end.
- The Oracle DB tells CBP which importers have HFC phasedown allowances.

The Oracle DB, the Apex front-end, and e-GGRT are hosted “on premises” at EPA’s National Computing Center (NCC).

Here’s a simplified illustration of the reporting system:

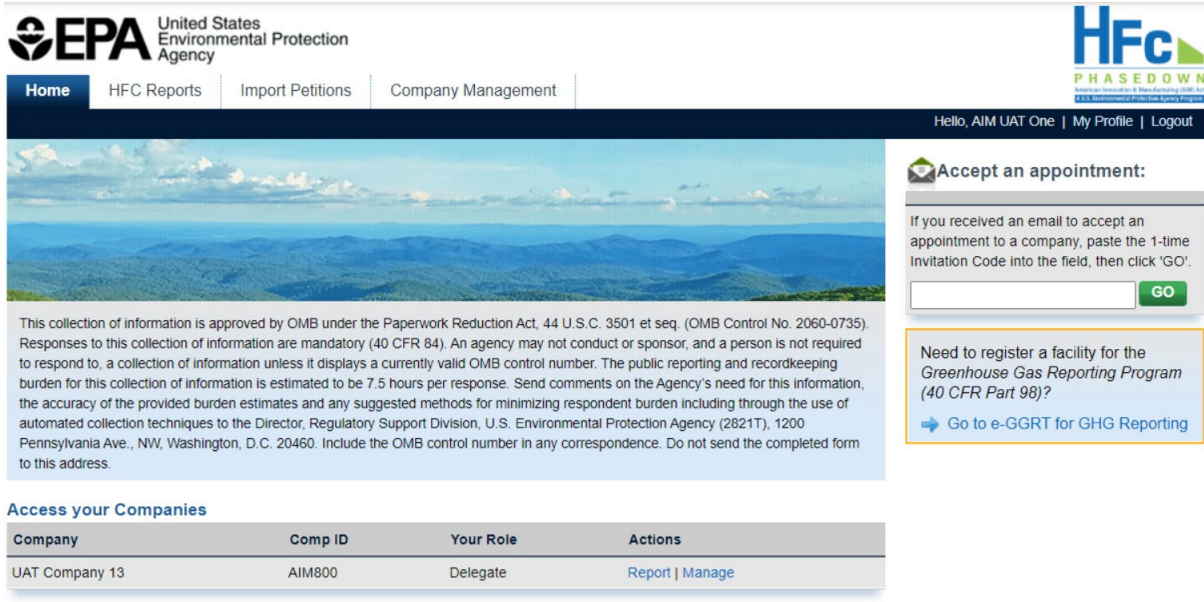


1. Stakeholders submit some reports (mostly related to the ODS phaseout) to the Apex front-end.
2. Stakeholders submit reports related to the HFC phasedown to the AIM reporting module within e-GGRT.
3. Those HFC reports are passed from e-GGRT to SPD’s Oracle DB.
4. Reports are passed from the Apex front-end to the Oracle DB. The Oracle DB also makes that data available to the Apex front-end that SPD staff can see. The DB tracks how many allowances

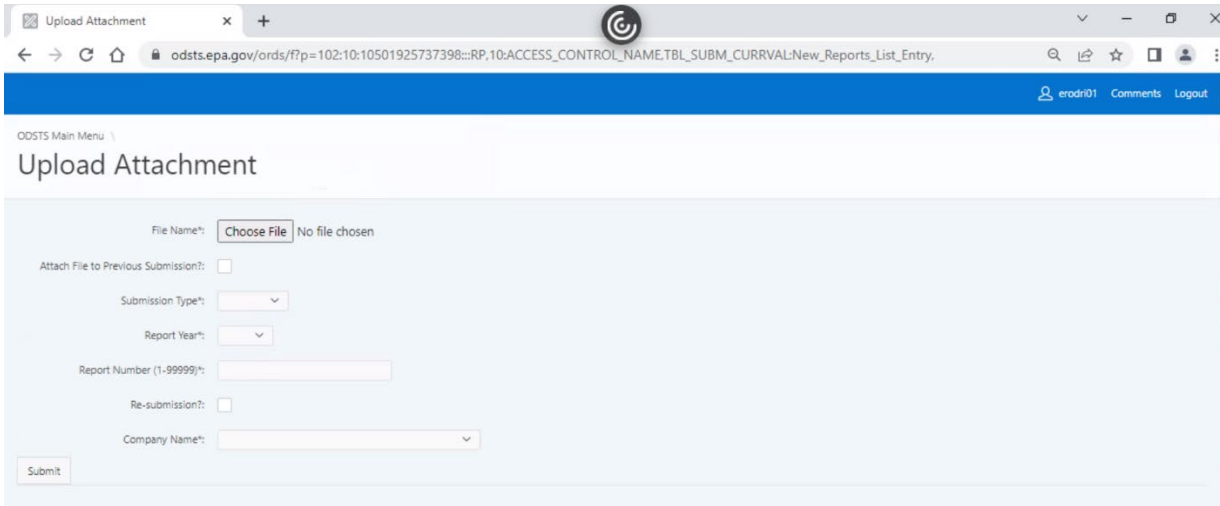
<sup>9</sup> EPA’s Greenhouse Gas Reporting Program (GHGRP) created e-GGRT to help implement requirements under 40 CFR part 98. E-GGRT is where companies subject to GHGRP’s regulations submit annual reports detailing their annual greenhouse gas emissions or supplies. GHGRP is housed within EPA’s Climate Change Division and is separate from SPD, although GHGRP and SPD work closely together.

- each entity has in the ODS phaseout and HFC phasedown programs.
- SPD staff log into the ApEx front-end to view reports, issue approvals or rejections, view summaries of the data in the DB, etc.
  - SPD's Oracle DB tells CBP which importers have HFC phasedown allowances.

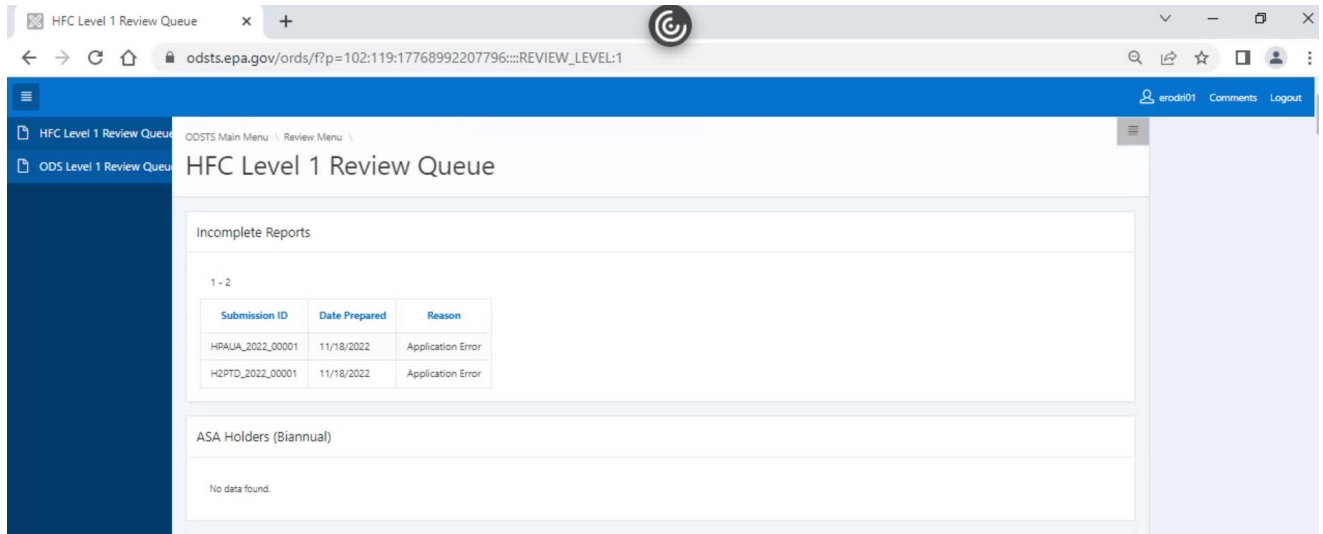
The screenshots below show what each of these front ends look like.



The screenshot above shows what the "AIM reporting module" looks like within e-GGRT. This is the front-end application that stakeholders use to upload HFC-related reports.



The screenshot above shows what the ApEx UI looks like to stakeholders. This is the front-end application that stakeholders use to upload HFC- and ODS-related reports.



The screenshot above shows what the Apex UI looks like to EPA staff and contractors. This is the front-end that SPD uses to review reports, summarize data, etc.

Again, all of the components of reporting system are hosted at the EPA NCC. EPA staff must log into a virtual desktop environment (VDI) to see data in system.

## 1.4 Controlled Unclassified Information

Within the reporting system, SPD handles a significant amount of Controlled Unclassified Information (CUI), because HFC- and ODS-related reports often contain CUI. Examples of this CUI include the specific chemicals that companies produce at certain facilities, as well as the supplier and customer relationships that companies maintain. Partly to ensure that this CUI is kept confidential, the reporting system is hosted at EPA's NCC, and EPA staff can only access the Apex front-end by logging into a VDI environment.<sup>10</sup> Information (even unrestricted, non-CUI data) can only be moved from the VDI environment manually with explicit permission from key EPA staff.

Significant portions of the data in the reporting system are not CUI, including entities' current allowance balances, transfers, and the number allowances expended each quarter. SPD wants to be able to publish this non-CUI data easily, to meet its data transparency goals.

## 1.5 Problems with these legacy systems and processes

The last few sections described SPD's current data systems and processes. This section lists the challenges that SPD staff face with these systems and processes.

1. SPD does not have a single place that houses all of its data. Instead, the data is housed in a messy, disjointed manner. Customs data lives in OneDrive, for example, while data on entities' allowance balances lives in the reporting system.
2. The process of comparing data from different sources relies heavily on manual work by SPD staff. This manual work is expensive, time-consuming, and error prone. This limits SPD's ability to effectively monitor stakeholder compliance. SPD staff must spend significant amounts time manually moving files in and out of the VDI, for example. The current configuration of the reporting system and the VDI ensures that SPD staff must conduct all true ups of Customs and EPA data on an ad hoc basis.
3. The current configuration of the reporting system, in which stakeholders report through a portal built into e-GGRT, means that the Greenhouse Gas Reporting Program (GHGRP) is paying IT costs for SPD and owns some of SPD's IT infrastructure. Long term, this is not a desirable arrangement for either SPD or GHGRP.
4. The current configuration of the reporting system means that SPD is heavily reliant on contractor support for virtually all of its IT development—and even basic data analysis. SPD doesn't own the Oracle DB underlying the reporting system. SPD staff cannot query the DB directly, and rely on contractor support to create expensive, bespoke data "reports." These reports often do not fully meet the needs of SPD staff.
5. SPD's IT systems and processes are not built to scale. This is unacceptable, given the requirements that SPD must fulfill to implement the HFC phasedown regulations.
6. Oracle is one of the most expensive database offerings on the market and SPD could realize long-term cost savings by adopting an alternative database provider.

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<sup>10</sup> It is worth noting, however, that Microsoft Office 365 is rated FISMA moderate, which means it could likely fulfill the security requirements associated with SPD's CUI. See page four of [this document](#), for example.



7. SPD's current IT systems, especially the structure of the VDI system, make publishing public data a slow, difficult, and manual process. The current IT systems also make it difficult to move and analyze data internally. SPD needs to improve this system—or develop a better one—to meet its oversight and data transparency goals.

## 2.0 Purpose and Scope

### 2.1 Product Vision

SPD will develop three systems (Appendix A):

1. **A replacement for the existing reporting system application and database**, owned entirely by SPD, that uses modern software architecture.<sup>11</sup> SPD staff will be able to query the underlying database directly; stakeholders and the public will have easy access to data they are permitted to view. Connections between this system and other EPA systems will be quick and cheap to configure. SPD staff should be able to maintain this system to a large degree. SPD will also implement an improved data exchange with CBP as part of this system overhaul.
2. **A system to house SPD's applications and databases**, which will contain the replacement reporting system, as well as other SPD applications. This warehouse will store all of SPD's data in one place, where that data can be seamlessly and automatically merged and analyzed.
3. **An HFC container tracking system**. This is a new regulatory requirement for SPD, described in detail below.

EPA expects to own all of these systems and databases, even if EPA staff are not themselves primarily responsible for the operation and maintenance of the system.

EPA expects that all of these systems will be hosted on the cloud, using services such as Cloud.gov or EPA's cloud offerings, for example.<sup>12 13</sup> SPD has not yet chosen a cloud service provider. SPD is agnostic about where non-production environments are hosted, assuming those non-production environments do not house confidential business information (CBI), personally identifiable information (PII), or other sensitive information.

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<sup>11</sup> SPD will work with its existing contractors to provide any necessary support for this projects (e.g. for database migrations).

<sup>12</sup> SPD's current allowance tracking system has certain elements that involve EPA's "Cross-Media Electronic Reporting Rule" (CROMERR). When stakeholders submit quarterly excel reports summarizing their HFC imports, for example, they must provide a CROMERR "valid electronic signature." SPD expects that the re-engineered allowance tracking system will need to continue to be CROMERR compliant. SPD is in ongoing discussions with legal counsel and in-house IT specialists about how CROMERR might apply to the HFC container tracking system. (SPD's understanding is that CROMERR would not apply to the live feed of container tracking data, but this understanding could change in the course of these expert consultations). See this page for more information about CROMERR: <https://www.epa.gov/cromerr>

<sup>13</sup> This page has more details about EPA's cloud hosting options: [EPA Application Development/Hosting Environments | US EPA](#).

EPA expects that these systems will use microservices-based architectures, containerization, and other best practices in modern software development.

***Please note that EPA is on an extremely tight schedule, especially on the HFC container tracking project. EPA must have a live, production version of the HFC container tracking system ready by July 2024. (By regulation, HFC producers and importers must be able to register with the system in July 2024).***

## 2.2 Purpose

This statement of objectives (SOO) outlines the broad requirements needed to design, develop, deploy, and maintain the three systems described in the previous section. The information technology services under this SOO include activities such as consulting, architecture planning, design, code development and maintenance, user testing, documentation, end-user support, and task order management.<sup>14</sup> In general, building the necessary systems will require:

- Designing intuitive and easy-to-use systems, centered on the user, that adhere to accessibility requirements (i.e., Section 508)<sup>15</sup>;
- Building for scale—these systems, especially the tracking system—must handle large quantities of data (potentially tens of millions of transactions a year);
- Building for speed—these systems can almost never go down, and they need to respond to user requests within milliseconds;
- Using free, open-source software so that SPD avoids contractor lock-in, and so the final components can be offered in the public domain;<sup>16</sup>
- Rationalizing SPD’s data management, so that all of SPD’s data is available in one place—a place where SPD can easily spin up automated data analysis pipelines;
- Building secure systems that adhere to information technology and information management (ITIM) policies, procedures, and standards, and can run on EPA-approved web and/or cloud platforms. EPA’s IT/IM Policies, Procedures, and Standards can be accessed at: <https://www.epa.gov/irmpoli8/current-information-directives>;
- Support SPD in evaluating the options and opportunities to leverage Federal and EPA ITIM shared services to support the development and maintenance of new HFC systems;
- Developing and operating in a DevOps (or DevSecOps) environment;
- Integrating automated testing to ensure high quality, reliable software deployments;
- Applying best-practice Agile development and project management methods;
- Engaging SPD technical staff in a collaborative design and development process to ensure SPD’s ability to maintain and support the software in the future.

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<sup>14</sup> Please note that “information and data management services” fall within the scope of “IT services.” IT services do not solely encompass software development and deployment, for example.

<sup>15</sup> Refer to [www.section508.gov](http://www.section508.gov) for more information about accessibility standards.

<sup>16</sup> The EPA intends to publish the software in the public domain. The contractor will have to obtain EPA permission before delivering software that incorporates any software that is not free and open source. The contractor must post all developed code to an EPA-managed GitHub repository designated by the EPA.

## 2.3 Scope

### 2.3.1 User Stories

Applying best-practice Agile/Scrum development methods includes managing a shared backlog for development and code maintenance. To provide an illustration of the type of user stories that may populate the backlog, several example user stories are provided. These user stories do not comprise the full scope or detail of the project, which will emerge over the course of the engagement through close collaboration between the contractor and SPD Product Owner(s) during regular user research and usability testing.

The actual user stories developed as part of the engagement may be modified, added to, retracted, and/or reprioritized by the SPD at any time. SPD expects that the user stories will be continuously refined during the development process.

### 2.3.2 Illustrative User Stories for the Database and Application Warehouse

As a	I want to	So that I can
SPD staff member	Quickly and easily add, remove, or modify applications within the application warehouse	Stand up new tools to meet regulatory and implementation goals
SPD staff member	Query underlying data using Structured Query Language (SQL)	Look for patterns in stakeholders' data and find potentially illegal activity. Run custom queries to summarize data as needed.
SPD staff member	Quickly stand-up scheduled data analysis routines based on R or Python that generate dashboards and/or reports	Better identify potentially illegal activity on an ongoing basis
SPD staff member	Quickly publish data visualizations for public consumption	Meet SPD's data transparency goals
SPD staff member	Upload data to the application warehouse using a quick drag-and-drop user action	Bring useful outside data into the data warehouse
SPD staff member	Exchange data with outside systems with quick-configure Application Programming Interfaces (APIs)	Bring useful outside data into the data warehouse

### 2.3.3 Illustrative User Stories for the Re-vamped Allowance Tracking & Reporting System

As a	I want to	So that I can
Allowance holder or another stakeholder	Submit various reports	Meet my reporting obligations
Allowance holder or another stakeholder	View my past reports	Quality check my submissions
Allowance holder or another stakeholder	View the status of submitted reports	Confirm whether my submitted reports have been approved, rejected, or are still under review
Allowance holder or another stakeholder	Submit cover letters, attachments, and other documentation	Provide additional supporting documentation related to my reporting requirements as needed or at the request of EPA staff
Allowance holder	View my current allowance balance	Ensure I do not exceed my allowance balance
Allowance holder	Quickly view my past imports in one place	Review my previously submitted data to ensure it is correct
SPD staff member	View and manage allowance balances	View summary allowance activity by company. Update allowance balances to reflect annual allocations and administrative consequences.
SPD staff member	View reports and approve or reject them	Uphold EPA's reporting requirements and implement the phaseout and phasedown programs
SPD staff member	View Customs data merged onto quarterly importer reports and easily configure automatic alerts that fire when concerning data patterns appear	Find potentially illegal imports
SPD staff member	Send ad hoc and automatic blast communications to stakeholders	Ping stakeholders that have missing or late reports, or remind them of upcoming deadlines and requirements
SPD staff member	Send ad hoc customized communications to stakeholders	Communicate with stakeholders regarding reporting discrepancies or other specific issues
SPD staff member	Manage correspondence with stakeholders	View and manage correspondence (including attachments and supporting documentation) with registered industry stakeholders
SPD staff member	Query underlying data using Structured Query Language (SQL)	Look for patterns in stakeholders' data and find potentially illegal activity. Run custom queries to summarize data as needed.

	SPD staff member	Quickly stand-up scheduled data analysis routines based on R or Python that generate dashboards and/or reports	Better identify potentially illegal activity on an ongoing basis
	SPD staff member	Quickly update and reconfigure the Customs reference file and node-to-node connection between EPA's reporting system and Customs' systems	Better identify potentially illegal activity on an ongoing basis
	SPD staff member or stakeholders	Manage agent relationships	Authorize someone to act on behalf of a primary or alternate representative
	SPD staff member or stakeholders	Access a help desk	Submit tickets for functionality questions and/or issues

### 2.3.4 Illustrative User Stories for the HFC Container Tracking system

As in the tables above, the table below shows example user stories.<sup>17 18</sup>

<sup>17</sup> The purpose of the HFC container tracking system is to identify and track all legal containers of bulk HFCs. The system is not intended to somehow track smuggled or illegal containers of HFCs (it's not clear how such a system would work). But by identifying the universe of legal HFCs, EPA and industry, by a process of elimination, can identify illegal containers. Here are a few examples of how this might work:

1. If a container has no tracking barcode, EPA and industry would immediately know that the container is suspect, because EPA regulations require that legal containers have tracking barcodes.
2. If an industry player scans container, and that container has a barcode ID that's already been used for a legal container, the industry player would know that the container is suspect. In this case, it's likely a fraudulent container that's been given a duplicate ID code.
3. If an unusual sale appears, such as a supplier suddenly changing customers, EPA would have reason to investigate further.

In general, the goal of the system is to allow the EPA and law-abiding market actors to better identify illegal containers.

<sup>18</sup> There are approximately 5 companies that produce HFCs in the U.S. There are approximately 80 companies that import HFCs. Many of those companies also fill empty containers with HFCs taken out of other containers (which would need to be logged in this system).

See here for lists of allowance-holding entities: <https://www.epa.gov/climate-hfcs-reduction/hfc-allowance-allocations>

There are about 65 companies that "reclaim" HFCs. A list of these companies can be found here: <https://www.epa.gov/climate-hfcs-reduction/hfc-allowance-allocations>

Some of the reclamation companies are also represented in the list of companies that import HFCs.

Most of those companies (fewer than 200 in all) will have to start reporting by 2026. Two-hundred is a relatively good order-of-magnitude estimate for the number of entities that will have to report. But EPA does not currently have an accurate estimate of the number of containers of HFCs that these companies fill or sell in a year. Some companies likely don't handle more than a few thousand containers in a year. Others may handle millions annually. So the total number of transactions per year is relatively unknown. If one assumes that there are 200 reporters in the later years of the period of performance, and each reporter handles 10 million transactions

As a	I want to	So that I can
Producer	Report the contents of the cylinders I fill	Meet my reporting obligations
Importer	Report the contents of the cylinders I fill	Meet my reporting obligations
Repackager or Filler	Report the contents of the cylinders I fill	Meet my reporting obligations
Reclaimer or Fire Suppressant Recycler	Report the contents of the cylinders I fill and/or reprocess	Meet my reporting obligations
Seller	Report a sale	Meet my reporting obligations and confirm the legality of my sale
Buyer	Report a purchase	Meet my reporting obligations and confirm the legality of my purchase
SPD staff member	Receive automatic alerts when entities report inconsistent transactions (e.g., a duplicate cylinder ID, or a record in the tracking system does not match a record in the Customs data)	Find potentially illegal imports
SPD staff member	Quickly stand-up scheduled data analysis routines based on R or Python that generate dashboards and/or reports	Better identify potentially illegal activity on an ongoing basis
SPD staff member	Have transfers, conferrals, and other actions that impact allowance balances be reflected in the container tracking system	Analyze the data based on the most-up-to-date allowance balances

SPD has conducted interviews and site visits with a significant share of future system users. In broad terms, these stakeholders seem to fall into one of three categories of tracking system users:

1. Large companies that would prefer to buy or build their own tracking system and report their tracking data to EPA via a node-to-node transfer, such as an Application Programming Interface (API). At least two companies already have sophisticated, container-level tracking in place.
2. Medium-sized companies that would prefer to use a tracking web/mobile application, but do not want to invest in buying or creating their own. For these companies, EPA might create a container tracking app.
3. Small companies that have so few transactions that they could report their transactions by uploading an Excel form to an EPA website.

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annually, that would be 2 billion transactions a year. That is likely a significant overestimate, but provides a rough upper bound on the number of transactions in 2026.

In 2027, when distributors of bulk HFCs must begin to participate, the number of transactions would grow significantly.

### 2.3.5 Minimum Viable Product for the HFC Container Tracking system

A minimum viable product (MVP) is defined as “that version of a new product which allows a team to collect the maximum amount of validated learning about customers with the least effort.”<sup>19</sup>

Several companies already have their own container-level inventory tracking systems. SPD assesses that the MVP for this container tracking system can be an API that lets these companies stream their data to EPA in real-time. Based on market research, the EPA estimates setting up this API would take relatively little time and effort, compared to constructing a system that includes front-end applications with complicated user interfaces. The API will allow the Agency to quickly view a large quantity of container-level data, which will inform the development of the rest of the tracking system.

### 2.3.6 Minimum Viable Product for the Revamped Allowance Tracking and Reporting System

SPD estimates that the MVP for the revamped reporting system includes,

- A system schematic, outlining the front- and back-end infrastructure that will support the new system, and
- A series of wireframes showing what the UIs will look like for the new system.

This should be accompanied by a list of features and a provisional timeline with discrete Agile sprints in which those features will be built.

### 2.3.7 List of Deliverables with Quality Assurance Surveillance Plan (QASP)

The following tables sets forth the performance standards and quality levels the code and documentation provided by the contractor must meet, and the methods the EPA will use to assess the standard and quality levels of that code and documentation.

**Quality Assurance Surveillance Plan (QASP)** (This QASP is a sample only. It represents high level project areas the government may choose to surveil). See the solicitation for further information and guidance.

What will be monitored	Performance Standards	Acceptable Quality Level (AQL)	Method of Assessment	Frequency
Product Backlog	Substantially free of defects.	One sprint’s worth of work refined to meet the team’s Definition of	Periodic Sampling	Every other week after Backlog Refinement meetings

<sup>19</sup> <https://18f.gsa.gov/2016/07/26/buying-better-digital-products-part-2-setting-the-product-vision-and-strategy/>

		Ready or as agreed with EPA.		
<b>In-progress and completed items on the sprint Kanban Board</b>	Substantially free of defects.	EPA will monitor the team’s progress to ensure that the team’s actual velocity stays within 10% of the forecast velocity.	Periodic Sampling	Every 1-4 weeks during sprint review and sprint retrospective meetings
<b>Codebase and associated documentation.</b>	Substantially free of defects. See next table (“deliverables”) for more about code performance standards.	EPA will monitor the codebase to ensure that the team is adequately commenting code. EPA will also monitor to ensure that the code has sufficient supporting documentation.	Periodic Sampling	Every 1-4 weeks or after significant additions or revisions to the codebase
<b>All user interfaces (and, by extension, the underlying applications and databases)</b>	Free of defects.	EPA staff and stakeholders will conduct regular UX testing on the product as it is developed. The product should function as expected.	Periodic sampling	Each time a significant new feature is rolled out unless EPA makes an exception.

**Deliverables**

This table lists the deliverables that the contractor will be expected to provide.



<b>Deliverable</b>	<b>Performance Standards</b>	<b>Acceptable Quality Level (AQL)</b>	<b>Method of Assessment</b>	<b>Frequency</b>
<b>Project Management Plan (PMP)</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	At the start of the project, when major changes are made, and at the start of every Option Year
<b>Staffing Plan</b>	Maintain required levels of staffing	99% defect free or as agreed with EPA	100% Inspection	Included in the monthly report
<b>Weekly Status Report</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	Every Friday
<b>Project Status Report and Financials</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	Included in the monthly report
<b>Wireframes/ Design Documents</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection; sending to stakeholders for feedback	Wireframe and artifacts from Product Design sessions are available before development and as updates are made or as agreed with EPA

<b>EPA Design System Style Guide Documentation</b>	100% peer reviewed and substantially free of defects	99% defect free or as agreed with EPA	100% Inspection	At the end of every Program Increment or beginning of a new one or as agreed with EPA
<b>Deployment/ Rollback Plans</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	Prior to each scheduled production release
<b>Master Test Plan</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	At the end of every Program Increment or beginning of a new one or as agreed with EPA
<b>Security Plan/Security Documentation</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	At the end of every Program Increment or beginning of a new one or as agreed with EPA
<b>Deliverables (scheduled + ad hoc)</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	Periodic Sampling	By 2:30 pm (EST/EDT as applicable) on the due date
<b>Quality Assurance Surveillance Plan (QASP)</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	Submitted with Solicitation, updated as required.
<b>Tested code</b>	Code delivered under the order must have substantial test code	Minimum of 70% test coverage of all code. All areas	100% Inspection	At the end of each sprint and with final

	coverage. A version-controlled, EPA-managed GitHub code repository that comprises the product will remain in the government domain.	of code are meaningfully tested.		delivery (release).
<b>Maintainable Code</b>	Code delivered under this order must have a high maintainability rating. The technical debt ratio (an indicator of maintainability), defined as the remediation cost divided by the development cost, must be low.	The technical debt ratio for all code must be $\leq 0.05$ .	100% Inspection (e.g., SonarCloud)	At the end of each sprint and with final delivery (release).
<b>Accessible</b>	Web Content Accessibility Guidelines 2.1 A and AA guidelines and Applicable 508 Standards 1194.XX (21 a-l ,22 a-p,24c-d, 31a-b)	0 errors reported using an automated scanner, 0 keyboard, color, and color contrast errors. 80% of errors reported through manual testing are resolved, or as agreed to by EPA	100% Inspection along with documentation explaining any unresolved or unresolvable issues	VPAT updated at the end of each Program Increment and with final delivery (release)
<b>Deployed</b>	Code must successfully build and deploy into test environment.	Successful build with a single command	Direct Observation	At the end of each sprint.

<b>Documented code</b>	Source code developed as part of the project will be well documented.	Major functionality in the software/source code is documented. All projects in GitHub contain a README which includes a description of the project and instructions on how to install and run the software.	Combination of manual review and automated testing, if available.	At the end of each sprint and with final delivery (release).
<b>API driven architecture</b>	Any public or private APIs developed as part of the project will be well-documented and semantically versioned.	All API endpoints, parameters, defaults, and outputs documented and updated at the end of every applicable sprint.  Semantic versioning will be kept up to date at the end of every applicable sprint.	Combination of manual review and automated testing, if available.	At the end of each sprint and with final delivery (release).
<b>Secure</b>	OWASP Application Security Verification Standard 3.0	Code submitted must be free of medium- and high- level static and dynamic security vulnerabilities	100% Inspection  Clean tests from a static testing SaaS (such as CodeQL or SonarCloud) and from dynamic application security testing tool (such as OWASP ZAP or NetSparker), along	At the end of each sprint and with final delivery (release).

			with documentation explaining any false positives	
<b>Open source and dependencies</b>	<p>Each project will be using a package manager (e.g., npm) that maintains a list of the dependencies. Ensures that any dependency that is not free and open source (e.g., code effects) has received prior written approval before use.</p> <p>List anything that is not free and open source and evidence of EPA approval.</p>	<p>Contractor must obtain EPA written permission before delivering software incorporating any software or tools that is not free or open source</p>	Direct Observation	At the end of each sprint and with final delivery (release).
<b>User research</b>	<p>Usability testing and other user research methods will be conducted throughout the development process as needed (not just at the beginning or end).</p>	<p>Research plans, user stories, and artifacts from usability testing and/or other research methods with end users are available at the end of every research study.</p>	<p>Direct Observation</p> <p>EPA will manually evaluate the artifacts based on a research plan provided</p>	At the end of every user research study

<b>Lifecycle planning document for the HFC container tracking system and the app &amp; data warehouse</b>	100% peer reviewed and substantially free of defects.	99% defect free or as agreed with EPA	100% Inspection	At the end of the build phase, before the O&M phase begins for these systems
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### 2.4 General Program Management

The contractor must work collaboratively with the EPA development team, including the Product Owner(s), user experience (UX) specialists, developers, and subject matter experts (SMEs), using best practices of Agile/Scrum development methods. SPD does not possess the software development talent to create this system (that is what the contractor will bring to the team),<sup>20</sup> but SPD staff understand the regulations, the industry, and some of the compliance/enforcement dynamics at play. The contractor team needs to work closely with SPD to ensure that the software meets the needs of the HFC phasedown program. SPD intends to dedicate significant staff time to working with the contractor team on this project.

Collaboration between SPD and contractor staff will include weekly meetings to develop, groom, and prioritize the backlog, discuss issues, and review progress. The contractor must also conduct periodic discussions (both formal and informal, telecon and face-to-face) with SPD stakeholders in the form of technical exchange meetings (TEMS), collaborative development sessions, program reviews, user experience sessions, design reviews, etc., as required. Prior to all meetings, when relevant, the contractor shall provide EPA with a meeting agenda and any other materials that will be discussed during the meeting. Contractors will be expected to be able to explain features of the codebase (like what each microservice does, the overall architecture, etc) to SPD staff.

To facilitate communication with the EPA development team, the contractor shall use the EPA-managed Microsoft Teams for real-time interactions and communication.

To facilitate ease of access to key systems and database, staff with Tier 4 security clearance is preferred.

For the purposes of project management, issue tracking, collaboration, and transparency, the contractor shall use EPA-provided information platforms (e.g., Microsoft Teams, GitHub, Mural) to track and display project documentation, milestones, user stories, defects, and tasks. The contractor shall enter and maintain the information in the information platform so that SPD staff can generate regular reports and review user stories, defects, and tasks and their statuses. To facilitate contract management, the Contractor may elect to use a proprietary financial reporting tool and/or securely submit invoices and

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<sup>20</sup> SPD does not possess a deep bench of software developers. The Division has one person who is skilled in data analysis in Python and R, and another who additionally has some intermediate front- and backend development experience (JavaScript, CSS, HTML, PostgreSQL, and some knowledge of a few web frameworks, like Django).

other necessary contract or proprietary financial information to EPA through email.

To ensure quality is managed through the lifecycle of the engagement, the contractor shall develop and maintain a quality management plan (QMP) or quality assurance project plan (QAPP).

## **2.5 Reporting**

The contractor shall provide weekly progress reports that include,

- information about progress,
- a list of deliverables with identifying information (date and contractor personnel delivering),
- level of effort (LOE) expended during the week (if used),
- planned actions for the next week, and
- projected LOE (if used) for the next week.

EPA expects that many if not all those elements will be captured in the Kanban board or other project management platform that the contractor shall use.

On a periodic basis to be determined by EPA, the contractor shall provide a staffing plan for the current option year, a contractor project team organization chart (e.g., current and planned) and risks that may interfere with planned activities for the next one to six months.

On a monthly basis, the contractor shall provide a financial update, and short summary of project progress, and a staffing plan.

## **2.6 Contract Place of Performance**

The contractor may choose the location(s) from which to perform the required software development services. The contractor team must be available during the hours from 9:30am to 3:00pm Eastern Time. Virtual interaction is acceptable and expected. Real-time interaction will be conducted through EPA-managed Microsoft Teams or in-person meetings. If in person meetings are held, they will be primarily at EPA headquarters or within the Washington, D.C. commuting area.

## **3.0 Operating Constraints (Non-functional Requirements)**

### **3.1 Environment**

#### **3.1.1 Portability**

Applications should be built for the web using open web standards; not for specific browsers, client hardware, operating systems, or installed library/framework versions.

The existing reporting system relies heavily on Oracle stored procedures, functions, and packages. To help ensure portability to other database systems, the contractor shall shift logic and computation into libraries at the web service and/or application layers.

Applications should be constructed in a manner suitable for deployment on modern cloud platforms and designed for Platform-as-a-Service portability. UIs should be mobile-friendly.

### **3.1.2 Accessibility**

Ensure Section 508 compliance across SPD systems by building web-based solutions passing the WCAG (Web Content Accessibility Guidelines) 2.1 Level AA Success Criteria. Incorporate the United States Web Design System (USWDS) to help achieve this goal.

### **3.1.3 Usability**

SPD systems should be designed around user personas. Questions such as “What tasks do the users need to accomplish?” and “How can the users accomplish those tasks most easily?” should guide the design and development process. The design process should center the users’ experience. The contractor shall work with EPA to conduct user testing throughout the development process. The quality of the UI will matter in the revamped reporting system, and it will determine the success of the HFC container tracking system.

### **3.1.4 Compliance**

The areas of Code of Federal Regulations listed in section 1.0 Background dictate an initial set of compliance requirements for SPD’s data systems.

In addition:

- Ensure all SPD systems implement the required controls specified by the National Institute of Standards and Technology (NIST) Risk Management Framework (RMF), targeting FISMA Moderate.
- Build SPD’s data systems in alignment with the website modernization requirements of the 21st Century Integrated Digital Experience Act (H.R.5759).

### **3.1.5 Availability**

Design and implement the revised reporting system and application warehouse systems targeting a 99% uptime. Design and implement the container tracking system targeting a 99.999% uptime.

### **3.1.6 Flexibility**

These systems should permit efficient creation of new reports by SPD staff and make it easy to expose them across multiple applications and to the public, using an API-first approach. SPD staff should be able



to directly query underlying DBs using SQL, schedule code to run against those DBs, and configure reports and alerts to update after scheduled code runs. SPD staff should be able to understand and modify the codebase supporting the application warehouse and reporting system.

### **3.1.7 Integrity**

Ensure that monitoring plans, quality assurance test data, inventory data, emissions data, account data, allowance data, etc. are maintained with well-defined audit records, preserving original data as well as revised data, and allow changes only by authorized users.

### **3.1.8 Elastic Scalability**

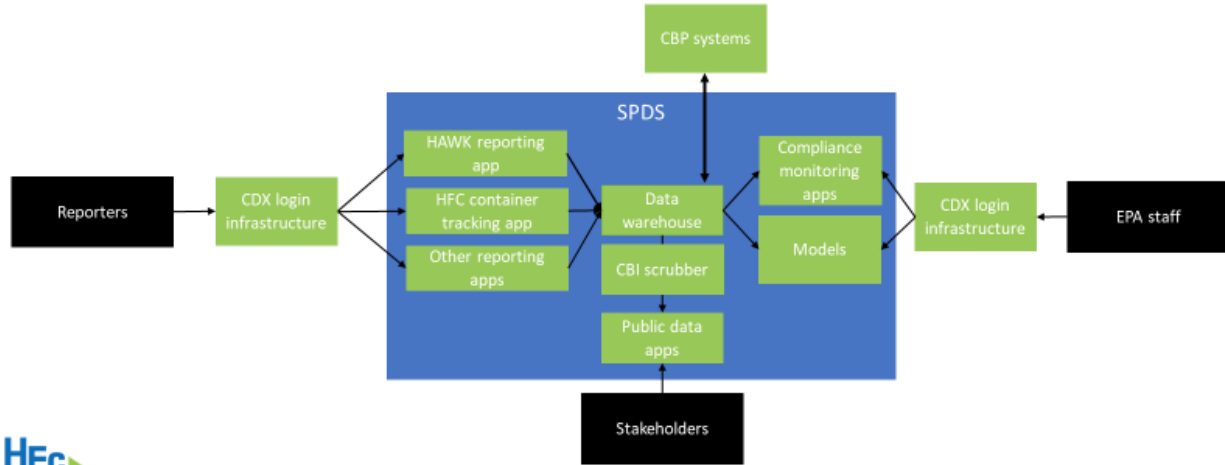
The resources (computing, storage, etc.) supporting SPD's data systems must have the ability to be dynamically allocated when usage dictates and dynamically deprovisioned when no longer in use. Usage of the HFC container tracking system, for example, will spike dramatically during certain months.

### **3.1.9 Opportunistic reuse**

As stressed elsewhere in this document, EPA has a strong preference for using open-source software. Furthermore, EPA intends to make the codebase underlying these new systems as easily available to the public as possible. EPA's goal is to allow the public to reuse the code written to create these systems.

## **Appendix A. A Notional SPDS**

# Notional SPD System



Internal & Deliberative | Contains Law Enforcement Sensitive and Controlled Unclassified Information

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## Appendix B. Government Furnished Information

Piece of Government Furnished Information	Location of the information	When the Contractor will have access to the information
HFC supply chain research paper	EPA internal SharePoint	Post award
Architecture diagram of existing allowance tracking system	EPA internal SharePoint	Post award
Schema of SPD's existing databases	EPA internal SharePoint	Post award
SPD's existing data	Oracle database	Post award
Glossary of SPD's existing data	EPA internal SharePoint	Post award
Internal memos concerning the development of the systems described in this	EPA internal SharePoint	Post award

SOO		
Diagrams of user stories for the HFC container tracking system	EPA internal SharePoint	Post award
Estimates of the number of users of the HFC container tracking system	EPA internal SharePoint	Post award