Rudi Muenster and John Russell, VIM Technologies, Inc., outline how the cement industry can leverage technology to ease the burden of semi-annual compliance reporting.

THE RIGHT WAY TO REPORT

It has been nearly four years since the National Emissions Standards for Hazardous Air Pollutants (NESHAP) amendments affecting the Portland Cement Manufacturing Industry (PC MACT) took effect, and the only constant has proven to be the uncertainty around reporting requirements. As part of this ruling, sources are required to submit data electronically according to §63.1354(b)(9) within 60 days of the end of the semi-annual reporting period. As VIM Technologies reported in *World Cement* back in 2016, electronic reporting was just one of the many challenges facing the PC MACT industry under these new rules. While sources were able to meet the other challenges head on, the reporting element continues to be one of constant flux due to the Environmental Protection Agency's (EPA's) rapid push towards electronic reporting across all environmental media platforms.

Sources must use the Compliance and Emission Data Reporting Interface (CEDRI) located on the EPA Central Data Exchange (CDX) to submit the required emissions data and supplemental information required by the rule. Since this type of reporting began, over eight gruelling semi-annual periods ago, EPA has consistently made changes, forcing the industry to adjust as the agency continues to refactor their systems. EPA collects approximately 9000 files per year through CEDRI, across 50+ source categories.

This article will briefly address the challenges the PC MACT industry faces in managing its electronic reporting obligations. VIM Technologies will first revisit the history of cement sources reporting through CEDRI, as well as discuss its somewhat troubled past, and go on to share a detailed outline of a specific approach VIM Technologies, Inc. (VIM) is implementing to reduce the burden placed on PC MACT facility environmental managers to complete these reports.

CEDRI

Reporting using CEDRI is not new to the PC MACT industry. Sources have been submitting performance test reports and notice of compliance reports utilising CEDRI since 2010. What is new is that the PC MACT Rule now requires all emission compliance-related data to be reported via CEDRI rather than in traditional hardcopy format. This includes, but is not limited to, the following: 30-day rolling average data, excess emissions, downtime, and malfunction reports.

EPA is deliberately shifting away from hard copy report submissions for the following reasons:

- Electronic reporting is already a common element of modern life, so it makes sense to keep environmental reporting up to date with available technology.
- It allows for data standardisation, which makes for more efficient validation and reduces the number of incorrect/incomplete reports.
- Electronic reporting reduces the work burden associated with environmental reporting.
- Better data storage and more transparent environmental databases that the public/agencies can access.
- Maintenance and storage costs associated with retaining paper records could be minimised by replacing those records with electronic records of electronically submitted data and reports.

Given all the benefits electronic reporting has to offer, it comes as no surprise that EPA is gradually making it a standard requirement for all future regulations. In fact, just about every update that has been made to a NESHAP or New Source Performance Standard (NSPS) update over the last three years has mandated reporting via CEDRI.

What the industry did not foresee was EPA's change in direction on the format of these electronically generated reports. EPA has revised its demands for these reports three times within the last four years. Just when sources begin feeling comfortable and mastering a new reporting format, EPA changes direction and presents a new set of reporting hoops to jump through. This level of change often requires affected sources to revisit standard operating procedures (SOPs) and incur hours of lost work due to outdated information. It seems that just when sources get comfortable with the reports and master the complexities of the CEDRI user interface, EPA changes direction.

When CEDRI reporting initially rolled out in 2016 there were two different formats allowed to make a complete submittal: create a submission using a CEDRI webform or upload an extensible markup language (XML) file. While the XML approach would have been the preferred method of choice (due to its flexible format and universal adoption by software vendors), the XML model was never fully embraced by EPA and it was never functional. One of the possible reasons for its demise was due to the varying number of industry groups needing to comply with the different NSPS and NESHAP rules. Each industry subpart that reports data through CEDRI contains varying monitoring and reporting requirements, that result in a different report. EPA was not equipped to deal with these changes using a single XML report and therefore abandoned the approach.

Throughout the 2016 – 2018 timeframe, EPA worked on and performed updates to the CEDRI interface and began to incorporate Microsoft Excel spreadsheets. In early 2018, CEDRI was updated to accommodate a combination of webforms and a series of four excel spreadsheets, one for each of the major reporting components (Monitoring System Averages, CMS Downtime Detail, CMS Downtime summary and Excess Emission Summary).

As part of the CEDRI 2020 updates, a major initiative to push CEDRI reporting to all NSPS and NESHAPS sources, EPA discontinued the use of web forms effective 24 September 2020. Webforms were replaced by a new, consolidated, Excel spreadsheet template. Beginning with the next reporting period, PC MACT sources will be required to use the new Excel template.

EPA is currently updating the Excel template to version 2.0 to allow for better version control and tracking updates made to the file. Once EPA releases an updated spreadsheet, sources will have one additional reporting period in order to transition over to the updated version.

Easing the burden

While it appears that EPA has standardised on Excel templates as the vehicle of choice for CEDRI reporting, there are no guarantees considering the rapid rate of change of specific reporting positions shown by EPA over the past several years. VIM started down the path of investigating ways to ease the burden on clients when it came time to completing these Excel templates. It became clear that the company's focus needed to be squarely on the report generation and assembly.

The software development team at VIM has developed an automated solution to help mitigate some of the challenges associated with assembling and populating these electronic reports thereby streamlining their delivery. The solution involves an Excel Add-In designed exclusively for use with the Data Acquisition and Handling System (DAHS) application named CEMLink6.

Once configured, the Excel Add-In allows users to retrieve their compliance data directly, reliably, and repeatedly from the CEMLink6 server and use it to populate these reports with the click of a single button.

Why an Excel Add-in?

When presented with this task, VIM's software development team objectively examined and considered several options to determine the best-fit solution for customers and the industry. These options ranged from upgrading the reporting package in CEMLink6 all the way to embedded third party controls that allowed Excel spreadsheets and reports to be hosted within the CEMLink6 product.

The development team conducted a thorough review of these options and strategies and surveyed key stakeholders for input. The option that always seemed far superior to the others was the development of an Excel Add-In for CEMLink6. There were several reasons behind this decision:

- Excel is already the dominant platform: Many of the reports that have already been developed and laid out by environmental agencies including CEDRI were developed as Excel spreadsheets.
- Familiarity: Most users in the industry are familiar with Excel and its capabilities. They are already using it extensively in their day-to-day tasks, thus minimising the learning curve.
  - It is also very likely to be installed/available at most facilities.
  - This option is more user friendly and workers get to leverage the built-in functionality and features that Excel provides, allowing reports to be rapidly configured and generated.
- Simplicity: An Excel Add-In keeps the configuration and report generation simple. Users can configure and run the report within the report.
  - This option also allows CEMLink6 to store the configuration of the report with the report itself, enabling the Excel report to be self-contained/encapsulated, keeping everything that is needed to generate the report within the Excel file.
- Quality: The Excel Add-in can pull data directly from the DAHS, reducing errors and improving the quality of reports.
- Potential: Although the immediate objective was to facilitate populating reports from various environmental agencies, this approach sets the stage for many future opportunities:
  - Bringing data into Excel from the DAHS allows even the most novice users to analyse their compliance data in a whole new way. From here, users can create custom reports and visualisations and bring their compliance data to life.
  - Excel is only the first chapter in VIM's data integration story. Similar strategies can also be applied to other business intelligence platforms, such as Microsoft's Power BI.

Tools and technologies

Although it is hosted within Excel, the CEMLink6 Excel Add-In was developed using technologies from Microsoft that are consistent with those used to develop the CEMLink6 application. These technologies include:

- .NET Framework, which has been around for 16+ years and has a well-established track record of success. The .NET Framework is a development platform that provides managed, industry-standard libraries and routines for building enterprise applications.
- Visual Studio Tools for Office (VSTO), which allows Office applications dated 2003 and later, to seamlessly host .NET Framework applications. This allows the Add-In to be hosted inside of Excel while interfacing nicely with the CEMLink6 application.

Deployment

Following the release of CEMLink6 version 6.1.747, the Excel Add-In is now included as part of each release and is made available for licensed users.

Using the CEMLink6 client as the vehicle for deployment, the installer for the Excel Add-In can be downloaded from the DAHS server and installed on one or more remote workstations where Microsoft Excel will also be installed and reporting will be performed.

By using the CEMLink6 client-server architecture, the integrated, role-based security model is exercised to ensure only authorised users will have access to the Excel Add-In.

Fundamentals

Once the Excel Add-In is downloaded and installed, it is designed to function in two phases – configuration and data retrieval.

Configuration

Report configuration using the Excel Add-In is typically a one-time step that must be performed to define the contents of the report and how it will be populated. The Excel report that gets configured should be the latest version supported by CEDRI for the applicable subpart, in this case, Part 63 Subpart LLL version 1.0.

Inside the CEMLink6 Excel Add-In, only two elements are required as part of the configuration phase, namely:

- Server Connections
- Lists

Server connections and lists are configured and managed using the features made available in the main ribbon of the CEMLink6 Excel Add-In.

Server connections

When first connecting the CEMLink6 client application to the DAHS server, the user must create a server connection. A server connection allows remote clients to communicate to the server using a series of web service calls.

The Excel Add-In's server connection is no different and requires this same information as well to communicate with the DAHS server.

The Excel Add-In leverages all the same communication frameworks and technologies that have been used by CEMLink6 for nearly a decade, so there are no additional security hoops to jump through beyond what is currently in place.

To create a new server connection for the Excel Add-In, click the new server connection button in the main ribbon and simply provide the URL in the dialog that follows.

One of the more powerful features available in the Excel Add-In is that users can manage and maintain connections to multiple servers. Imagine overseeing environmental reporting across an entire fleet and needing to aggregate/analyse data from multiple facilities. The CEMLink6 Excel Add-In can retrieve that data and makes this possible.

Lists

The second element required to configure a report using the Excel Add-In is a list. A list is a placeholder in the Excel workbook where data from the CEMLink6 server will be enumerated. The data presented in a list is two dimensional and includes rows and columns. The contents of the lists are completely configurable.

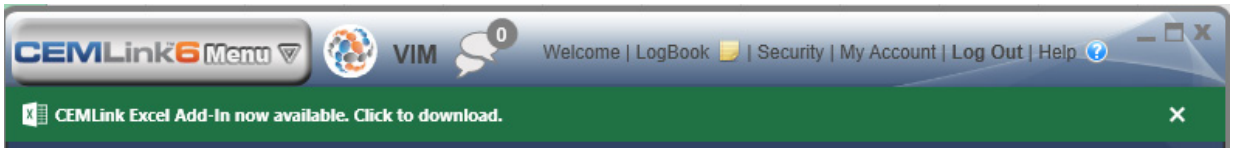
A list can be placed in any location within the workbook, such as any worksheet (tab), row, column, or cell. To populate all the data required by a report, an Excel workbook will feature multiple lists configured throughout.

When configuring a list, users must define several key elements:

- The server to retrieve the data from.
- The type of data one wants to retrieve from that server.
  - Average or calculated data.
  - Excess Emission Summary or Detail.
  - Downtime Summary or Detail.
- The starting location of the list.
- The columns/attributes to include that will further describe the data being queried.
  - The order those columns should appear in.
  - Any custom calculations/expressions to run during run-time.

Changes

Once a list is configured, most users will typically not need to touch those settings again unless the reporting requirements change or the structure of



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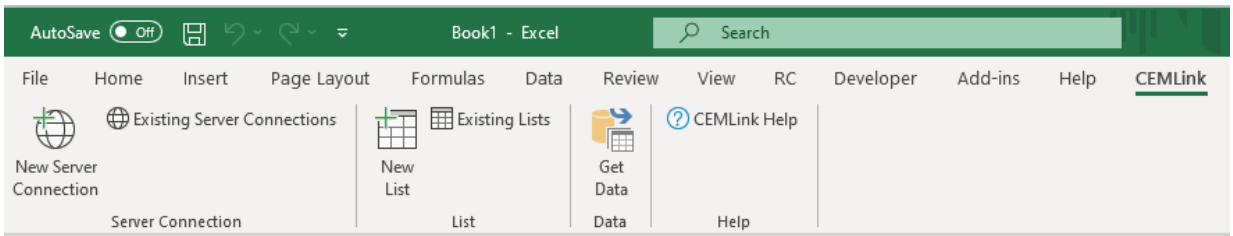


Server Connections and Lists are configured and managed using the features made available in the main ribbon of the CEMLink6 Excel Add-In.

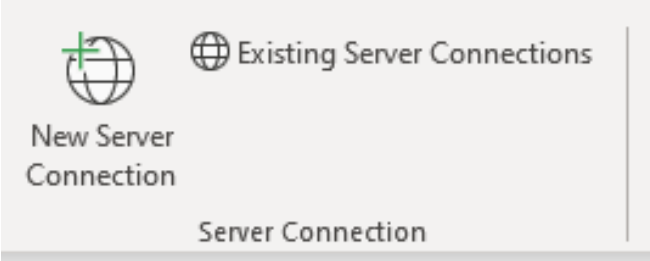
the report itself changes (i.e., when EPA changes the Excel Template to version 2.0). Using these configuration tools, lists can easily be managed and modified using the Excel Add-In.

List configurations can even be quickly replicated and moved from one Excel report to another.

Get Data

The second phase is running the report and populating the Excel spreadsheet. This involves querying the data from the server and using it to populate the configured lists within the report. This is where the users will spend most of their time once the configuration steps have been completed. This phase will be performed each reporting period.

Using the Get Data feature, the report can be generated with the click of a single button. Users can select to retrieve data and populate one or more lists, after providing a specific date range for which to run the report.



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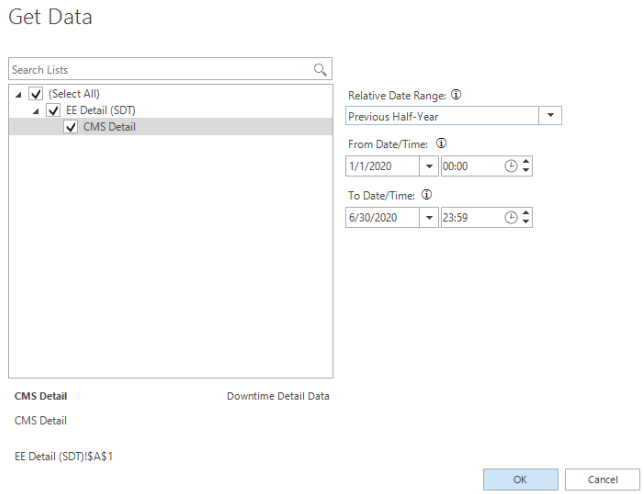

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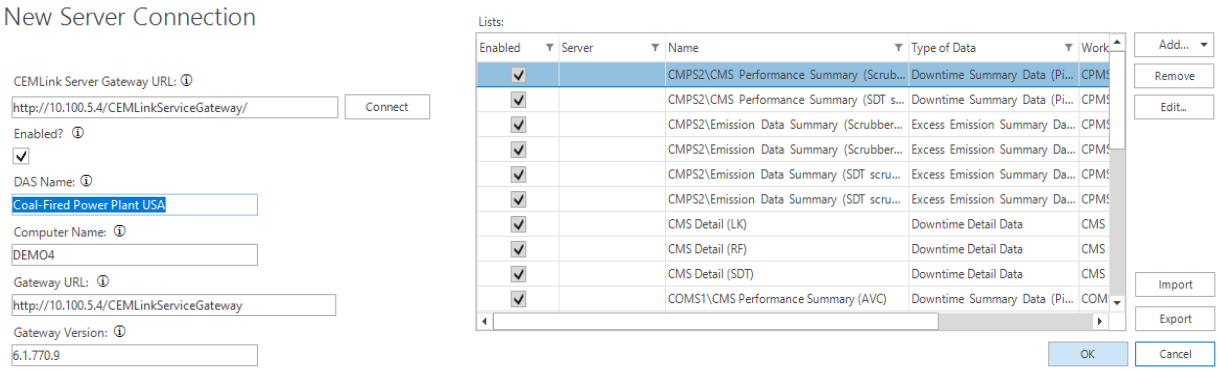

One of the more powerful features available in the Excel Add-In is that users can manage and maintain connections to multiple servers (left). The second element required to configure a report using the Excel Add-In is a list (right).

Conclusion

With EPA's recent shift to Excel templates for CEDRI, the development of the Excel Add-In satisfies an immediate need faced by many in the cement industry. The Excel Add-In provides a single tool that is both easy and flexible by which nearly any report can be prepared and populated in a reliable and repeatable manner. The Add-In also offers a level of integration between VIM Technologies' products and other platforms, bringing new power and potential to users and the industry. VIM is certainly excited about what the future holds for the CEMLink6 Excel Add-in and its far-reaching capabilities. ■

About the author

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