The Good, Bad and the Ugly – Pandemic-Driven Acceleration in Audit Technology

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Abstract

Process Safety compliance audit and assessment activities were significantly impacted by access and travel restrictions during the COVID-19 pandemic. In many cases, the ability to conduct an evaluation on-site was eliminated entirely. Agile organizations were able to quickly incorporate technological improvements into audit techniques to allow for continuing assessments.

The presentation will provide recommended strategies, tools, and methods for executing an efficient and value-added remote audit. Since many organizations are looking to continue with remote auditing as a means of reducing travel expense, ensuring that the audit remains a robust, thorough, and valuable tool in assessing a facility's compliance health is paramount to the organization's assurance and governance process.

This presentation discusses the positive and negative aspects of three improvement areas which were driven by the pandemic:

- Collaborative audit tools and techniques
- Improvements and advances in data analytics
- Remote access tools, including cameras and drones

We will share our experience in working with several diverse industries, including oil and gas processing; specialty chemical manufacturing; and ammonia refrigeration. We will discuss the utility of collaborative tools with an emphasis on the utility of Microsoft Teams for both audit transparency and reduced turnaround time for audit report and documentation.

COVID-19 and Operational Audits

With the exception of business operations impacted by supply chain issues, it would be difficult to identify a central business function more affected by COVID-19 (COVID) lockdowns, travel restrictions, and health concerns than operational audit organisations. For most companies utilising a process safety management system to address chemical hazards, audit activities follow a tightly controlled calendar – in many cases a three-year schedule reflective of the audit requirement in the U.S. Process Safety Management Standards (29 CFR 1910.119 and 40 CFR 68).

For most of us in operational audit functions, our world pressed the "reset button" in early March 2020. Audit teams were recalled, travel schedules were scrapped and uncertainty reigned. For our organisations, a quick pivot was required to maintain audit schedules and to provide service to our internal and external clients.

Inherent in this change was an urgency to survey existing technology and adapt techniques to provide a remote facsimile of the intensive on-site operational audit we had traditionally provided.

Collaborative Audit Tools

Perhaps the most ubiquitous change experienced by organizations was the sudden "ZOOM" to web-based videoconferences. The explosion of teleconference use provided a surprise to both service providers (struggling with bandwidth) and users (struggling with unfamiliar software). In just weeks, facility personnel and auditors were uncovering our laptop cameras and interacting 'face-to-face' from our homes and offices.

For our organisations, we needed to use a platform that met three key needs:

1. Face-to-face interview capability
2. Real-time screen sharing
3. Mobile accessibility to allow for field use

For each of our organisations, we landed on Microsoft Teams – in which decision we were hardly alone. Teams' user base grew from 32 million on March 12, 2020 to 75 million by April 29, 2020. It has continued to expand, with a reported 270 million active users as of the end of January 2022. For the interactive and "drop-in" nature of our audits, Teams provided an excellent platform.

Teams also provided the opportunity for outside subject matter experts (SME) to be involved in the review and development of audit documents and workpapers inside a secure collaboration space. We have each developed documents which can be simultaneously reviewed and edited by multiple users, allowing for reports and presentations to be easily developed 'live' by the audit team.

Our audit teams have also used Google Meet and the Google suite of collaborative products (Google Sheets/Google Docs) to equal effect. For those consulting in this space, the mastery of multiple products has been a new business imperative.

Since beginning with Teams in 2020, the product has continued to evolve and improve. Our audit teams now rely on Teams for communication (through the Team chat feature); document storage (replacing difficult to use SharePoint applications); scheduling; and action tracking (through the planner feature).

We have found that the ability to maintain an open video call in the Teams workspace (or call on demand) has allowed audit teams to behave in ways similar to pre-pandemic "conference room" workspaces, encouraging discussion of emerging issues and resolution of potential findings.

The use of such tools has demanded a certain etiquette be developed. In particular, auditors have learned the importance of leaving video cameras on, maintaining eye contact through audit calls and interviews, and using the 'raise hand' feature to avoid interruption or talking over other participants. Both auditors and auditees have learned to become more patient with one another as the Audit now invades their personal space which also includes families, pets, housework, homework, and other competing distractions. Auditors have needed to show professionalism in demeanor, even when online and not in-person.

The use of screen sharing has become an important part in the audit review process. For 3rd party SMEs who often lack access to internal software (SAP, Intelex, Enablon – all discussed later), interviews which incorporate screen sharing have become *de rigeur*. We have also found that screen sharing has added benefits for the auditee, enabling better clarity on the subject or document being discussed.

As an example of this in action, we have engaged in remote audits of MOC/PSSR and PHA action items managed using Intelex or Enablon (so-called EHS management software packages). Auditees provide or generate lists of MOC or PHA action items (generally in Excel spreadsheet exports). Auditors can perform statistical samples of these items in the form of their associated number. At the start of an interview, a prepared auditee can have numerous windows – the desired sample – open with each of the subject MOC or PHA items. This makes proceeding through the audit effective and efficient. This is an example of a learning from remote auditing which can, and should, be migrated to regular auditing.

The last aspect of the use of Teams for remote audit interviews is the added scheduling rigor defined by Teams meeting scheduling. Developing a tight schedule allows for more effective use of auditee time (especially in the circumstance where one employee is responsible for many (if not all) elements of a program). A tightly scheduled program also provides for participation from a wider range of personnel, including corporate SMEs who may have been involved in the development of programs, but are not on site. Examples of this include emergency planners and instrumentation engineers – who would otherwise not be able to travel to audits and whose input might be overlooked.

Data Analytics for Operational Audits

The COVID pandemic coincided with increased use and utility of "big data" in financial auditing. The concepts of both data analytics and data lakes arose in the 2010s to become an important consideration in financial audit. The *AICPA Guide to Audit Data Analytics* defines audit data analytics (ADA) as "the science and art of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to subject matter of an audit through analysis, modelling, and visualization for planning and performing the audit."

Operational auditors have long relied on a combination of knowledge, intuition, and "auditor's luck" to find and explore fruitful paths leading to findings and recommendations. Data analytics – used in small or large ways – has helped reduce search time and

"augment intuition" to allow auditors to cover more ground (i.e., move from AD Little based audit sample sizes to potentially 100% testing) and more effectively identify deficiencies and in the best cases, draw insights based on the more comprehensive results.

In its most simplistic form, a data analytics approach to a MOC/PSSR evaluation at a chemical operation can mean the effective use of a dashboard developed within an EHS management system application such as Intelex or Enablon. In a more complex approach, data analytics could involve mining computerized maintenance management system (CMMS) data to tease out resource management (e.g., staffing) gaps, downtime concerns, and extended maintenance intervals without engaging in hours of tedious document review.

In one of our organizations, central functions have begun collecting operational data into data lakes and developing PowerBI dashboards to provide pictures of the health of various operational activities, including things such as operating limit and design limit excursions, overdue inspection and maintenance activities, training deficiencies, etc. Depending on the quality, currency and 'cleanliness' of the data, using these internal dashboards may be appropriate. However, in many cases, development of data analytics is necessary.

Incorporating data analytics (DA) in operational audits can provide great benefits, but to get the best results, a rigorous and well thought out approach needs to be taken, including consideration of the following items:

- Define the questions to be answered with analytics.
- Understand what data exists, the 'format' of the data, and what controls need to be overcome in order to access the data. Getting access to the data early is key to enable the analyst time to develop the analytics.
- Bring the data analyst into the audit preparation activities as soon as possible. Often, the analysts are computer wizards, but likely won't have an operational background, so it will be necessary to spend time together to understand the questions to be answered, how the available data can be used to answer the questions, where the data resides, and trialing the analytics to see if the results are right.

One of our organizations has successfully utilized DA to complete 100% sampling of relief valve preventive maintenance data to confirm that required test frequencies were met and test results were accurately reflected (i.e., pass / fail was recorded correctly based on test result and required set pressure of equipment). It may sound like a simple endeavour, but given the complexities of computerized maintenance management systems (e.g., SAP), the level of effort to understand where the data resided in the system, how it was coded, how it was linked to other data, etc. was time-consuming.

We have also conducted DA to confirm that operating limit and design limit excursions were accurately flagged in software systems, and then check the results against operations logs and excursion investigation data to confirm that appropriate actions were being taken to track and address limit exceedances.

DA has also been successfully utilised to assess operator overtime rates and compare against API suggested rates, to get a view on potential for fatigue in the operations workforce.

Data Analytics can also be utilized to provide specific focus areas for the audit, based upon a company's operating experience. For example, one of our organizations is using data analytics from its Process Safety Event (PSE) data to identify site- and company-specific focus areas to be specifically checked during an Audit. The rigor provided by the Audit provides an extra layer of assurance that particular items resulting in high-risk or repetitive incidents are being appropriately addressed by the facility.

Remote Access and Observation

The total travel ban (on a nearly worldwide basis) of March 2020 brought operational site inspections to an abrupt halt. Auditors returned home and looked at blank screens and doom-scrolled their phones, dreaming of walking down piping diagrams and inspecting relief valves. It appeared that the days of easy access to physical systems were numbered.

Once again, organizations were forced to explore new models of auditing and new means to complete field inspections. Solutions from the simple to the extreme presented themselves. Operational auditors were given a front-row seat on the edge of technological development.

Our organisations used a range of techniques to fulfill the requirements of our audit programmes for field inspections. Early days included auditors using FaceTime in unclassified areas and Microsoft Teams meetings taken using phones and tablets. Auditors suddenly became experts in classified electrical areas, learning what phone cases provided them with intrinsically safe solutions for Class I, Div. 2 areas.

Intrinsically safe cases for iPhone and Android products are generally as costly as the phones themselves, but do allow for access in process areas for a range of applications, not solely for audit purposes. We have been able to conduct field reviews of MOC items, piping diagram walkdowns, and contractor observations using a variety of devices and software programs.

One of our organizations experimented with the use of virtual reality goggles where the auditor in a remote location is 'connected' to an operator on site who goes into the facility to look at equipment / installations / etc. of interest. The upside of this was the ability of the remote auditor to see 'live' conditions of the item of interest; the downside was the lack of ability of the remote operator to get a 'general feel' for site conditions or observe other items that spark interest that were not anticipated as part of audit preparation.

As useful as field observation video is, it is a poor replacement for those aspects of operational auditing which have traditionally required field inspections. For us, a hybrid model has worked effectively – with or without extensive pre-field preparations.

In one of our organisations, audits during the pandemic were conducted with field assistance – using one or two employees/SMEs to conduct field activities while the remainder of the audit team remained remote. Often times the on-site auditor was selected from a nearby company facility (internal) or a local external auditor was chosen to minimize travel risks during the pandemic. We used this model successfully for both domestic and international audits. For international audits, staffing a language-proficient SME in the field was critical. The on-site auditor(s) were provided specific items for field verification and follow-up by the remaining remote auditors. In this manner, the on-site auditor was the "eyes" of the entire audit team. In some cases, the on-site auditor was also responsible for an element in its entirety in addition to their field duties. Success of this method was largely a combination of the SME's understanding of the operational aspects of our business and the comfort level of our operational personnel in the field.

As with in-person audits, we found that operational personnel were more comfortable with employees who had more overall familiarity with their operations (whether internal or external) and who were perceived as adding value through their visits. In one case one of our internal SMEs remained well after the daily audit session had ended to work with operations and engineering staff on a particularly challenging process restart following an upset.

We have also explored the use of a hybrid remote/on-site audit using an extended pre-read and video interview period on the front end of the audit. In this case, a week (or more) of interviews and document requests followed by a reduced on-site period. For certain audit assignments, this process appears to be the optimal mix. Considering evaluation of mechanical integrity, for example, auditors can review inspection, test, and preventive maintenance documentation. When coupled with effective use of data analysis of CMMS, substantial pre-audit activities allow a field auditor to focus on anomalies and perceived deficiencies.

Extensive pre-read has also reduced miscommunication and confusion between field auditors and operations personnel. Once again, the use of Teams or Google Drive allows auditees to provide massive amounts of data which would swamp email systems or would just be untenable as email attachments. Missing documents can be more effectively researched without the time pressures of an audit closing looming near.

Document availability is another area accelerated by the pandemic. We have seen increased use and acceptance of both simple document management systems (such as Google Docs, SharePoint, or Box/DropBox) and EHS management systems such as Intelex or Enablon. Much documentation previously available only in hard copy is now delivered as an electronic file (such as a Portable Document File – PDF) or has been scanned for broader availability. Acceptance of electronic document management by design/build contractors has led to increased ease at finding design bases, design specifications, and materials of construction.

It should also be noted that while electronic document availability is of great benefit to the Audit Team, it often comes at the cost of significant resource utilization by the facility personnel. Particularly for items like completed safe work permits which are often available in hard-copy, these documents now have to all be scanned to be made available to remote auditors. These permits and other hard-copy documents can number in the thousands. Whereas in a fully on-site audit the facility can simply hand the auditor a stack of permits to review, for a fully remote audit all of those items have to be scanned and uploaded to be available electronically. This aspect of time spent by the facility on preparation should not be underestimated, and we recommend that

additional facility preparation time be considered for fully remote audits compared to the time typically spent preparing for an on-site audit.

As regards field observations, one of our organizations has even experimented with the use of drones for remote mechanical integrity inspections of non-classified processes. While this technique has met with some success – especially in cold spaces (we have applied this to the inspection of refrigeration equipment in sub-zero environments), it is not likely to be useful near classified areas. Drone malfunctions in or around a classified process could lead to a disaster through many causes.

Conclusion

The COVID pandemic has provided some bright spots for operational audit professionals. The extended isolation and limitations on travel have provided opportunities for audit professionals to reconnect with family, friends, and avocations. It has shined a light on techniques and technologies which will allow us to reduce on-site audit time, size of audit teams, and increase effectiveness. One can only hope that we can continue to build on these learnings without a new pandemic.