

Proposed Amendments Related to Aspects of Designing and Performing Audit Procedures that Involve Technology-Assisted Analysis of Information in Electronic Form

PCAOB Release No. 2023-004
June 26, 2023

PCAOB Rulemaking
Docket Matter No. 052

Summary: The Public Company Accounting Oversight Board (PCAOB or the “Board”) is proposing to amend AS 1105, *Audit Evidence* and AS 2301, *The Auditor’s Responses to the Risks of Material Misstatement*, and to make conforming amendments to other related PCAOB auditing standards. Since the standards were originally issued, auditors have expanded their use of technology-assisted analysis of information in electronic form in audits. The amendments are designed to improve audit quality and enhance investor protection by addressing aspects of designing and performing audit procedures that involve technology-assisted analysis of information in electronic form.

Public

Comment: Interested persons may submit written comments to the Board. Comments should be sent via e-mail to comments@pcaobus.org or through the Board’s website at www.pcaobus.org. Comments may also be sent to the Office of the Secretary, PCAOB, 1666 K Street, NW, Washington, DC 20006-2803. All comments should refer to PCAOB Rulemaking Docket Matter No. 052 in the subject or reference line and should be received by the Board by August 28, 2023.

Board

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I. EXECUTIVE SUMMARY

We are proposing amendments to AS 1105, *Audit Evidence* and AS 2301, *The Auditor's Responses to the Risks of Material Misstatement* (the "proposed amendments"), and conforming amendments to other related PCAOB auditing standards. The proposed amendments are designed to improve audit quality and enhance investor protection by addressing the growing use of certain technology in audits. In particular, the amendments would update PCAOB auditing standards to more specifically address aspects of designing and performing audit procedures that involve analyzing information in electronic form with technology-based tools (i.e., technology-assisted analysis). Increasingly, registered public accounting firms obtain audit evidence by analyzing large volumes of information in electronic form. The proposed updating of PCAOB standards is designed to increase the likelihood that audit procedures performed with the use of technology-assisted analysis provide sufficient appropriate audit evidence to support the opinion expressed in the auditor's report.

Staff Research

The proposed amendments described in this release are informed by the PCAOB staff's research project on *Data and Technology*. The staff's research has involved gathering information from PCAOB oversight activities, reviewing firm methodologies, engaging with preparers of financial statements, investors, academics, and other stakeholders on their experiences with data and technology, and monitoring the activities of other audit standard setters and regulators.

Use of Technology-Assisted Analysis in the Audit

Our research indicates that some auditors are expanding their use of technology-assisted analysis (often referred to in practice as "data analysis" or "data analytics") to perform specific audit procedures that are described in existing AS 1105. These procedures include, for example, inspecting company information in electronic form by examining the correlation between different types of transactions, comparing company information to third-party information, performing analytical procedures by comparing an auditor's expectation to the company's recorded balances or transactions, or recalculating company information. Auditors use technology-assisted analysis in many audit areas, including those involving significant risks of material misstatement to financial statements due to error or fraud.

Why the Board is Proposing These Changes Now

Existing PCAOB standards relating to audit evidence and responses to risk (AS 1105 and AS 2301) discuss certain fundamental areas of auditor responsibilities, which include addressing the risk of material misstatement to the financial statements by obtaining sufficient appropriate audit evidence. Since the standards were issued by the Board in 2010, advancements in technology have enabled auditors to expand the use of technology-assisted analysis in audits. If

not designed and executed in accordance with PCAOB standards, audit procedures that involve analyzing information in electronic form with technology-based tools may not provide sufficient appropriate audit evidence. Our research indicates that AS 1105 and AS 2301 may be more effective if they more specifically address aspects of audit procedures that involve technology-assisted analysis.

Key Provisions of the Proposed Amendments

The Board's proposal would further specify and clarify auditor responsibilities by amending certain requirements of AS 1105 and AS 2301. The proposed amendments are designed to reduce the likelihood that an auditor who uses technology-assisted analysis will issue an opinion without having obtained relevant and reliable audit evidence. The proposed amendments are principles-based and therefore are intended to be adaptable to the ever-evolving nature of technology. The Board's proposal is focused on addressing aspects of technology-assisted analysis and does not address other technology applications used in audits (e.g., blockchain or artificial intelligence) or the evaluation of the appropriateness of tools by the firm's system of quality control. In particular, the proposed amendments would:

- Specify considerations for the auditor's investigation of items that meet criteria established by the auditor when designing or performing substantive audit procedures;
- Specify that if an auditor uses audit evidence from an audit procedure for more than one purpose the procedure needs to be designed and performed to achieve each of the relevant objectives;
- Provide additional details regarding auditor responsibilities for evaluating the reliability of external information maintained by the company in electronic form and used as audit evidence;
- Clarify the differences between tests of details and analytical procedures, and emphasize the importance of appropriate disaggregation or detail of information to the relevance of audit evidence; and
- Update certain terminology in AS 1105 to reflect the greater availability of information in electronic form and improve the consistency of the use of such terminology throughout the standard.

This release provides background on the Board's standard-setting project, discusses the proposed amendments, and includes an economic analysis that further considers the need for standard setting and the anticipated economic impacts of our proposed approach. The release also includes two appendices. Appendix 1 sets forth the text of the proposed amendments. Appendix 2 includes conforming amendments to other related PCAOB auditing standards.

Requesting Public Comment on Our Proposal

We are seeking comment on the proposed amendments and conforming amendments to other PCAOB auditing standards. Throughout the release we have included detailed questions soliciting your feedback on specific aspects of our proposal. You are encouraged to comment on any or all topics, respond to any or all questions, provide feedback in areas not covered by specific questions, and provide any evidence, including empirical evidence or your practical experiences, that informs your views.

Instructions on how to comment, including by e-mail or postal mail, can be found on the cover sheet of this release. Comments submitted can be found at the docket page of PCAOB Rulemaking Docket Matter No. 052.

II. BACKGROUND

In 2010, the Board adopted auditing standards related to the auditor's assessment of and response to risk (the "risk assessment standards"), including AS 1105 and AS 2301. Although the risk assessment standards were designed to apply to audits that involve the use of information technology by auditors, the use of information in electronic form¹ and technology-based tools by companies and their auditors to analyze such information has expanded significantly since these standards were developed.

In light of the increased use of technology by companies and auditors, in 2017 the Board added to its agenda a research project to assess whether there is a need for guidance, changes to PCAOB standards, or other regulatory actions. Among other things, research findings indicated that auditors have expanded their use of certain technology-based tools, including tools used to perform technology-assisted analysis (as described above, also referred to in practice as "data analytics" or "data analysis")² to plan and perform audits.³ In addition, research findings highlighted the importance to investor protection of addressing aspects of designing and performing audit procedures that involve technology-assisted analysis, which are discussed in this release.⁴ The remainder of this section of the release provides an overview of

¹ Within this proposal, the term "information in electronic form" encompasses items in electronic form that are described in PCAOB standards using terms such as "information," "data," "documents," "records," "accounting records," and "company's financial records."

² Within this proposal, the terms "data analysis" or "data analytics" are used synonymously, with the term used based on the terminology used by the source cited.

³ See PCAOB's *Data and Technology* research project, available at <https://pcaobus.org/oversight/standards/standard-setting-research-projects/data-technology>.

⁴ The detailed discussion of the proposed amendments is included in Section III of this release. It addresses: (a) clarifying the difference between tests of details and analytical procedures; (b) specifying

the staff's research, existing requirements, and current practice. In addition, it discusses reasons for improving the existing standards.

A. Overview of Staff Research

The proposed amendments described in this release are informed by the ongoing research conducted by PCAOB staff regarding auditors' use of technology as part of the *Data and Technology* research project.⁵ The research was conducted to assess whether there is a need for guidance, changes to PCAOB standards, or other regulatory actions considering the increased use of technology-based tools by auditors and preparers, and the increasing availability and use of information from sources external to the company being audited. Generally, commenters to the Board's Draft Strategic Plan supported the Board's efforts to evaluate developments in data and technology.

The staff's research has involved gathering information from PCAOB oversight activities, reviewing changes that audit firms have made to their policies and methodologies related to the use of technology-assisted analysis, and considering relevant academic research. In addition, the staff has engaged with preparers of financial statements, investors, academics, and other stakeholders on their experiences with data and technology, and monitored the activities of other audit standard setters and regulators. The research was also informed by the PCAOB Data and Technology Task Force, whose members provided valuable perspectives on the use of technology by auditors and preparers, as well as the application of PCAOB standards when using such technology in audits.⁶

The proposed amendments address only one area of auditors' use of technology – aspects of designing and performing audit procedures that involve technology-assisted analysis. Other areas continue to be addressed as part of the staff's ongoing research activities. In addition, we launched the Technology Innovation Alliance Working Group, which will advise the Board on the use of emerging technologies by auditors and preparers relevant to audits and

the auditor's responsibilities when audit evidence from an audit procedure is used for more than one purpose; (c) specifying considerations for the auditor's investigation of items when designing and performing substantive procedures; and (d) specifying responsibilities for evaluating the reliability of certain audit evidence.

⁵ See PCAOB's *Data and Technology* research project, available at <https://pcaobus.org/oversight/standards/standard-setting-research-projects/data-technology>.

⁶ See also *Spotlight: Data and Technology Research Project Update* (two updates published in 2020 and 2021), available at <https://pcaobus.org/resources/staff-publications>.

their potential impact on audit quality.⁷ These ongoing activities may inform future standard-setting projects.

B. Existing Requirements

The proposed amendments would modify certain requirements of PCAOB standards relating to audit evidence and responses to risk (AS 1105 and AS 2301). AS 1105 explains what constitutes audit evidence and establishes requirements regarding designing and performing audit procedures to obtain sufficient appropriate audit evidence. AS 2301 establishes requirements regarding designing and implementing appropriate responses to those identified and assessed risks of material misstatement. As noted above, these standards were written before advancements in technology enabled auditors to expand their use of technology-assisted analysis, and do not specifically address aspects of designing and performing audit procedures that involve such analysis.

The following discussion provides a high-level overview of the areas in PCAOB standards that would be addressed by the proposed amendments. Section III in this release provides additional details regarding the specific requirements that we propose to amend.

Classification of Audit Procedures (See Figure 1 below) – Under PCAOB standards, audit procedures can be classified into either risk assessment procedures or further audit procedures, that consist of tests of controls and substantive procedures. Substantive procedures include tests of details and substantive analytical procedures.⁸ Existing standards describe examples of specific audit procedures⁹ but do not specify what differentiates an analytical procedure from a test of details. PCAOB standards do not preclude the auditor from designing and performing audit procedures to accomplish more than one purpose. The purpose of an audit procedure determines whether it is a risk assessment procedure, test of controls, or substantive procedure.¹⁰

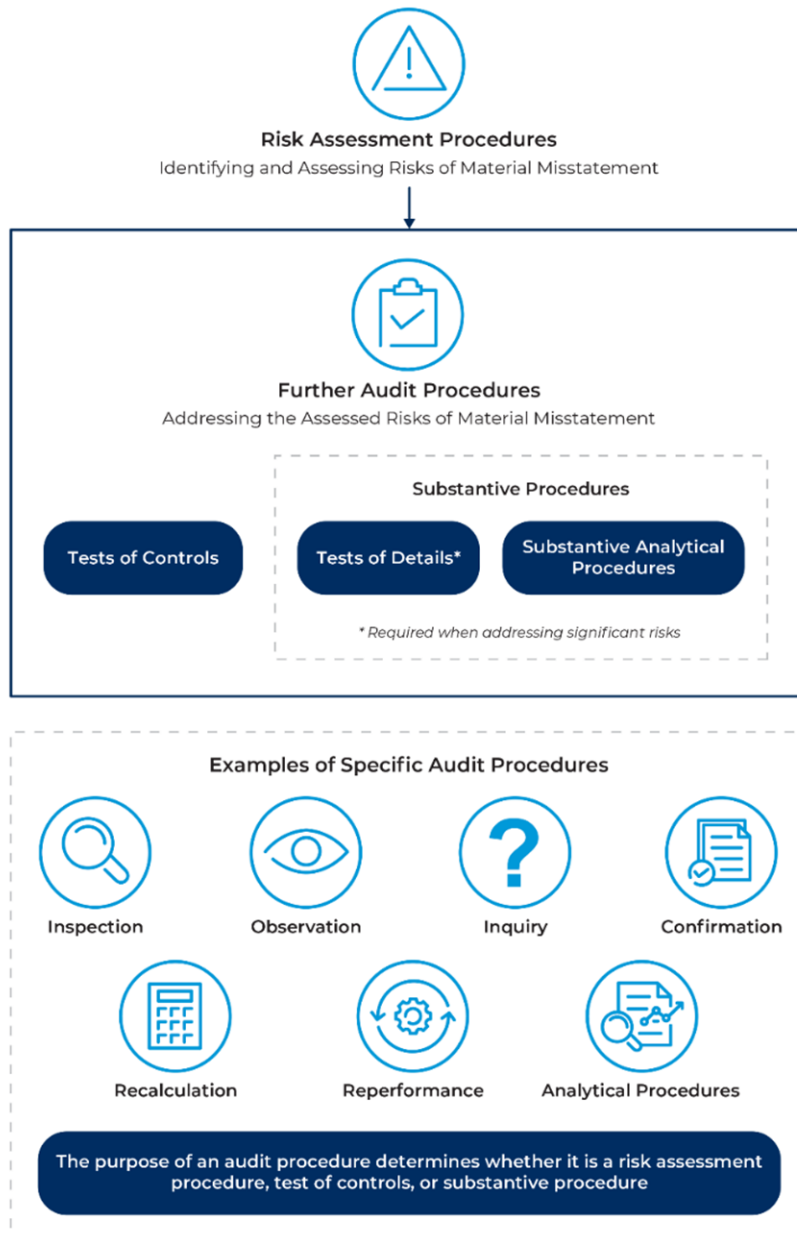
⁷ See *PCAOB Launches Technology Innovation Alliance Working Group*, available at <https://pcaobus.org/news-events/news-releases/news-release-detail/pcaob-launches-technology-innovation-alliance-working-group>.

⁸ See AS 1105.13.

⁹ See AS 1105.15-.21.

¹⁰ See AS 1105.14.

Figure 1. Classification of Audit Procedures



Investigation of Specific Items – Designing substantive tests of details and tests of controls includes determining the means of selecting items for testing. Under existing standards, when selecting items for testing, the auditor may use one or a combination of means, including selecting specific items, selecting a sample that is expected to be representative of the population (i.e., audit sampling), or selecting all items. The auditor may decide to select for testing specific items within a population because they are important to

accomplishing the objective of the audit procedure or because they exhibit some other characteristic.¹¹ Unlike with respect to the auditor's responsibilities for planning, performing, and evaluating samples that are representative of the population,¹² existing PCAOB standards do not specify auditor responsibilities for investigating items identified by the auditor based on criteria established when designing or performing a substantive audit procedure on all or part of a population.

Relevance and Reliability of Audit Evidence – Under PCAOB standards audit evidence is all the information, whether obtained from audit procedures or other sources, that is used by the auditor in arriving at the conclusions on which the auditor's opinion is based.¹³ PCAOB standards require auditors to plan and perform audit procedures to obtain sufficient appropriate audit evidence to provide a reasonable basis for their audit opinion. Sufficiency is the measure of the quantity of audit evidence, and appropriateness is the measure of its quality. To be appropriate, audit evidence must be both relevant and reliable in providing support for the auditor's conclusions.¹⁴ The relevance of audit evidence depends on the design and timing of the audit procedure used to test the assertion or control. The reliability of audit evidence depends on the nature and source of the evidence and the circumstances under which it is obtained, such as whether the information is provided to the auditor by the company being audited and whether the company's controls over that information are effective.¹⁵ In addition, when using information produced by the company as audit evidence, the auditor is responsible for evaluating whether the information is sufficient and appropriate for purposes of the audit.¹⁶ Existing PCAOB standards do not specify auditor responsibilities regarding external information in electronic form maintained by the company that the auditor uses as audit evidence.

C. Current Practice

Our research indicates that audit procedures involving technology-assisted analysis are an important component of many audits. The use of technology-assisted analysis has expanded over the last decade as more accounting firms, including smaller firms, incorporate such analysis as part of their audit procedures. However, the investment in and use of technology-

¹¹ See AS 1105.22-27.

¹² See AS 2315, *Audit Sampling*.

¹³ See AS 1105.02.

¹⁴ See AS 1105.04-.06.

¹⁵ See AS 1105.07-.08.

¹⁶ See AS 1105.10.

assisted analysis vary across registered firms and across individual audit engagements within a firm.¹⁷

The greater availability of both information in electronic form and technology-based tools to analyze such information has contributed significantly to the increase in the use of technology-assisted analysis by auditors. More companies use enterprise resource planning (ERP) and other information systems that maintain large volumes of information in electronic form, including information generated internally by the company and information that the company receives from external sources. Significant volumes of this information are available to auditors for use in their performance of audit procedures.

Powerful technology-based analysis tools to process and analyze large volumes of information have become more readily available to auditors. As a result, auditors often apply technology-assisted analysis to the entire population of transactions comprising one or more financial statement accounts. Our research indicates that auditors primarily use technology-assisted analysis when identifying and assessing risks of material misstatement to identify new risks or to refine the assessment of known risks. For example, by analyzing a full population of revenue transactions, an auditor may identify certain components of the revenue account as subject to higher risks or may identify new risks of material misstatement associated with sales to a particular customer or in a particular location.

Increasingly, some auditors have been using technology-assisted analysis in audit procedures that are performed to respond to assessed risks of material misstatement, including in substantive procedures. For example, such analysis has been used to identify and select for testing specific items included within the population or to test the details of all items in the population. PCAOB staff have observed that auditors use technology-assisted analysis mostly in the testing of revenue and related receivable accounts, inventory, journal entries, expected credit losses, and investments.¹⁸ As discussed in more detail below,¹⁹ some auditors use audit evidence obtained from such analysis to achieve more than one purpose.

Audit methodologies of several larger firms affiliated with global networks address the use of technology-assisted analysis by the firms' audit engagement teams. For example, the methodologies specify the audit engagement teams' responsibilities for: (i) designing and performing audit procedures that involve technology-assisted analysis (e.g., determining whether an audit procedure is a substantive procedure); (ii) evaluating analysis results (e.g., whether identified items indicate a misstatement or whether performing additional procedures

¹⁷ See also discussion in Section IV.A., below of this release.

¹⁸ See page 15 of *Spotlight: Staff Update and Preview of 2021 Inspection Observations*, available at https://pcaob-assets.azureedge.net/pcaob-dev/docs/default-source/documents/staff-preview-2021-inspection-observations-spotlight.pdf?sfvrsn=d2590627_2/.

¹⁹ See Section III.B of this release.

is necessary to obtain sufficient appropriate audit evidence); and (iii) evaluating the relevance and reliability of information used in the analysis.

D. Reasons to Improve the Auditing Standards

The proposed amendments have been developed to reduce the likelihood that the auditor does not obtain relevant and reliable audit evidence through audit procedures that involve technology-assisted analysis. Although the staff's research project on *Data and Technology* indicates that auditors are using technology-assisted analysis in audit procedures, it also indicates that existing standards do not specify aspects of designing and performing audit procedures that involve technology-assisted analysis. We have also heard from the Board's Investor Advisory Group that auditors' use of technology-assisted analysis is an area of concern due to potential overreliance by auditors on company-produced information, and that there could be a benefit in addressing the use of such analysis in the standards.²⁰

One commenter on the PCAOB's draft strategic plan noted, "[t]hroughout the Strategic Plan, technology is a constant theme as both an opportunity and risk for the PCAOB and the audit industry; we could not agree more. As investors, we have seen many examples of how technology can create incredible efficiencies and sometimes mayhem. We share the concerns of many stakeholders that some bad actors will utilize technology to cut corners, weakening audit quality to save money. As investors ultimately pay the audit bill, we support reducing the costs of audits, but not at the expense of audit quality."²¹

Using technology-assisted analysis may enhance the effectiveness and efficiency of audit procedures. For example, analyzing larger volumes of information and in more depth may better inform the auditor's risk assessment by providing different perspectives, exposing previously unidentified relationships that may reveal new risks, and providing more information when assessing risks. At the same time, inappropriate application of PCAOB standards when designing and performing audit procedures that involve technology-assisted analysis has the potential to compromise the quality of audits where the procedures are used. For example, PCAOB staff reviews of audits that involve technology-assisted analysis have found instances of

²⁰ See PCAOB Investor Advisory Group Meeting June 8, 2022, available at <https://pcaobus.org/news-events/events/event-details/pcaob-investor-advisory-group-meeting-2022>.

²¹ See page 2 of the Colorado Public Employees' Retirement Association comment letter on the PCAOB Draft 2022-2026 Strategic Plan, dated September 15, 2022, available at https://pcaob-assets.azureedge.net/pcaob-dev/docs/default-source/about/administration/strategic-plan-comments-2022/14_copera.pdf?sfvrsn=60d1eb76_4.

non-compliance with PCAOB standards related to evaluating the relevance and reliability of information in electronic form and evaluating certain items identified through the analysis.²²

The proposed modification of existing PCAOB standards would address aspects of designing and performing audit procedures that involve technology-assisted analysis where we have identified the need for additional specificity or clarity in the existing standards.²³ These aspects include areas where PCAOB reviews of audits have identified instances of noncompliance with PCAOB standards and areas where auditors have raised questions during our research regarding the applicability of PCAOB standards to the use of technology-assisted analysis. Section III below of this release discusses the proposed amendments in more detail. Section IV below discusses alternatives that we considered when developing the proposed amendments.

Questions:

1. Does the description of auditors' use of technology-assisted analysis in designing and performing audit procedures accurately depict the current audit practice? If not, what clarifications should be made? Are there other aspects of auditors' use of technology-assisted analysis that we should consider?
2. Does the release accurately describe aspects of designing and performing audit procedures involving technology-assisted analysis where improvements to PCAOB standards may be necessary?
3. In addition to the proposed amendments, what other requirements may need to be included in PCAOB standards to address use of technology-assisted analysis in audits?

²² See page 9 of *Spotlight: Staff Update and Preview of 2020 Inspection Observations*, and page 15 of *Spotlight: Staff Update and Preview of 2021 Inspection Observations*, available at <https://pcaobus.org/resources/staff-publications>.

²³ Other PCAOB standard-setting projects may address other aspects of firms' and auditors' use of technology in performing audits. For example, see paragraphs .44h and .47h of proposed QC 1000, *A Firm's System of Quality Control*, PCAOB Release No. 2022-006 (Nov. 18, 2022), which discusses a firm's responsibilities related to technological resources.

III. DISCUSSION OF THE PROPOSED AMENDMENTS

A. Clarifying the Differences Between Tests of Details and Analytical Procedures and Emphasizing the Importance of Appropriate Disaggregation or Detail of Information

See paragraphs .07, .13, and .21 of AS 1105 of the proposed amendments in Appendix 1.

The proposed amendments would further clarify the differences between tests of details and analytical procedures. They would also emphasize the importance of appropriate disaggregation or detail of information used as audit evidence.

Performing Substantive Procedures in Response to the Risks of Material Misstatement

Under PCAOB standards, the auditor's response to risks of material misstatement involves performing substantive procedures for each relevant assertion of each significant account and disclosure.²⁴ Substantive procedures under PCAOB standards include tests of details and substantive analytical procedures.²⁵ Appropriately designing and performing an audit procedure to achieve a particular objective is key to appropriately addressing the risks assessed by the auditor. For significant risks of material misstatement, including fraud risks, the auditor is required to perform tests of details that are specifically responsive to the assessed risk,²⁶ as it is unlikely that audit evidence obtained from substantive analytical procedures alone would be sufficient.²⁷

Analytical Procedures in PCAOB Standards

As described above, technology-assisted analysis is often referred to in practice as "data analytics" or "data analysis." The use of this terminology in practice and the use of the term "analytical procedures" in PCAOB standards have led to questions about whether an audit procedure involving technology-assisted analysis can be a test of details (i.e., not an analytical procedure as described under PCAOB standards). The distinction is important because, as explained above, PCAOB standards require that the auditor perform tests of details when responding to an assessed significant risk of material misstatement, (i.e., performing only analytical procedures would not be sufficient). The staff have observed that auditors use technology-assisted analysis in both audit procedures that fall under the definition of analytical procedures and those that involve testing the details of accounts and disclosures. Existing

²⁴ See AS 2301.36.

²⁵ See AS 1105.13b.

²⁶ See AS 2301.11 and .13, specifying the auditor's responsibilities for responses to significant risks, which include fraud risks.

²⁷ See paragraph .09 of AS 2305, *Substantive Analytical Procedures*.

standards describe what constitutes an analytical procedure,²⁸ but they do not describe what constitutes a test of details.

Currently, PCAOB standards describe analytical procedures as a specific type of audit procedure – an evaluation of financial information made by a study²⁹ of plausible relationships among both financial and nonfinancial data. Analytical procedures under existing PCAOB standards are performed to achieve various objectives throughout the audit (See Figure 2 below). For example, analytical procedures are performed as part of identifying and assessing risks of material misstatement,³⁰ and also as part of the auditor’s overall review of the financial statements.³¹ As noted above, analytical procedures also can be performed as a substantive procedure (i.e., a substantive analytical procedure) addressing an assessed risk of material misstatement.³² Substantive analytical procedures require a greater level of precision than analytical procedures performed as risk assessment procedures.³³

²⁸ See AS 1105.21 for the description of an analytical procedure.

²⁹ AS 1105.21, footnote 27 of AS 2110, *Identifying and Assessing Risks of Material Misstatement*, and AS 2305.02 refer to analytical procedures as a “study” of plausible relationships among both financial and nonfinancial data. The proposed amendments would amend these paragraphs by replacing the term “study” with “analysis” to align with current practice. In addition, the proposed amendments to these paragraphs would clarify that data can be either external or company-produced.

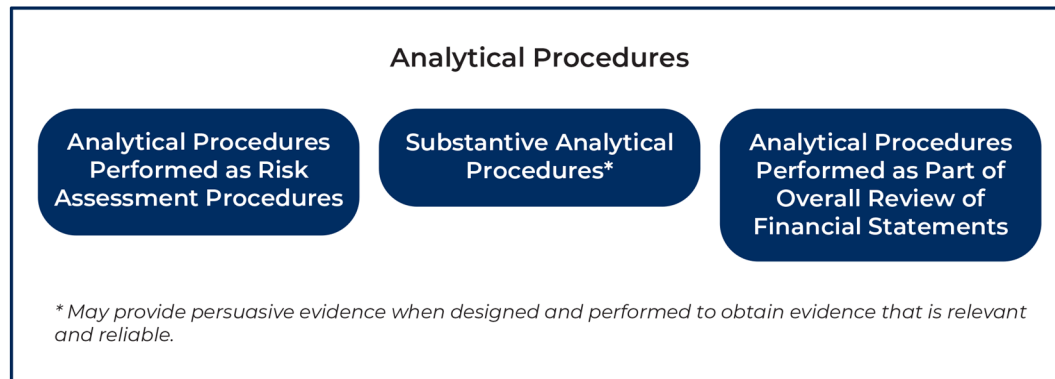
³⁰ See AS 2110.46-.48 for the auditor’s requirements related to designing and performing analytical procedures as part of identifying and assessing risks of material misstatement.

³¹ See paragraphs .05-.09 of AS 2810, *Evaluating Audit Results* for the auditor’s requirements related to performing analytical procedures in the overall review.

³² See AS 2305 for the auditor’s requirements related to substantive analytical procedures. The Board has a separate standard-setting project (<https://pcaobus.org/oversight/standards/standard-setting-research-projects/substantive-analytical-procedures>) related to substantive analytical procedures, which will likely result in changes to the auditor’s responsibilities regarding the use of substantive analytical procedures and, in turn, may result in changes to AS 2305.

³³ See AS 2110.48.

Figure 2. Analytical Procedures



Under PCAOB standards, analytical procedures involve comparing the auditor’s expectations, that have been derived from plausible and predictable relationships, to recorded amounts and investigating significant differences. For example, a substantive analytical procedure performed regarding a company’s interest expense could be performed at a more disaggregated level than a risk assessment procedure. It could involve the auditor developing an expectation about the amount of the expense based on information available to the auditor about the par value of the financial instruments and the applicable interest rates, comparing the expectation to the company’s recorded interest expense, and investigating significant differences between the company’s recorded amount and the auditor’s expectation.

Specifying the Difference Between Tests of Details and Analytical Procedures

To increase the likelihood that auditors obtain sufficient appropriate audit evidence when using technology-assisted analysis, the proposed amendments would more specifically outline differences between tests of details and analytical procedures under PCAOB standards. Unlike with respect to analytical procedures, existing PCAOB standards do not elaborate on the particular features of tests of details. Existing standards describe types of procedures that may serve as tests of details but also indicate that such procedures could be performed as risk assessment procedures or tests of controls.³⁴ The proposed amendments to paragraphs .13 and .21 of AS 1105 would further clarify the meaning of the term “test of details” by explaining that a test of details involves performing audit procedures with respect to individual items included in an account or disclosure, whereas analytical procedures generally do not involve evaluating individual items, unless those items are part of the auditor’s investigation of significant differences from expected amounts.

³⁴ See, e.g., AS 1105.13-.14.

As described above in Section II, our research indicates that technology-assisted analysis is used in designing and performing a variety of audit procedures, including risk assessment and substantive audit procedures, including substantive analytical procedures and tests of details. For example, a procedure that uses technology-assisted analysis to recalculate individual stock-based compensation awards by using grant date, stock price, and type of award could be considered a test of details under PCAOB standards because the recalculation is performed for each individual item in the account.

In contrast, an audit procedure that uses technology-assisted analysis to develop an auditor's expectation for interest income in total for the account, would be considered an analytical procedure, not a test of details, if the procedure was not applied to individual items in the account. In this scenario, if the auditor had identified a significant risk of material misstatement related to the account or disclosure and their relevant assertion(s), the auditor would be required to supplement the analytical procedures with tests of details of the account or disclosure.³⁵

Emphasizing the Importance of Appropriate Disaggregation or Detail of Information Used as Audit Evidence

Whether an auditor performs tests of details, substantive analytical procedures, or other tests, technology-assisted analysis may enable the auditor to analyze large volumes of information at various levels of disaggregation (e.g., regional or global) or detail (e.g., relevant characteristics of individual items such as product type or division). Our research indicates that determining the appropriate level of disaggregation or detail of information that the auditor is using as audit evidence is important for obtaining audit evidence that is relevant in supporting the auditor's conclusions.³⁶ The level of disaggregation or detail that is appropriate depends on the objective of the audit procedure. For example, when testing the valuation assertion of residential loans that are measured based on the fair value of the collateral, disaggregated sales data for residential properties by geographic location would likely provide more relevant audit evidence than combined sales data for both commercial and residential properties by geographic location.

The proposed amendments would amend existing paragraph .07 of AS 1105 to emphasize that the relevance of audit evidence depends on the level of disaggregation or detail of information necessary to achieve the objective of an audit procedure. The proposed amendments would not prescribe an expected level of disaggregation or detail, as auditor

³⁵ See AS 2301.11.

³⁶ See, e.g., page 5 of *Staff Guidance – Insights for Auditors Evaluating the Relevance and Reliability of Audit Evidence Obtained From External Sources* (October 2021), available at: <https://pcaobus.org/oversight/standards/staff-guidance>.

judgment is needed to determine the relevance of information based on the objective of the audit procedure.

Questions:

4. Are the proposed amendments that clarify differences between tests of details and analytical procedures clear and appropriate? If not, what changes should be made to them?
5. Would the proposed amendment that states that the relevance of audit evidence also depends on the level of disaggregation or detail of information necessary to achieve the objective of the audit procedure improve the auditor's evaluation of the relevance of audit evidence? If not, what changes should be made?

B. Specifying the Auditor's Responsibilities When Using Audit Evidence for More Than One Purpose

See paragraph .14 of AS 1105 of the proposed amendments in Appendix 1.

The proposed amendments would, consistent with other standards, specify auditor responsibilities when audit evidence obtained from an audit procedure is used for more than one purpose.

Multi-purpose Audit Procedures in PCAOB Standards

Under PCAOB standards, the purpose of an audit procedure determines whether it is a risk assessment procedure, test of controls, or substantive procedure.³⁷ Although AS 1105 – a standard that describes specific audit procedures – does not specify whether an audit procedure may be designed to achieve more than one purpose, the standard does not preclude the auditor from designing and performing multi-purpose audit procedures.³⁸ In fact, other PCAOB standards have long permitted auditors to use audit evidence for more than one purpose through the performance of properly designed “dual-purpose” procedures in certain scenarios.³⁹

³⁷ See, e.g., AS 1105.14.

³⁸ This interpretation was highlighted in a recent PCAOB staff publication. See page 4 of the Spotlight: *Data and Technology Research Project Update* (May 2020), available at <https://pcaobus.org/Documents/Data-Technology-Project-Spotlight.pdf>.

³⁹ See, e.g., AS 2110.39, which states that “The auditor may obtain an understanding of internal control concurrently with performing tests of controls if he or she obtains sufficient appropriate evidence to achieve the objectives of both procedures,” and AS 2301.47, which discusses performing a

Considering the variety of applications of technology-assisted analysis throughout the audit, the question of whether the audit evidence obtained from an audit procedure that involves technology-assisted analysis can be used for more than one purpose has arisen during our research. We believe PCAOB standards could be modified to address these matters more specifically, to facilitate the auditor's design and performance of audit procedures that provide sufficient appropriate audit evidence.

Specifying Auditor Responsibilities When Using Audit Evidence for More Than One Purpose

We are proposing to amend paragraph .14 of AS 1105 to supplement existing direction in AS 2110 and AS 2301. The revisions to AS 1105.14 would specify that if an auditor uses audit evidence from an audit procedure for more than one purpose, the auditor should design and perform the procedure to achieve each of the relevant objectives. For example, if an auditor uses audit evidence from an audit procedure to inform their risk assessment and to perform a substantive audit procedure, the auditor would need to design the procedure to achieve the objectives of both AS 2110 and AS 2301. The proposed amendments would address situations identified in our research where auditors could potentially perform multi-purpose procedures involving technology-assisted analysis.

In particular, the staff's research indicates that technology-assisted analysis could be used in a variety of audit procedures, including risk assessment and further audit procedures (which include tests of details and substantive analytical procedures). The staff's research also indicates that an audit procedure that involves technology-assisted analysis may provide audit evidence for more than one purpose (e.g., identifying and assessing risks of material misstatement and addressing assessed risks). For example, a technology-assisted analysis of the accounts related to the procurement process could both: (i) provide the auditor with insights into the volume of payments made to new vendors (e.g., a risk assessment procedure to identify new or different risks); and (ii) concurrently match approved purchase orders to invoices received and payments made for each item within a population (e.g., a test of details to address an assessed known risk associated with the occurrence of expenses and obligations of liabilities).

The proposed amendments are designed to increase the likelihood that auditors appropriately design and perform multiple-purpose audit procedures that involve technology-assisted analysis to obtain sufficient and appropriate audit evidence. The proposed amendments are not meant to suggest that all audit procedures involving technology-assisted analysis possess some inherent characteristics of a multi-purpose audit procedure. As noted above, for an audit procedure to be considered multi-purpose, the procedure needs to be designed and performed to achieve the desired relevant objectives of each procedure. An

substantive test of a transaction concurrently with a test of a control relevant to that transaction (a "dual-purpose test").

auditor may use audit evidence from an audit procedure that involves technology-assisted analysis to achieve one or, if possible, several objectives, depending on the facts and circumstances of the company and the audit.

The purpose, objective, and results of multi-purpose procedures should be clearly documented. Under existing PCAOB standards, audit documentation must contain sufficient information to enable an experienced auditor, having no previous connection with the engagement, to understand the nature, timing, extent, and results of the procedures performed, evidence obtained, and conclusions reached.⁴⁰ Accordingly, audit documentation should make clear each purpose of the multi-purpose procedure, the results of the procedure, the evidence obtained, the conclusions reached, and how such evidence achieves the objectives of each procedure.

Questions:

6. Are the proposed requirements that specify the auditor's responsibilities when using audit evidence from an audit procedure to achieve more than one purpose clear and appropriate? If not, what changes should be made to the amendments?

C. Specifying Considerations for the Auditor's Investigation of Items When Designing or Performing Substantive Audit Procedures

See paragraph .37A of AS 2301 of the proposed amendments in Appendix 1.

The proposed amendments would specify an auditor's responsibilities regarding addressing specific items identified by the auditor when designing and performing substantive audit procedures.

Selecting Certain Items for Testing Under PCAOB Standards

Under PCAOB standards, the auditor may use one or a combination of means to select items for testing – selecting all items, selecting a representative sample, and selecting specific items. The auditor may decide to test specific items within a population because they are important to accomplishing the objective of the audit procedure or because they exhibit some other characteristic (e.g., they are unusual or risk-prone).⁴¹ Under PCAOB standards, applying audit procedures to specific items does not constitute audit sampling. Audit sampling involves selecting for testing items in such a way that the selected items (an audit sample) can be expected to be representative of the population, so the results of the test could be projected to

⁴⁰ See paragraphs .04 and .06 of AS 1215, *Audit Documentation*.

⁴¹ See, e.g., AS 1105.25.

the population.⁴² In contrast, items selected based on certain criteria would not necessarily be representative of the population.

Our research indicates that auditors use technology-assisted analysis to identify specific items within a population (e.g., an account or class of transactions) for further investigation. For example, auditors may identify all revenue transactions above a certain amount, transactions processed by certain individuals, or transactions where the shipping date does not match the date of the invoice. Because technology-assisted analysis may enable the auditor to examine all items in a population, it is possible that the analysis may return dozens or even hundreds of items within the population that meet one or more criteria established by the auditor.

Considering current practice, we believe that PCAOB standards should be modified to address more directly the auditor's responsibilities in such scenarios. The auditor's appropriate investigation of identified items is important both for identifying and assessing the risks of material misstatement and for designing and implementing appropriate responses to the identified risks. For example, the auditor's investigation may indicate a previously unidentified risk of material misstatement, or a need to modify planned audit procedures to appropriately address an already identified risk.

Specifying Auditor Responsibilities for Investigating the Identified Items

The proposed amendments, which would be included as new paragraph AS 2301.37A, supplement existing direction in PCAOB standards. They would specify considerations for the auditor's investigation of items that meet criteria established by the auditor when designing or performing substantive procedures on all or part of a population of items.

In practice, an auditor may establish criteria and identify and investigate specific items when performing risk assessment procedures and use the results to design a substantive procedure. Alternatively, an auditor may establish criteria and identify and investigate specific items as part of performing a substantive procedure in response to an assessed risk of material misstatement.

Under the proposed amendments, when the auditor establishes and uses criteria to identify items for further investigation, as part of designing or performing substantive procedures, the auditor's investigation should consider whether the identified items:

- Provide audit evidence that contradicts the evidence upon which the original risk assessment was based;
- Indicate a previously unidentified risk of material misstatement;

⁴² See, e.g., AS 1105.27 and AS 2315.24.

- Represent a misstatement or indicate a deficiency in the design or operating effectiveness of a control; or
- Otherwise indicate a need to modify the auditor's risk assessment or planned audit procedures.

When the auditor's investigation identifies a fact pattern described in the above considerations, the auditor would have a responsibility to address it as required under existing PCAOB standards, which may include inquiring of management. An auditor may also determine it necessary to perform an additional, more focused, analysis of the same population (e.g., to determine whether information obtained through the investigation indicates that a previously unidentified risk of material misstatement exists). As the auditor's investigation could be pivotal for identifying a risk of material misstatement or for determining the appropriate response to risk, the proposed amendments would require the auditor, when inquiring of management, to obtain audit evidence to evaluate the appropriateness of management's response. The auditor has a responsibility under existing PCAOB standards to document the investigation, including whether additional audit procedures should be performed following the consideration of the above factors and, if so, which ones.

Certain Considerations When Applying Proposed Amendments

The proposed amendments would not prescribe the nature, timing, or extent of procedures for investigating the identified items. Because of the wide variety of analyses that may be applied by the auditor, it would be impractical to anticipate what a particular investigation could entail or what information it may provide to the auditor. Further, the nature, timing, and extent of an investigation (including the number of items selected for further testing) would depend on whether it is conducted as part of the risk assessment when designing substantive procedures, or in response to the identified risks.

For example, as part of performing risk assessment procedures, an auditor may identify a significant number of revenue transactions involving new products that were released during the year under audit. The auditor may further investigate the identified items by analyzing the correlation between certain accounts to determine whether there are components of the revenue account that are subject to significantly differing risks of material misstatement (e.g., customer returns and refunds that are particularly prevalent for some products but not others). The auditor may use the results to design substantive procedures that would address the risks.

In another example, as part of performing substantive procedures for raw material purchase transactions, an auditor may identify items with certain characteristics (e.g., amount, timing, or location). Investigating the identified transactions could involve examining documentary support for all the identified items where the risk of material misstatement has been assessed as higher; and for the identified items where the risk of material misstatement has been assessed as lower, the auditor may select specific items for testing. The auditor could

assess risk relating to certain transactions differently based on auditor determined characteristics, such as amount, timing, location, or other characteristics, and select items for testing based on assessed risk.⁴³

The proposed amendments do not address the auditor's responsibilities over other items in the population (i.e., items other than those identified by the auditor for further investigation). The auditor would determine the nature, timing, and extent of audit procedures that are necessary to perform relating to the other items in the population in accordance with existing PCAOB standards.⁴⁴

Questions:

7. Would the proposed amendments, that specify considerations for the auditor's investigation of items that meet criteria established by the auditor when designing or performing substantive procedures, improve the identification and assessment of the risks of material misstatement and the design and implementation of appropriate responses to the assessed risks?
8. What other factors, if any, should the auditor consider when investigating items that meet criteria established by the auditor when designing or performing substantive procedures?

D. Specifying Auditor Responsibilities for Evaluating the Reliability of Certain Audit Evidence

See paragraphs .08, .10, .10A, .15, .19 and .21 of AS 1105 of the proposed amendments in Appendix 1.

The proposed amendments would specify auditor responsibilities regarding certain company-provided information that the auditor uses as audit evidence. They would also highlight and emphasize the importance of controls over information technology.

Using Information Provided by the Company as Audit Evidence

Audit evidence is all information that is used by the auditor in arriving at the conclusions on which the auditor's opinion is based, including information in electronic form used in technology-assisted analysis.⁴⁵ The auditor may obtain audit evidence from the company or

⁴³ In practice, this is sometimes referred to as "transaction scoring," because an auditor would assign a risk "score" to a transaction based on its characteristics or other factors.

⁴⁴ See, e.g., AS 2301.36-.46 describing the auditor's responsibilities for substantive procedures, including determining the nature, timing, and extent of procedures.

⁴⁵ See AS 1105.02.

from external sources. Information that is extracted from a company's information system and provided to the auditor may include: (i) company-produced information (e.g., invoices issued by the company or shipping documents created by the company); and (ii) information that the company received from external sources (e.g., purchase orders submitted by customers or cash received by the company from a customer as payment for an invoice).

Under PCAOB standards, the reliability of information produced by the company is increased when the company's controls over that information are effective.⁴⁶ PCAOB standards discuss the auditor's responsibility for evaluating whether the information produced by the company is sufficient and appropriate for purposes of the audit.⁴⁷ PCAOB standards do not include analogous requirements regarding information received by the company from external sources, maintained in its information systems, and then provided to the auditor to be used as audit evidence.

The staff's research indicates that in performing technology-assisted analysis, auditors use large volumes of information provided by the company that the company received from external sources in electronic form. Because the information is maintained in the company's information system and can potentially be modified by the company, we believe it important to address in PCAOB standards the reliability of audit evidence that the auditor obtains through using this type of information.

Evaluating the Reliability of External Information Maintained by the Company in Electronic Form and Used as Audit Evidence

We propose specifying auditor responsibilities regarding the reliability of external information maintained by the company in electronic form and used as audit evidence, in a new paragraph AS 1105.10A. The paragraph would explain that a company may provide to the auditor information that it received from one or more external sources and maintained in its information systems in electronic form. Because the company exercises certain control over the information, the proposed amendments would require the auditor to evaluate whether the information is reliable for purposes of the audit by performing procedures to:

- Obtain an understanding of the source of the information and the company's procedures by which such information is received, recorded, maintained, and processed in the company's information systems; and

⁴⁶ See AS 1105.08, which uses the term "generated internally by the company." As noted below in this section, the proposed amendments would amend AS 1105.08 by replacing this term with "produced by the company" to use consistent terminology throughout the standard.

⁴⁷ See AS 1105.10.

- Test controls (including information technology general controls (ITGC) and automated application controls) over the company’s procedures described above, or test the company’s procedures described above (e.g., comparing the information the company provided to the auditor to information the company obtained from the external source).

Performing the evaluation procedures described above over the information in electronic form is important to the auditor’s conclusion about the reliability of audit evidence obtained from audit procedures that use such information. Under PCAOB standards, evidence obtained from a knowledgeable source that is independent of the company is more reliable than evidence obtained only from internal company sources.⁴⁸ The proposed amendments are designed to address the risk that the external information maintained by the company and provided to the auditor to be used as audit evidence may be incomplete or inaccurate (i.e., when compared with the original version that the company obtained) or that a company may otherwise modify the external information before providing it to the auditor.

Emphasizing the Importance of Controls Over Information Technology

As noted above, auditors obtain from companies and use in the performance of audit procedures large volumes of information in electronic form. Accordingly, the proposed amendments would emphasize the importance of controls over information technology for the reliability of audit evidence.⁴⁹ In paragraph AS 1105.08, we propose to state that both information produced by the company and external information maintained by the company in electronic form are more reliable when the company’s controls over that information are effective, including ITGCs and automated application controls. A similar point would be included in paragraph AS 1105.15 regarding company-produced information. In addition, we propose to emphasize in paragraph AS 1105.10 that testing controls over the accuracy and completeness of company-produced information includes testing ITGCs and automated application controls. The added emphasis would not imply that testing other relevant controls is less important or unnecessary.

Certain Considerations When Applying the Proposed Amendments

The proposed amendments would not prescribe the nature, timing, or extent of the auditor’s evaluation procedures. An auditor would design the evaluation procedures considering the wide variety of types of external information received by companies and differences in the procedures for receiving, recording, maintaining, and processing such information. Further, the nature, timing, and extent of the auditor’s evaluation would depend

⁴⁸ See AS 1105.08.

⁴⁹ The proposed amendments to AS 1105.08, .10, and .15, which are discussed in this section, state “where applicable” in relation to the controls over information technology, as information produced by the company may also include information not in electronic form which is subject to manual controls.

on the purpose for which the auditor uses the information whose reliability is being evaluated. In general, performing audit procedures to address the risks of material misstatement involves obtaining more persuasive evidence than in performing risk assessment procedures. Accordingly, evaluating the reliability of information used in substantive procedures and tests of controls would require more auditor effort than evaluating the reliability of information used in risk assessment procedures.

Questions:

9. Are the proposed amendments that specify requirements for the auditor to perform procedures to evaluate the reliability of external information maintained by the company in electronic form that the auditor uses as audit evidence clear and appropriate? If not, what changes should be made to the amendments?
10. Are the proposed amendments that emphasize the importance of controls over information technology for the reliability of audit evidence clear and appropriate? If not, what changes should be made?
11. When the auditor uses information produced by the company and external information maintained by the company in electronic form, should PCAOB standards require internal controls over such information to be tested and determined to be effective for such information to be considered reliable audit evidence?

Updating Certain Terminology in AS 1105

In conjunction with the discussion of information technology in this release, we are proposing to update certain terminology in AS 1105, without changing the meaning of the requirements. Considering the greater availability and use of information in electronic form, we are proposing to use the term “information” instead of the term “documents and records” in AS 1105.15 and .19. Further, to avoid a misinterpretation that only certain procedures could be performed electronically, we are proposing to remove the reference to performing recalculation “manually or electronically” in AS 1105.19. For consistent terminology, we are proposing to replace the terms “generated internally by the company” in AS 1105.08 and “internal” in AS 1105.15 with the term “produced by the company.” In addition, we are proposing to clarify in AS 1105.21 that auditors may analyze both external and company-produced data as part of performing analytical procedures.

Question:

12. Are the proposed amendments that update certain terminology in AS 1105 clear and appropriate? If not, what changes should be made?

IV. ECONOMIC ANALYSIS

The Board is mindful of the economic impacts of its standard setting. This section describes the economic baseline, economic need, expected economic impacts of the proposed amendments, and alternative approaches considered. There are limited data and research findings available to estimate quantitatively the economic impacts of the proposed amendments. Therefore, the Board's economic discussion is largely qualitative in nature. However, where reasonable and feasible, the analysis incorporates quantitative information, including descriptive statistics on the tools that firms use in technology-assisted analysis.⁵⁰

A. Baseline

Section II above describes important components of the baseline against which the economic impact of the proposed amendments can be considered, including the Board's existing standards, firms' current practices, and observations from the Board's inspections program. We discuss below two additional aspects of current practice that inform our understanding of the economic baseline: (i) the staff's analysis of the tools that auditors use in technology-assisted analysis; and (ii) research on auditors' use of technology-assisted analysis.

1. Staff Analysis of Tools that Auditors Use in Technology-Assisted Analysis

Staff reviewed information provided by firms pursuant to the PCAOB's oversight activities regarding tools they use in technology-assisted analysis.⁵¹ The information identifies and describes tools used by audit engagement teams. Staff reviewed information provided by

⁵⁰ As noted above, this proposal uses the term "technology-assisted analysis" in reference to the analysis of information in electronic form that is performed with the assistance of technology-based tools. Others, including firms and academics, may refer to such analysis as "data analysis" or "data analytics." As discussed above, the use of "data analysis" or "data analytics" in Section IV of the release is intended to align with terminology used by the source cited. The terms "data analysis" or "data analytics" should not be confused with the term "analytical procedures" that is used in PCAOB standards to refer to a specific type of audit procedure (see AS 1105.21) that may be performed with or without the use of information in electronic form or technology-based data analysis tools.

⁵¹ Within this proposal the term "tool" refers to specialized software that is used on audit engagements to examine, sort, filter, and analyze transactions and information used as audit evidence or which otherwise generates information that aids auditor judgment in the performance of audit procedures. Spreadsheet software itself is not inherently a tool, but a spreadsheet may be built to perform the functions of a tool (examining, sorting, filtering, etc.), in which case it is included within the scope of this term. The staff's analysis was limited to tools classified by the firms as data analytic tools. Tools may be either purchased by a firm or developed by a firm.

the U.S. global network firms (“GNFs”) as well as two U.S. non-affiliated firms (“NAFs”).⁵² The information was first provided for the 2018 inspection year and is available through the 2021 inspection year for the GNFs and is available through the 2020 inspection year for the NAFs reviewed, as of the date of our analysis.

Firms reported using both internally developed and externally purchased tools. Some of the externally purchased tools were customized by the firms. The nature and number of tools varied across firms, and their use varied with the facts and circumstances of specific audit engagements. Some firms consolidated some of their tools over time, thus reducing the number of unique tools they use. Firms generally do not require the use of such tools on audit engagements.

The average number of tools used by audit engagement teams, as reported to the PCAOB by the U.S. GNFs, increased from approximately 13 to approximately 16 per firm, or approximately 24%, between 2018 and 2021. In the 2021 inspection year, U.S. GNFs reported that 90% of their tools are used for data visualization, summarization, tabulation, or modeling.⁵³ All the U.S. GNFs reported using tools to assist in: (i) identifying and selecting journal entries; and (ii) selecting samples for testing. The U.S. GNFs reported having tools that support both risk assessment (e.g., assessing loan risk) and substantive procedures (e.g., performing journal entry testing or fair value testing). The U.S. GNFs developed 73% of the reported tools in-house while the rest were purchased externally. Furthermore, approximately 14% of the U.S. GNFs’ tools used cloud computing. Less than 7% of the U.S. GNFs’ tools used blockchain technology, artificial intelligence, or robotic process automation. All the U.S. GNFs’ tools use issuer data and 18% also use third-party data.

Compared to U.S. GNFs, the U.S. NAFs within the scope of the staff’s review reported to the PCAOB using fewer tools. In all inspection years between 2018 and 2020, on average, the NAFs reported using approximately one tool per firm. The U.S. NAFs used the tools to visualize, summarize, and model data. One U.S. NAF developed an in-house tool to support risk assessment and testing of companies’ credit loss models. Another U.S. NAF purchased a tool externally to support audit sampling procedures. Furthermore, the U.S. NAFs’ tools used issuer data (e.g., journal entry data) as inputs.

2. Research on Auditors’ Use of Technology-Assisted Analysis

Academic studies regarding the prevalence of technology-based tools used to analyze information in electronic form and the impacts of using such tools on issuer audits and broker-

⁵² The U.S. GNFs are Deloitte & Touche LLP, Ernst & Young LLP, KPMG LLP, PricewaterhouseCoopers LLP, Grant Thornton LLP, and BDO US LLP. U.S. NAF firms include registered firms that are not global network firms.

⁵³ For example, some firms identified Microsoft Power BI and IDEA as tools used for data visualization, summarization, tabulation, or modelling.

dealer engagements are limited. However, several recent surveys provide insights regarding: (i) how auditors have been incorporating data analytics into their audit approaches; and (ii) potential impediments to auditors' further implementation of data analytics.

Regarding incorporating data analytics into audit approaches, the surveys indicate that while the use of data analytics presently may not be widespread, it is becoming more common in various aspects of the audit, primarily risk assessment and, to a lesser extent, substantive procedures. For example, a 2017 survey of U.S. auditors reported that auditors used data analytics in risk assessment and journal entry testing.⁵⁴ Also, a survey of Norwegian auditors, some of whom perform audits under PCAOB standards, reported that the use of data analytics was not yet widespread and was used primarily as supplementary evidence. In this survey, the respondents indicated that data analytics were used primarily in risk assessment and various types of substantive procedures, including analytical procedures.⁵⁵ A 2018 to 2019 survey of auditors in New Zealand Big 4 firms reported that auditors are more frequently encountering accessible, large client data sets. The respondents reported that third-party tools to process the data are increasingly available and allow auditors with less expertise in data analytics to make effective use of data.⁵⁶

Earlier surveys reported qualitatively similar, though less prevalent, use of data analytics. For example, a 2016 survey of Canadian firms reported that 63% and 39% of respondents from large firms and small to mid-sized firms, respectively, had used data analytics, most commonly in the risk assessment and substantive procedures phases. Both groups reported that data analytics was used to provide corroborative evidence for assertions about classes of transactions for the period under audit. However, only smaller and mid-size firms reported that data analytics also was used to provide primary evidence for assertions about classes of transactions for the period under audit and account balances at period end.

⁵⁴ See Ashley A. Austin, Tina D. Carpenter, Margaret H. Christ, and Christy S. Nielson, *The Data Analytics Journey: Interactions Among Auditors, Managers, Regulation, and Technology*, 38 *Contemporary Accounting Research* 1888 (2021). The survey also states:

[A]uditors report that they strategically leverage data analytics to provide clients with business-related insights. However, regulators voice concerns that this practice might impair auditor independence and reduce audit quality.

The proposed amendments are not intended to suggest that when using technology-assisted analysis in an audit, auditors do not need to comply with PCAOB independence standards and rules, and the independence rules of Securities and Exchange Commission. Auditors are still expected to comply with these standards and rules when using technology-assisted analysis on an audit engagement.

⁵⁵ See Aasmund Eilifsen, Finn Kinserdal, William F. Messier, and Thomas E. McKee, *An Exploratory Study into the Use of Audit Data Analytics on Audit Engagements*, 34 *Accounting Horizons* 75 (2020). The authors do not report when the survey was performed.

⁵⁶ See Angela Liew, Peter Boxall, and Denny Setiawan, *The Transformation to Data Analytics in Big-Four Financial Audit: What, Why and How?*, 34 *Pacific Accounting Review* 569 (2022).

Furthermore, only larger firms reported that data analytics was also used to provide corroborative evidence for assertions about account balances at period end.⁵⁷

A survey of 2015 year-end audits performed by UK firms reported that the use of data analytics was not as prevalent as the market might expect, with the most common application being journal entry testing.⁵⁸ A 2015 survey of UK and EU auditors found that data analytics was being used in both risk assessment procedures and to perform certain audit procedures (e.g., recalculation).⁵⁹ Finally, a 2014 survey of U.S. auditors reported that they often use information technology to perform risk assessment, analytical procedures, sampling, internal control evaluations, and internal control documentation. The respondents identified moderate use of data analytics in the context of client administrative or practice management.⁶⁰

Regarding potential impediments to the implementation of data analytics, surveys indicate that some firms are reluctant to implement data analytics in their audit approach due to perceived regulatory risks. For example, one survey found that auditors were cautious about implementing data analytics due to a lack of explicit regulation. Respondents reported performing both tests of details that do not involve data analytics and those that do involve data analytics on audits under PCAOB standards.⁶¹ Another survey found that auditors did not require the use of advanced data analytic tools partly due to uncertainty regarding how regulatory authorities would perceive the quality of the audit evidence produced. However, the respondents tended to agree that both standard setters and the auditing standards themselves allow information obtained from data analytics as audit evidence.⁶² Another survey found that some auditors were reluctant to implement data analytics because the auditing standards do

⁵⁷ See CPA Canada, *Audit Data Analytics Alert* (2017) at 7, Exhibit 4, and Exhibit 7.

⁵⁸ See Financial Reporting Council, *Audit Quality Thematic Review: The Use of Data Analytics in the Audit of Financial Statements* (2017) at 11.

⁵⁹ See George Salijeni, Anna Samsonova-Taddei, and Stuart Turley, *Big Data and Changes in Audit Technology: Contemplating a Research Agenda*, 49 *Accounting and Business Research* 95 (2019).

⁶⁰ See D. Jordan Lowe, James L. Bierstaker, Diane J. Janvrin, and J. Gregory Jenkins, *Information Technology in an Audit Context: Have the Big 4 Lost Their Advantage?*, 32 *Journal of Information Systems* 87 (2018). The authors do not define the term “data analytics,” and present it as an application of information technology in the audit distinct from other audit planning and audit testing applications. However, we believe it is likely that some of the applications of information technology reported in the study would likely be impacted by the proposed amendments and hence provide relevant baseline information.

⁶¹ See Austin et al., *The Data Analytics Journey* 1910. See also Liew et al., *The Transformation* 579-580.

⁶² See Eilifsen et al., *An Exploratory Study*. See also Felix Krieger, Paul Drews, and Patrick Velte, *Explaining the (Non-) Adoption of Advanced Data Analytics in Auditing: A Process Theory* 41 *International Journal of Accounting Information Systems* 1 (2021).

not specifically address them.⁶³ These survey findings are consistent with other surveys that find auditors structure their audit approaches to manage regulatory risks arising from inspections, including risks associated with compliance with PCAOB standards.⁶⁴ However, by contrast, another survey found that the audit regulatory environment was not commonly cited by respondents as an impediment to the use of data analytics.⁶⁵

Overall, the research suggests that the auditor's use of data analytics in designing and performing audit procedures is becoming increasingly prevalent. This provides a baseline for considering the potential impacts of the proposed amendments. The research also suggests that some auditors perceive regulatory risks when implementing data analytics. This provides evidence of a potential problem that standard setting may address.

Question:

13. We request comment generally on the baseline for evaluating the economic impacts of the proposed amendments. Is there additional information regarding auditors' use of technology-assisted analysis or are there additional academic studies that we should consider?

B. Need

Several attributes of the audit market support a need for the PCAOB to establish effective audit performance standards. First, the company under audit, investors, and other financial statement users cannot easily observe the services performed by the auditor or the quality of the audit. This leads to a risk that, unbeknownst to the company under audit, investors, or other financial statement users, the auditor may perform a low-quality audit.⁶⁶

⁶³ See, Salijeni, et al., *Big Data*.

⁶⁴ See Kimberly D. Westermann, Jeffrey Cohen, and Greg Trompeter, *PCAOB Inspections: Public Accounting Firms on "Trial,"* 36 *Contemporary Accounting Research* 694 (2019). See also Lindsay M. Johnson, Marsha B. Keune, and Jennifer Winchel, *U.S. Auditors' Perceptions of the PCAOB Inspection Process: A Behavioral Examination,* 36 *Contemporary Accounting Research* 1540 (2019).

⁶⁵ See CPA Canada, *Audit Data Analytics* at Exhibit 10.

⁶⁶ See, e.g., Monika Causholli and Robert W. Knechel, *An Examination of the Credence Attributes of an Audit,* 26 *Accounting Horizons* 631, 632 (2012):

During the audit process, the auditor is responsible for making decisions concerning risk assessment, total effort, labor allocation, and the timing and extent of audit procedures that will be implemented to reduce the residual risk of material misstatements. As a non-expert, the auditee may not be able to judge the appropriateness of such decisions. Moreover, the auditee may not be able to ascertain the extent to which the risk of material misstatement has been reduced even after the audit is completed. Thus,

Second, the federal securities laws require that an issuer retain an auditor for the purpose of preparing or issuing an audit report. While the appointment, compensation, and oversight of the work of the registered public accounting firm conducting the audit is, per Sarbanes-Oxley, entrusted to the issuer's audit committee,⁶⁷ there is nonetheless a risk that the auditor may seek to satisfy the interests of the issuer audit client rather than the interests of investors and other financial statement users.⁶⁸ This risk can arise out of the audit committee's identification with the company or its management (e.g., for compensation) or through management's exercise of influence over the audit committee's supervision of the auditor, which can result in a *de facto* principal-agent relationship between the company and the auditor.⁶⁹ Effective auditing standards address these risks by explicitly assigning responsibilities to the auditor that, if executed properly, are expected to result in high-quality audits that satisfy the interests of audited companies, investors, and other financial statement users.

Economic theory suggests that technology is integral to the auditor's production function—i.e., the quantities of capital and labor needed to produce a given level of audit quality. As technology evolves, so do the quantities of capital and labor needed to produce a given level of audit quality.⁷⁰ Auditing standards that do not appropriately accommodate the evolution of technology may therefore inadvertently deter or insufficiently facilitate improvements to the audit approach. Risk-averse auditors may be especially cautious about incorporating significant new technological developments into their audit approaches because they may be either unfamiliar with the technology or unsure whether a new audit approach would comply with the PCAOB's auditing standards. On the other hand, auditing standards that are too accommodative (e.g., they do not fully address scenarios that may occur when auditors

information asymmetry exists between the auditee and the auditor, the benefit of which accrues to the auditor. If such is the case, the auditor may have incentives to: Under-audit, or expend less audit effort than is required to reduce the uncertainty about misstatements in the auditee's financial statements to the level that is appropriate for the auditee.

⁶⁷ See Section 301 of Sarbanes-Oxley, 15 U.S.C § 78f(m) (also requiring that the firm "report directly to the audit committee"). As an additional safeguard, the auditor is also required to be independent of the audit client. See 17 CFR 210.2-01.

⁶⁸ See, e.g., Joshua Ronen, *Corporate Audits and How to Fix Them*, 24 *Journal of Economic Perspectives* 189 (2010).

⁶⁹ See *id.*; see also, e.g., Liesbeth Bruynseels and Eddy Cardinaels, *The Audit Committee: Management Watchdog or Personal Friend of the CEO?*, 89 *The Accounting Review* 113 (2014). Cory Cassell, Linda Myers, Roy Schmardebeck, and Jian Zhou, *The Monitoring Effectiveness of Co-Opted Audit Committees*, 35 *Contemporary Accounting Research* 1732 (2018). Nathan Berglund, Michelle Draeger, and Mikhail Sterin, *Management's Undue Influence over Audit Committee Members: Evidence from Auditor Reporting and Opinion Shopping*, 41 *Auditing: A Journal of Practice & Theory* 49 (2022).

⁷⁰ See Gregory N. Mankiw, *Principles of Economics*, (6th ed. 2008) at 76 (discussing how technology shifts the supply curve).

use new technologies in the audit) may not sufficiently address potential risks to audit quality arising from new audit approaches.

Since 2010, when the PCAOB released a suite of auditing standards related to the auditor's assessment of and response to risk, two key technological developments have occurred. First, ERP systems that structure and house large volumes of information in electronic form have become more prevalent among issuers. For example, one study reports that the global ERP market size increased by 60% between 2006 and 2012.⁷¹ As a result, auditors have greater access to large volumes of company-produced and third-party information in electronic form that may potentially serve as audit evidence. Second, the use of more sophisticated data analysis tools has become more prevalent among auditors.⁷² As noted above, the staff's analysis of the tools that firms use in technology-assisted analysis indicates that the number of such tools used by U.S. GNFs on audits increased by 24% between 2018 and 2021.⁷³

These recent technological developments have been changing the way technology-assisted analysis is used in audits, as discussed in more detail in Section IV.A above. Although PCAOB standards related to the auditor's assessment of and response to risk generally were designed to apply to audits that use information technology, they may be less effective in providing direction to auditors if the standards do not address certain advancements in the use of technology-assisted analysis in audits. Modifying existing PCAOB standards through the proposed amendments would address this risk, as discussed below. The remainder of this section discusses the specific problem that the proposed amendments are intended to address and how the proposed amendments are intended to address it.

1. Problem to be Addressed

Audit procedures that involve technology-assisted analysis may be an effective and efficient way to obtain persuasive audit evidence. Although the staff's research indicates that auditors are using technology-assisted analysis to obtain audit evidence, it also indicates that

⁷¹ See Adelin Trusculescu, Anca Draghici, and Claudiu Tiberiu Albuлесcu, *Key Metrics and Key Drivers in the Valuation of Public Enterprise Resource Planning Companies*, 64 *Procedia Computer Science* 917 (2015).

⁷² This may be caused in part by a decrease in the quality-adjusted cost of software (i.e., the cost of software holding quality fixed). For example, see U.S. Bureau of Economic Analysis, "Table 5.6.4. Price Indexes for Private Fixed Investment in Intellectual Property Products by Type," (accessed Dec. 21, 2022) (indicating that the price index for capital formation in software by the business sector has decreased by approximately 13% between 2010 and 2021). In preparing its price indices, the U.S. Bureau of Economic Analysis attempts to control for changes in product quality over time. Improvements to product quality may have contributed in part to some increase in the cost of software, including some of the software that can process large volumes of data.

⁷³ See Section IV.A. See also Lowe et al., *Information Technology* 95 (reporting an increase in the use of information technology in audits between 2004 and 2014).

existing PCAOB standards do not specify aspects of designing and performing audit procedures that involve technology-assisted analysis. As discussed in detail in Section III above, these aspects may include classifying auditing procedures, determining whether an audit procedure provides audit evidence for more than one purpose, investigating certain items identified by the auditor, and evaluating the reliability of external information obtained by the company and provided to the auditor in electronic form.

Consequently, under existing standards, there is a risk that when using technology-based tools to design and perform audit procedures that involve technology-assisted analysis, auditors may fail to obtain sufficient appropriate audit evidence when addressing one or more financial statement assertions. For example, if an auditor does not appropriately investigate certain items identified through technology-assisted analysis, the auditor may not identify indicators of a risk of material misstatement that would need to be addressed under PCAOB standards. In another example, if an auditor does not appropriately evaluate the level of disaggregation of certain information maintained by the company, the auditor would not be able to determine, under PCAOB standards, whether the evidence obtained is relevant to the assertion being tested.⁷⁴

Furthermore, there is a risk that auditors may choose not to perform audit procedures that involve technology-assisted analysis, even if performing such procedures would be a more effective or efficient way of obtaining audit evidence. For example, an auditor may choose not to perform a substantive procedure that involves technology-assisted analysis if the auditor cannot determine whether the procedure would be considered a test of details under existing standards.

2. How the Proposed Amendments Would Address the Need

The proposed amendments would address the risk that the auditor may not obtain sufficient appropriate audit evidence when addressing one or more financial statement assertions. For example, the proposed amendments would: (i) specify considerations for the auditor when specific items are identified for investigation as part of designing or performing substantive procedures;⁷⁵ (ii) specify procedures the auditor should perform to evaluate the reliability of external information maintained by the company in electronic form and used as audit evidence;⁷⁶ and (iii) clarify that if the auditor uses audit evidence from an audit procedure

⁷⁴ See, e.g., Helen Brown-Liburd, Hussein Issa, and Danielle Lombardi, *Behavioral Implications of Big Data's Impact on Audit Judgment and Decision Making and Future Research Directions*, 29 *Accounting Horizons* 451 (2015) (discussing how irrelevant information may limit the value of data analysis). See also Financial Reporting Council, *Audit Quality*.

⁷⁵ See detailed discussion in Section III.C.

⁷⁶ See detailed discussion in Section III.D.

for more than one purpose, the auditor should design and perform the procedure to achieve the relevant objectives.⁷⁷

The proposed amendments would also address the risk that auditors may choose not to perform audit procedures involving technology-assisted analysis by clarifying: (i) the difference between tests of details and analytical procedures;⁷⁸ and (ii) that audit evidence from an audit procedure may be used for more than one purpose.⁷⁹ Collectively, the proposed amendments should lead auditors to perceive less risk of non-compliance with PCAOB standards when using technology-assisted analysis.

Question:

14. The Board requests comment generally on the need for rulemaking. Should we consider any additional arguments, academic studies, or data related to the need for rulemaking?

C. Economic Impacts

This section discusses the expected benefits and costs of the proposed amendments and potential unintended consequences. Overall, we expect that the economic impact of the proposed amendments, including both benefits and costs, would be relatively modest. We also expect that the benefits of the proposed amendments would justify the costs and any unintended consequences.

1. Benefits

The proposed amendments may lead auditors to design and perform audit procedures more efficiently and effectively. They would achieve this by clarifying and strengthening requirements of AS 1105 and AS 2301 related to aspects of designing and performing audit procedures that involve technology-assisted analysis.

More efficient and effective audit procedures may lead to higher audit quality, more efficient audits, lower audit fees, or some combination of the three. To the extent the proposed amendments would lead to higher audit quality, they would benefit investors and other financial statement users by reducing the likelihood that the financial statements are materially misstated, whether due to error or fraud.

Investors may also benefit from being able to use the more reliable financial information to improve the efficiency of their capital allocation decisions (e.g., investors may reallocate

⁷⁷ See detailed discussion in Section III.B.

⁷⁸ See detailed discussion in Section III.A.

⁷⁹ See detailed discussion in Section III.B.

capital from less profitable companies to more profitable companies). Investors may also perceive less risk in capital markets generally, leading to an increase in the supply of capital. An increase in the supply of capital could increase capital formation while also reducing the cost of capital to companies.⁸⁰

Auditors also are expected to benefit from the proposed amendments because the additional clarity provided by the proposed amendments could reduce regulatory uncertainty and the associated compliance costs. Specifically, the proposal would provide auditors with a better understanding of their responsibilities, which in turn should reduce the risk that auditors would design and perform potentially unnecessary audit procedures (e.g., potentially duplicative audit procedures).

The following discussion describes the benefits of key aspects of the proposed amendments that are expected to impact auditor behavior. As discussed in Section IV.B above, the changes are intended to clarify and specify aspects of designing and performing audit procedures that involve technology-assisted analysis. To the extent that a firm has already incorporated aspects of the proposed amendments into its methodology, some of the benefits described below would be reduced.⁸¹

i. Reducing the Likelihood of Not Obtaining Sufficient Appropriate Audit Evidence

The proposed amendments would enhance audit quality by reducing the likelihood that an auditor who uses technology-assisted analysis will issue an opinion without obtaining sufficient appropriate audit evidence to support the opinion. For example, the proposed amendments would specify auditors' responsibilities for investigating items that meet auditor-established criteria when designing or performing substantive procedures. In another example, the proposed amendments would specify auditors' responsibilities for evaluating the reliability of electronic information. As a result, auditors may be more likely to obtain sufficient appropriate audit evidence when designing and performing audit procedures that use technology-assisted analysis. This would result in higher audit quality. As described above, the higher audit quality would benefit investors and other financial statement users by reducing the likelihood that the financial statements are materially misstated, whether due to error or fraud. These benefits to audit quality would apply both to audit engagements where auditors currently incorporate technology-assisted analysis into their audit approach and audit

⁸⁰ See, e.g., Hanwen Chen, Jeff Zeyun Chen, Gerald J. Lobo, and Yanyan Wang, *Effects of Audit Quality on Earnings Management and Cost of Equity Capital: Evidence from China*, 28 *Contemporary Accounting Research* 892 (2011); Richard Lambert, Christian Leuz, and Robert E. Verrecchia, *Accounting Information, Disclosure, and the Cost of Capital*, 45 *Journal of Accounting Research* 385 (2007).

⁸¹ See discussion in Section II.C.

engagements where auditors have been previously reluctant to use technology-assisted analysis because of the risk of noncompliance.

ii. Greater Use of Technology-Assisted Analysis

The proposed amendments may lead to some increase in the use of technology-assisted analysis by auditors when designing and performing multi-purpose audit procedures and tests of details. For example, the proposed amendments would clarify the difference between tests of details and analytical procedures. As a result of this clarification, auditors may make greater use of technology-assisted analysis when designing or performing tests of details because they may perceive a reduction in noncompliance risk.

Notwithstanding the associated fixed and variable costs, greater use of technology-assisted analysis by the auditor when designing or performing audit procedures may allow the auditor to perform engagements with fewer resources, which may increase the overall resources available to perform audits.⁸² In economic terms, it may increase the supply of audit quality.⁸³ As one example, the auditor may be able to gather sufficient appropriate audit evidence with fewer staff hours by using technology-assisted analysis to automatically perform an audit procedure rather than manually perform the procedure. Current labor shortages of qualified individuals and decreases in accounting graduates and new CPA examination candidates amplify the value of gathering sufficient appropriate audit evidence with fewer staff hours.⁸⁴ Apart from consideration of demands from the audited company, discussed in greater detail below, the efficiencies that may arise from greater utilization of technology-assisted analysis would be retained by the auditor in the form of higher profit. However, to better address regulatory, litigation, or reputational risks, the auditor may choose to redeploy engagement-level resources to other work. For example, auditors may shift staff resources to audit areas or issues that are more complex or require more professional judgment.⁸⁵

As a result of the greater use of technology-assisted analysis by auditors, some companies may be able to obtain a higher level of audit quality, renegotiate their audit fee, or

⁸² See Section IV.C.2.ii for discussion on the costs associated with greater use of technology-assisted analysis.

⁸³ For purposes of this discussion, “audit quality” refers to assurance on the financial statements provided by the auditor to the users of the financial statements. The “supply of audit quality” is the relationship between audit quality and incremental cost to the auditor. An “increase in the supply of audit quality” occurs when the incremental costs of audit quality decrease (e.g., due to technological advances) and the auditor is able to profitably provide more audit quality.

⁸⁴ See, e.g., AICPA Private Companies Practice Section, *2022 PCPS CPA Top Issues Survey (2022)*; AICPA, *2021 Trends: A report on accounting education, the CPA exam and public accounting firms’ hiring of recent graduates (2021)*.

⁸⁵ See, e.g., Salijeni et al., *Big Data*.

some combination of the two. The outcome would likely vary by company depending on the competitiveness of the company's local audit market and the company's audit quality expectations. For example, negotiating power may be smaller for larger multinational issuers, which may have fewer auditor choices, than for smaller issuers, which may have more auditor choices. Furthermore, some companies may expect their auditor to reassign engagement team staff resources from repetitive or less complex audit procedures to more judgmental aspects of the audit. Other companies may expect the engagement team to perform the audit with fewer firm resources (e.g., fewer billable hours). Some research suggests that most companies prefer audit fee reductions in response to their auditor's greater use of data analytics.⁸⁶

Because the proposed amendments do not require the auditor to use technology-assisted analysis when designing and performing audit procedures, the associated benefits would likely be limited to cases where the benefits to the auditor would justify the costs to the auditor, as well as any fixed costs required to update the auditor's approach (e.g., update methodologies, provide training). The fixed costs may be significant; however, some firms may have incurred some of these costs already.⁸⁷ Moreover, despite the continued tendency of companies to adopt ERP systems to house their accounting and financial reporting data, some issuers' data may remain prohibitively difficult to obtain and analyze, thus limiting the extent to which the auditor can use technology-assisted analysis.⁸⁸ Some survey research also suggests that some firms lack sufficient staff resources to appropriately deploy data analysis.⁸⁹ Collectively, these private costs may deter some auditors from incorporating technology-assisted analysis into their audit approach and thereby reduce the potential benefits associated with greater use of the technology-assisted analysis.

Question:

15. Are there additional potential benefits that should be considered?

2. Costs

We expect the costs associated with the proposed amendments to be relatively modest. To the extent that firms would make changes to their existing audit approaches as a result of the proposed amendments, they may incur certain fixed costs (i.e., costs that are generally independent of the number of audits performed), including costs to: update audit

⁸⁶ See Austin et al., *The Data Analytics Journey*.

⁸⁷ See Section IV.A., discussing increased availability of data analytic tools at larger firms and Austin et al., *The Data Analytics Journey* 1908.

⁸⁸ See, e.g., Austin, *The Data Analytics Journey* 1906.

⁸⁹ See, e.g., Saligeni, *Big Data* 108. See also CPA Canada, *Audit Data Analytics*. However, some more recent survey research suggests that auditors tend to agree that they have the technical expertise to deploy data analytics. See Eilifsen et al., *An Exploratory Study* 84.

methodologies, templates, and tools; prepare training materials; train their staff; and purchase software. GNFs and some NAFs are likely to update their methodologies using internal resources, whereas other NAFs are likely to purchase updated methodologies from external vendors.

In addition, firms may incur certain engagement-level variable costs. For example, the proposed amendments related to evaluating whether external information maintained by the company in electronic form and used as audit evidence is reliable could require additional time and effort by engagement teams that would use such information in performing audit procedures. This additional time, and therefore the resulting variable costs, may be less on integrated audits or financial-statement audits that take a controls reliance approach because, in these cases, ITGCs and automated application controls over information in electronic form may already be tested. As another example, some firms may incur software license fees that vary by the number of users. To the extent that auditors incur higher costs to implement the proposed amendments and can pass on at least part of the increased costs through an increase in audit fees, audited companies may also incur an indirect cost.

Some aspects of the proposed amendments may result in more or different costs than others. The following discussion describes the potential costs associated with specific aspects of the proposed amendments.

i. Reducing the Likelihood of Not Obtaining Sufficient Appropriate Audit Evidence

As discussed above, the proposed amendments are intended to enhance audit quality by reducing the likelihood that an auditor would not obtain sufficient appropriate audit evidence. The proposed amendments would achieve this primarily by further clarifying and specifying auditor responsibilities when designing and performing audit procedures that involve technology-assisted analysis. As a result, some auditors may perform incremental procedures to comply with the new requirements, which may lead to incremental costs. For example, in addition to applying technology-assisted analysis to each item in the population and other tests of details to select individual items, some auditors may perform tests of details on a sample of items from the same population. These incremental procedures may apply to audit engagements where auditors currently incorporate technology-assisted analysis into their audit approach, and audit engagements where auditors have been reluctant to use technology-assisted analysis due to the risk of noncompliance.

At the firm level, some firms may incur relatively modest fixed costs to update their methodologies and templates (e.g., documentation templates) or customize their technology-based tools. Firms may also need to prepare training materials and train their staff. Firms may incur relatively modest variable costs if they determine that additional time and effort on an individual audit engagement would be necessary in order to design and perform audit procedures to comply with PCAOB standards as clarified or specified by the proposed

amendments. For example, a firm may incur additional variable costs to investigate items identified by the auditor that meet auditor-established criteria when designing or performing substantive procedures.

ii. Greater Use of Technology-Assisted Analysis

As discussed above, the proposed amendments would not require the use of technology-assisted analysis in an audit. However as noted above, the proposed amendments may lead to some increase in the use of technology-assisted analysis by auditors when designing and performing multi-purpose audit procedures and tests of details. The greater use of technology-assisted analysis by the auditor may allow the auditor to perform engagements with fewer resources. However, this potential efficiency benefit would likely be offset, in part, by fixed and variable costs to the audit firm. Relatively modest, fixed costs would be incurred to incorporate technology-assisted analysis into its audit approach. For example, some firms may purchase, develop, or customize new tools.⁹⁰ Some firms may choose to hire programmers to develop tools internally. Firms may also incur fixed costs to obtain an understanding of companies' information systems.⁹¹

Relatively modest variable costs would be incurred to use technology-assisted analysis on individual audit engagements. For example, firms may incur variable costs associated with preparing company data for analysis or updating their technology-based tools. In another example, a firm may incur variable costs to obtain specialized expertise for using technology-assisted analysis on audit engagements. For example, a firm data analytics specialist may be used on an audit engagement to automate certain aspects of data preparation or design and perform a custom technology-assisted analysis.

As discussed in Section IV.C.1.ii above, greater use of technology-assisted analysis may result in lower audit fees under certain conditions. We account for this impact as a reduced benefit to audit firms rather than a cost.

Several factors may limit the costs associated with greater use of technology-assisted analysis in an audit. First, the costs would likely only be incurred by a firm if it determined that the private benefits to it would exceed the private costs. Second, some firms have already made investments to incorporate technology-assisted analysis on audits. Finally, the cost of software that can process and analyze large volumes of data has been decreasing.⁹²

⁹⁰ See Financial Reporting Council, *Audit Quality*. See also Austin et al., *The Data Analytics Journey*.

⁹¹ See Eilifsen et al., *An Exploratory Study 71* (discussing how audit data analytics are less often used when the issuer does not have an integrated ERP/IT system). See also Financial Reporting Council, *Audit Quality*.

⁹² See *supra* note 72.

Questions:

16. Are there additional potential costs that should be considered? If so, what are they?
17. Are there additional academic studies or data related to the potential benefits and costs of the proposed amendments? If so, please provide citations or other reference information for such studies and data.

3. Potential Unintended Consequences

In addition to the benefits and costs discussed above, the proposed amendments could have unintended economic impacts. The following discussion describes potential unintended consequences considered by the Board and, where applicable, factors that mitigate them. These include actions taken by the Board as well as the existence of other countervailing forces.

i. Reduction in the Use of Technology-Assisted Analysis

It is possible that, as a result of the proposed amendments, some auditors could reduce their use of technology-assisted analysis. This could occur if the proposed amendments would lead firms to conclude that the private benefits would not justify the private costs of involving technology-assisted analysis in their audit approach. For example, the proposed amendments would specify considerations for investigating certain items identified by the auditor and procedures for evaluating the reliability of certain electronic information. As discussed in Section IV.C.2 above, such additional responsibilities could lead to fixed costs at the firm level and variable costs at the engagement level. As a result, some auditors may choose not to use audit procedures that involve technology-assisted analysis.

Several factors would likely limit any negative effects associated with this potential unintended consequence. First, we believe that any decrease in the use of technology-assisted analysis would likely arise from a reduction in the performance of audit procedures that would not have contributed significantly to providing sufficient appropriate audit evidence. This development would therefore probably benefit, rather than detract from, audit quality. For example, currently some auditors might not appropriately investigate items identified when using technology-assisted analysis in designing and performing substantive procedures. The proposed amendments would specify auditors' responsibilities for investigating the items identified. If auditors view the proposed requirement as too costly to implement, they may instead choose to perform audit procedures that do not involve the use of technology-assisted analysis. If the other procedures chosen by the auditor provide sufficient appropriate audit evidence, the reduction in the performance of audit procedures that involve technology-assisted analysis where auditors did not appropriately investigate items identified would benefit audit quality.

Second, any reduction in the use of technology-assisted analysis as a result of certain proposed amendments, such as in the above scenario, may be offset by the greater use of

technology-assisted analysis in other scenarios. For example, as discussed in Section IV.C.1 above, the proposed amendments would clarify the difference between tests of details and analytical procedures. As a result, auditors may make greater use of technology-assisted analysis in performing tests of details because they may perceive a reduction in non-compliance risk.

Finally, because the proposed amendments would be principles-based, auditors would be able to tailor their work subject to the proposed amendments to the facts and circumstances of the audit. For example, the proposed amendments would not prescribe procedures for investigating items that meet certain criteria established by the auditor. Rather, the auditor would be able to structure the investigation based on, among other things, the type of analysis (e.g., performed as part of risk assessment or substantive procedure) and considerations provided by the proposed amendments (e.g., indicate a previously unidentified risk of material misstatement).⁹³

ii. Inappropriately Designed Multiple-Purpose Audit Procedures

It is possible that some auditors could view the proposed amendments as allowing any audit procedure that involves technology-assisted analysis to be considered a multi-purpose procedure. Auditors who hold this view may fail to design and perform audit procedures that provide sufficient appropriate audit evidence. This potential unintended consequence would be mitigated by: (i) existing requirements of PCAOB standards; and (ii) a proposed amendment to paragraph .14 of AS 1105.

Existing PCAOB standards address auditors' responsibilities for designing and performing procedures to identify, assess, and respond to risks of material misstatement and obtaining sufficient appropriate audit evidence.⁹⁴ Auditor responsibilities established by existing PCAOB standards apply to the performance of both audit procedures that are designed to achieve a single objective and audit procedures that are designed to achieve multiple objectives. Further, existing standards specify auditor responsibilities in certain scenarios that involve multi-purpose audit procedures. For example, existing PCAOB standards discuss that an audit procedure may serve as both a risk assessment and a test of control provided that the auditor meets the objectives of both procedures.⁹⁵ In another example, existing PCAOB standards discuss that audit procedures may serve as both a test of control and a substantive procedure provided that the auditor meets the objectives of both procedures.⁹⁶

⁹³ See discussion in Section III.C.

⁹⁴ See AS 2110 and AS 2301.

⁹⁵ See AS 2110.39.

⁹⁶ See AS 2301.47.

In addition, the proposed amendment to paragraph .14 of AS 1105 would further mitigate the risk that auditors fail to design and perform multi-purpose audit procedures. The proposed amendment would emphasize the auditor's responsibility to achieve particular objectives specified in existing PCAOB standards when using audit evidence from an audit procedure for multiple purposes.

iii. Disproportionate Impact on Smaller Firms

It is possible that the costs of the proposed amendments could disproportionately impact smaller firms. As discussed in Section IV.C.2 above, increased use of technology-assisted analysis may require incremental investment and specialized skills. Smaller firms have fewer audit engagements over which to distribute fixed costs (i.e., they lack economies of scale). As a result, smaller firms may be less likely than larger firms to increase their use of technology-assisted analysis when designing and performing multi-purpose audit procedures and tests of details. Although the proposed amendments would not require auditors to use technology-assisted analysis, a choice not to use it may negatively impact smaller firms' ability to compete with larger firms (e.g., if using technology-assisted analysis is expected by prospective users of the auditor's report).

This potential unintended negative consequence would be mitigated by several factors. First, the fixed costs associated with the proposed amendments may be offset by engagement-level efficiencies which may increase the competitiveness of smaller firms. Second, as discussed in Section IV.B above, the costs associated with acquiring and incorporating technology-based tools that are used to perform technology-assisted analysis into firms' audit approaches have been decreasing and may continue to decrease. Third, while reduced competition may result in higher audit fees,⁹⁷ it may also reduce issuers' opportunity to opinion shop, thereby positively impacting audit quality.⁹⁸ Finally, any negative impact to the smaller firms' ability to compete with larger firms would likely be limited to smaller and mid-size issuers because smaller firms may lack the economies of scale and multi-national presence to compete for the audits of larger issuers. Indeed, there is some evidence that smaller and larger audit firms do not directly compete with one another in some segments of the audit market.⁹⁹

⁹⁷ See, e.g., Joshua L. Gunn, Brett S. Kawada, and Paul N. Michas, *Audit Market Concentration, Audit Fees, and Audit Quality: A Cross-Country Analysis of Complex Audit Clients*, 38 *Journal of Accounting and Public Policy* 1 (2019).

⁹⁸ See, e.g., Nathan J. Newton, Julie S. Persellin, Dechun Wang, and Michael S. Wilkins, *Internal Control Opinion Shopping and Audit Market Competition*, 91 *The Accounting Review* 603 (2016); Nathan J. Newton, Dechun Wang, and Michael S. Wilkins, *Does a Lack of Choice Lead to Lower Quality?: Evidence from Auditor Competition and Client Restatements*, 32 *Auditing: A Journal of Practice & Theory* 31 (2013).

⁹⁹ See, e.g., GAO Report No. GAO-03-864, *Public Accounting Firms: Mandated Study on Consolidation and Competition* (July 2003).

Questions:

18. The Board requests comment generally on the potential unintended consequences of the proposal. Are the responses to the potential unintended consequences discussed in the release adequate? Are there additional potential unintended consequences that the Board should consider? If so, what responses should be considered?
19. Are there any other economic impacts we did not describe above that are relevant to the Board's consideration?

D. Alternatives Considered

The development of the proposed amendments involved considering numerous alternative approaches to addressing the problems described above. This section explains: (i) why standard setting is preferable to other policy-making approaches, such as providing interpretive guidance or enhancing inspection or enforcement efforts; (ii) other standard-setting approaches that were considered; and (iii) key policy choices made by the Board in determining the details of the proposed amendments.

1. Why Standard Setting is Preferable to Other Policy-Making Approaches

The Board's policy tools include alternatives to standard setting, such as issuing interpretive guidance or increasing the focus on inspections or enforcement of existing standards. The Board considered whether providing guidance or enhancing inspection or enforcement efforts would be effective mechanisms to address concerns associated with aspects of designing and performing audit procedures that involve technology-assisted analysis.

Interpretive guidance provides additional information about existing standards. Inspection and enforcement actions take place after insufficient audit performance (and potential investor harm) has occurred. Devoting additional resources to guidance, inspections, or enforcement activities, without improving the relevant performance requirements for auditors, would at best focus auditors' performance on existing standards and would not provide the benefits associated with improving the standards.

The proposed amendments, by contrast, are designed to improve PCAOB standards by adding further clarity and specificity to existing requirements. For example, the proposed amendments would clarify the differences between two types of audit procedures discussed in PCAOB standards – tests of details and analytical procedures. In another example, the proposed amendments would specify auditor responsibilities for investigating certain items and for evaluating the reliability of certain information used as audit evidence.

2. Other Standard-Setting Approaches Considered

The Board considered, but is not proposing, developing a standalone standard that would address designing and performing audit procedures that involve technology-assisted analysis. Addressing the use of technology-assisted analysis in a standalone standard could further highlight the auditor's responsibilities relating to using technology-assisted analysis. However, a new standalone standard would also unnecessarily duplicate many of the existing requirements, as existing PCAOB standards are already designed to be applicable to audits performed with the use of technology, including technology-assisted analysis.

Further, as Section II above explains in greater detail, the staff's research indicates that auditors are using technology-assisted analysis in audit procedures. Rather than proposing a new standalone standard, this proposal uses a more targeted approach that includes amending certain requirements of the existing standards where our research indicates the need for providing further clarity and specificity regarding designing and performing audit procedures that involve technology-assisted analysis.

3. Key Policy Choices

i. Investigating Certain Items Identified by the Auditor

As discussed in Sections II and III above, auditors may use technology-assisted analysis to identify specific items within a population (e.g., transactions in an account) for further investigation.¹⁰⁰ The auditor's investigation may include, for example, examining documentary evidence for items identified through the analysis or performing procedures to determine whether the identified items indicate a previously unidentified risk of material misstatement.

We considered but are not proposing prescribing specific audit procedures to investigate items identified by the auditor in the way described in the above examples. We also considered but are not proposing prescribing specific audit procedures to address items not identified by the auditor for investigation (e.g., items in the remaining population). While certain audit procedures may be effective when investigating items identified under certain circumstances, other audit procedures may be more effective under different circumstances. Because of the wide range of both analyses that may be applied by the auditor and potentially appropriate audit procedures for investigating these items, we believe that an overly prescriptive standard could, in certain cases, unintentionally lead auditors to perform audit procedures without considering the facts and circumstances of the audit engagement.

¹⁰⁰ See detailed discussion in Section III.C.

ii. Defining the Term “Data Analysis”

As technology-assisted analysis is often referred to in practice as “data analysis” or “data analytics,” we considered but are not proposing to define the term “data analysis” or “data analytics” as a new type of specific audit procedure that would be included in the list of specific audit procedures in AS 1105. Defining a new type of specific audit procedure could potentially provide additional clarity when describing auditor responsibilities under PCAOB standards. However, our research indicates that, in practice, the meaning of the term “data analysis” varies depending on the context in which it is used. Auditors may use technology-assisted analysis at various stages of the audit (e.g., when identifying risk or addressing risk) and in various types of audit procedures (e.g., inspection, recalculation, reperformance, analytical procedures). As technology evolves, the meaning of the term data analysis may also evolve. Defining the term “data analysis” as a new specific audit procedure under AS 1105 could therefore create confusion and unnecessarily constrain the potential use of technology-assisted analysis in the audit.

Questions:

20. Are any of the alternative approaches, or any other approaches, preferable to the approaches that are being proposed to address audit procedures that involve technology-assisted analysis? If so, what are they and what reasons support one or more alternative approaches over the proposed approaches?
21. Are there additional economic considerations associated with this proposal that should be considered? If so, what are those considerations?

V. SPECIAL CONSIDERATIONS FOR AUDITS OF EMERGING GROWTH COMPANIES

Pursuant to Section 104 of the Jumpstart Our Business Startups (“JOBS”) Act, rules adopted by the Board subsequent to April 5, 2012 generally do not apply to the audits of emerging growth companies (“EGCs”), as defined in Section 3(a)(80) of the Securities Exchange Act of 1934 (“Exchange Act”), unless the SEC “determines that the application of such additional requirements is necessary or appropriate in the public interest, after considering the protection of investors, and whether the action will promote efficiency, competition, and capital formation.”¹⁰¹ As a result of the JOBS Act, the rules and related amendments to PCAOB

¹⁰¹ See Pub. L. No. 112-106 (Apr. 5, 2012). See Section 103(a)(3)(C) of the Sarbanes-Oxley Act, as added by Section 104 of the JOBS Act, which also provides that any rules of the Board requiring: (1) mandatory audit firm rotation; or (2) a supplement to the auditor’s report in which the auditor would be required to provide additional information about the audit and the financial statements of the issuer (auditor discussion and analysis), shall not apply to an audit of an EGC. The proposed amendments do not fall within either of these two categories.

standards that the Board adopts are generally subject to a separate determination by the SEC regarding their applicability to audits of EGCs.

To inform consideration of the application of auditing standards to audits of EGCs, the PCAOB staff prepares a white paper annually that provides general information about characteristics of EGCs.¹⁰² As of the November 15, 2021, measurement date, PCAOB staff identified 3,092 companies that self-identified with the SEC as EGCs and filed with the SEC audited financial statements in the 18 months preceding the measurement date.

As discussed in Section II, auditors are expanding the use of technology-assisted analysis in audits. The proposed amendments would address aspects of designing and performing audit procedures that involve technology-assisted analysis. The proposed amendments are principles-based and are intended to be applied in all audits performed pursuant to PCAOB standards, including audits of EGCs.

The discussion of benefits, costs, and unintended consequences of the proposed amendments in Section IV is generally applicable to all audits performed pursuant to PCAOB standards, including audits of EGCs. The economic impacts of the proposed amendments on an individual EGC audit would depend on factors such as the auditor's ability to distribute implementation costs across its audit engagements, whether the auditor has already incorporated technology-assisted analysis into its audit approach, and electronic information acquisition challenges (e.g., information availability, legal restrictions, or privacy concerns). EGCs are more likely to be newer companies, which are typically smaller in size and receive lower analyst coverage. These factors may increase the importance to investors of the higher audit quality resulting from the proposed amendments, as high-quality audits generally enhance the credibility of management disclosures.¹⁰³

¹⁰² For the most recent EGC white paper, see *Characteristics of Emerging Growth Companies and Their Audit Firms at November 15, 2021* (January 5, 2023), available at: <https://pcaobus.org/resources/other-research-projects>.

¹⁰³ Researchers have developed a number of proxies that are thought to be correlated with information asymmetry, including small issuer size, lower analyst coverage, larger insider holdings, and higher research and development costs. To the extent that EGCs exhibit one or more of these properties, there may be a greater degree of information asymmetry for EGCs than for the broader population of companies, which increases the importance to investors of the external audit to enhance the credibility of management disclosures. See, e.g., Steven A. Dennis and Ian G. Sharpe, *Firm Size Dependence in the Determinants of Bank Term Loan Maturity*, 32 *Journal of Business Finance and Accounting* 31 (2005); Michael J. Brennan and Avaniidhar Subrahmanyam, *Investment Analysis and Price Formation in Securities Markets*, 38 *Journal of Financial Economics* 361 (1995); David Aboody and Baruch Lev, *Information Asymmetry, R&D, and Insider Gains*, 55 *Journal of Finance* 2747 (2000); Raymond Chiang and P. C. Venkatesh, *Insider Holdings and Perceptions of Information Asymmetry: A*

However, as discussed in Section IV.A above, the use of technology-assisted analysis appears to be less prevalent among NAFs than GNFs. Therefore, since EGCs are more likely to be audited by NAFs than are non-EGCs, the impacts of the proposed amendments on EGC audits may be less than on non-EGC audits.¹⁰⁴

The proposed amendments could impact competition in an EGC's product market if the indirect costs to audited companies disproportionately impact EGCs relative to their competitors. However, as discussed in Section IV.C above, the costs associated with the proposed amendments are expected to be relatively modest. Therefore, the impact of the proposed amendments on competition, if any, is likewise expected to be limited.

Overall, the proposed amendments are expected to enhance the efficiency and quality of EGC audits that implement technology-assisted analysis and contribute to an increase in the credibility of financial reporting by those EGCs. To the extent the proposed amendments would improve EGCs' financial reporting quality, they may also improve the efficiency of capital allocation, lower the cost of capital, and enhance capital formation. For example, investors may improve their capital allocation by reallocating capital from less profitable EGCs to more profitable EGCs. Investors may also perceive less risk in EGC capital markets generally, leading to an increase in the supply of capital to EGCs. This may increase capital formation and reduce the cost of capital to EGCs. Furthermore, if certain of the proposed amendments did not apply to the audits of EGCs, auditors would need to address additional differing audit requirements in their methodologies, or policies and procedures, with respect to audits of EGCs and non-EGCs. This could create the potential for additional confusion.

Accordingly, and for the reasons explained above, the Board anticipates that, if it adopts the proposed amendments, it will request the Commission to determine that it is necessary or appropriate in the public interest, after considering the protection of investors and whether the action will promote efficiency, competition, and capital formation, to apply the proposed amendments to audits of EGCs.

Note, 43 *Journal of Finance* 1041 (1988); Molly Mercer, *How Do Investors Assess the Credibility of Management Disclosures?*, 18 *Accounting Horizons* 185 (2004).

¹⁰⁴ This statement is based on staff analysis of SEC filings and data from Audit Analytics and Standard & Poor's as of the Nov. 15, 2021 measurement date. The non-EGC-population is limited to exchange-listed companies that are not registered investment companies or EGCs and have filed audited financial statements with the SEC, including an audit report signed by a firm in the 18 months preceding the measurement date.

Question:

22. The Board requests comment generally on the analysis of the impacts of the proposal on EGCs. Are there reasons why the proposal should not apply to audits of EGCs? If so, what changes should be made so that the proposal would be appropriate for audits of EGCs? What impact would the proposal likely have on EGCs, and how would this affect efficiency, competition, and capital formation?

VI. EFFECTIVE DATE

The Board seeks comment on the amount of time auditors would need before the proposed amendments would become effective, if adopted by the Board and approved by the SEC. Specifically, the Board is considering whether compliance with the adopted amendments should be required for audits of fiscal years ending on or after June 30 in the year after approval by the SEC.

Questions:

23. How much time following SEC approval would audit firms need to implement the proposed requirements?
24. Would requiring compliance for fiscal years beginning after the year of SEC approval present challenges for auditors? If so, what are those challenges, and how should they be addressed?

VII. APPENDICES

This proposal includes this release with its appendices:

- Appendix 1 – Proposed Amendments
- Appendix 2 – Conforming Amendments to Related PCAOB Auditing Standards

VIII. OPPORTUNITY FOR PUBLIC COMMENT

The Board seeks comments on all aspects of its proposal, as well as specific comments on the proposed amendments. Among other things, the Board seeks comment on the economic analysis relating to its proposal, including potential costs. To assist the Board in evaluating such matters, the Board requests relevant information and empirical data regarding the proposed amendments.

Written comments should be sent by email to comments@pcaobus.org or through the Board's website at www.pcaobus.org. Comments may also be sent to the Office of the Secretary, PCAOB, 1666 K Street, NW, Washington, DC 20006-2803. All comments should refer

to PCAOB Rulemaking Docket Matter No. 052 in the subject or reference line and should be received by the Board no later than August 28, 2023.

The Board will consider all comments received. After the close of the comment period, the Board will determine whether to adopt final rules, with or without changes from the proposal. Any final rules adopted will be submitted to the SEC for approval. Pursuant to Section 107 of the Sarbanes-Oxley Act, proposed rules of the Board do not take effect unless approved by the SEC. Standards are rules of the Board under the Sarbanes-Oxley Act.

* * *

On the 26th day of June, in the year 2023, the foregoing was, in accordance with the bylaws of the Public Company Accounting Oversight Board,

ADOPTED BY THE BOARD.

/s/ Phoebe W. Brown

Phoebe W. Brown
Secretary

June 26, 2023

* * *

APPENDIX 1: PROPOSED AMENDMENTS

Proposed Amendments Related to Aspects of Designing and Performing Audit Procedures That Involve Technology-Assisted Analysis of Information in Electronic Form

This appendix presents the proposed amendments to the following PCAOB standards. Language that would be deleted is ~~struck through~~. Language that would be added is underlined.

- AS 1105, *Audit Evidence*
- AS 2301, *The Auditor's Responses to the Risks of Material Misstatement*

AS 1105, *Audit Evidence*

Relevance and Reliability

.07 *Relevance*. The relevance of audit evidence refers to its relationship to the assertion or to the objective of the control being tested. The relevance of audit evidence depends on:

- a. The design of the audit procedure used to test the assertion or control, in particular whether it is designed to (1) test the assertion or control directly and (2) test for understatement or overstatement; ~~and~~
- b. The timing of the audit procedure used to test the assertion or control; and
- c. The level of disaggregation or detail of information necessary to achieve the objective of the audit procedure.

.08 *Reliability*. The reliability of evidence depends on the nature and source of the evidence and the circumstances under which it is obtained. ~~For example, in general:~~

- Evidence obtained from a knowledgeable source that is independent of the company is more reliable than evidence obtained only from internal company sources.

Note: See Appendix A of this standard for requirements related to the evaluation of evidence from a company's specialist.

- ~~The reliability of information generated internally produced~~ by the company and external information maintained by the company in electronic form are more reliable ~~is increased~~ when the company's controls over that information including, where applicable, its information technology general controls and automated application controls, are effective.
- Evidence obtained directly by the auditor is more reliable than evidence obtained indirectly.
- Evidence provided by original documents is more reliable than evidence provided by photocopies or facsimiles, or documents that have been filmed, digitized, or otherwise converted into electronic form, the reliability of which depends on the controls over the conversion and maintenance of those documents.

Note: If a third party provides evidence to an auditor subject to restrictions, limitations, or disclaimers, the auditor should evaluate the effect of the restrictions, limitations, or disclaimers on the reliability of that evidence.

Using Information Produced by the Company

.10 When using information produced by the company as audit evidence, the auditor should evaluate whether the information is sufficient and appropriate for purposes of the audit by performing procedures to:³

- Test the accuracy and completeness of the information, or test the controls over the accuracy and completeness of that information, including, where applicable, information technology general controls and automated application controls;^{3A} and
- Evaluate whether the information is sufficiently precise and detailed for purposes of the audit.

³ When using the work of a company's specialist, see Appendix A of this standard. When using information produced by a service organization or a service auditor's report as audit evidence, see AS 2601, *Consideration of an Entity's Use of a Service Organization*, and for integrated audits, see AS 2201, *An Audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements*.

^{3A} For situations involving information in electronic form, see paragraph .17 of AS 2301, *The Auditor's Responses to the Risks of Material Misstatement*.

Evaluating the Reliability of External Information Maintained by the Company in Electronic Form

.10A The company may provide to the auditor information that the company received from one or more external sources and maintained in its information systems in electronic form.^{3B} When using such information as audit evidence, the auditor should evaluate whether the information is reliable for purposes of the audit by performing procedures to:

- a. Obtain an understanding of the source of the information and the company's procedures by which such information is received, recorded, maintained, and processed in the company's information systems, and
- b. Test controls (including information technology general controls and automated application controls) over the company's procedures discussed in subpart (a) of this paragraph or test the company's procedures discussed in subpart (a) of this paragraph.

^{3B} For example, information regarding a purchase order submitted to the company by a customer or regarding cash received by the company from a customer as payment for an invoice.

Audit Procedures for Obtaining Audit Evidence

.13 Audit procedures can be classified into the following categories:

- a. Risk assessment procedures,⁶ and
- b. Further audit procedures,⁷ which consist of:
 - (1) Tests of controls, and
 - (2) Substantive procedures, including tests of details and substantive analytical procedures.

Note: A test of details involves performing audit procedures with respect to individual items included in an account or disclosure, whereas analytical procedures generally do not involve evaluating individual items included in an account or disclosure, unless those items are part of the auditor's investigation of significant differences from expected amounts.^{7A}

⁶ AS 2110.

⁷ AS 2301, ~~The Auditor's Responses to the Risks of Material Misstatement.~~

^{7A} See also paragraph .21 of this standard.

.14 Paragraphs .15-.21 of this standard describe specific audit procedures. The purpose of an audit procedure determines whether it is a risk assessment procedure, test of controls, or substantive procedure. If the auditor uses audit evidence from an audit procedure for more than one purpose, the auditor should design and perform the procedure to achieve each of the relevant objectives. ^{7B}

^{7B} AS 2110 establishes requirements regarding the process of identifying and assessing risks of material misstatements of the financial statements. AS 2301 establishes requirements regarding designing and implementing appropriate responses to the risks of material misstatement, including tests of controls and substantive procedures.

Inspection

.15 Inspection involves examining information records or documents, whether internal or external, in paper form, electronic form, or other media, or physically examining an asset. Inspection of information records and documents provides audit evidence of varying degrees of reliability, depending on ~~its~~ their nature and source. ^{7C} ~~and, in the case~~ In addition, the reliability of internal records and documents information produced by the company, or external information maintained by the company, also depends on the effectiveness of the controls over their that information production, including, where applicable, information technology general controls and automated application controls. ^{7D} An example of inspection used as a test of controls is inspection of records for evidence of authorization.

^{7C} See paragraph .08 of this standard.

^{7D} For situations involving information in electronic form, see AS 2301.17.

Recalculation

.19 Recalculation consists of checking the mathematical accuracy of information documents or records. ~~Recalculation may be performed manually or electronically.~~

Analytical Procedures

.21 Analytical procedures consist of evaluations of financial information made by an analysis~~a study~~ of plausible relationships among both financial and nonfinancial data that can be external or company-produced. Analytical procedures also encompass the investigation of significant differences from expected amounts. Unlike tests of details, analytical procedures generally do not involve evaluating individual items included in an account or disclosure, unless those items are part of the auditor's investigation of significant differences from expected amounts.¹¹

¹¹ Paragraphs .46-.48 of AS 2110, establish requirements regarding performing analytical procedures as risk assessment procedures. AS 2305, *Substantive Analytical Procedures*, establishes requirements regarding ~~on~~ performing analytical procedures as substantive procedures. Paragraphs .05-.09 of AS 2810, *Evaluating Audit Results*, establish requirements regarding performing analytical procedures in the overall review of financial statements.

AS 2301, The Auditor's Responses to the Risks of Material Misstatement

Substantive Procedures

.37A When the auditor establishes and uses criteria to identify items for further investigation,^{17A} as part of designing or performing substantive procedures, the auditor's investigation should consider whether the identified items:

- a. Provide audit evidence that contradicts the evidence on which the original risk assessment was based;
- b. Indicate a previously unidentified risk of material misstatement;
- c. Represent a misstatement or indicate a deficiency in the design or operating effectiveness of a control; or
- d. Otherwise indicate a need to modify the auditor's risk assessment or planned audit procedures.

Note: Inquiring of management may assist the auditor with this consideration. The auditor should obtain audit evidence to evaluate the appropriateness of management's responses.

^{17A} For example, an auditor may identify balances or transactions that contain a certain characteristic or that are valued outside of a range.

APPENDIX 2: CONFORMING AMENDMENTS TO RELATED PCAOB STANDARDS

In connection with the proposed amendments, the Board is proposing amendments to several auditing standards to conform to the requirements of the proposed amendments. Language that would be deleted by the proposed amendments is ~~struck through~~. Language that would be added by the proposed amendments is underlined. The presentation of proposed amendments to PCAOB standards by showing deletions and additions to existing sentences, paragraphs, and footnotes is intended to assist the reader in easily comprehending the Board's proposed changes to the auditing standards. The Board's proposed amendments consist of only the deleted or added language. This presentation does not constitute or represent a proposal of all or of any other part of the auditing standard or interpretation as amended by this proposal.

The Board is requesting comments on all aspects of the proposed amendments.

Other PCAOB Standards Proposed to Be Amended

PCAOB Standard	Paragraph(s)	Subject Heading of Paragraph Affected	Action(s)	Page(s)
AS 1105, <i>Audit Evidence</i>	.A8	Appendix A – Using the Work of a Company's Specialist as Audit Evidence.	Make conforming amendment to footnote 5	p.A2-2
AS 2110, <i>Identifying and Assessing Risks of Material Misstatement</i>	.48	Performing Analytical Procedures	Make conforming amendment to footnote 27	p.A2-2
AS 2305, <i>Substantive Analytical Procedures</i>	.02	N/A	Make conforming amendment	p.A2-3
AS 2501, <i>Auditing Accounting Estimates, Including Fair Value Measurements</i>	.12	Testing Data Used	Make conforming amendment	p.A2-3
AS 2501	.13	Testing Data Used	Make conforming amendment	p.A2-3

AS 1105, *Audit Evidence*

Appendix A – Using the Work of a Company’s Specialist as Audit Evidence

.A8 The auditor should:

- a. Test the accuracy and completeness of company-produced data used by the specialist,⁴ and evaluate the relevance and reliability⁵ of data from sources external to the company that are used by the specialist;

⁴ See paragraph .10 of this standard.

⁵ See paragraphs .07, ~~and .08,~~ and .10A of this standard.

AS 2110, *Identifying and Assessing Risks of Material Misstatement*

Performing Analytical Procedures

.48 When performing an analytical procedure, the auditor should use his or her understanding of the company to develop expectations about plausible relationships among the data to be used in the procedure.²⁷ When comparison of those expectations with relationships derived from recorded amounts yields unusual or unexpected results, the auditor should take into account those results in identifying the risks of material misstatement.

²⁷Analytical procedures consist of evaluations of financial information made by an analysis-a study of plausible relationships among both financial and nonfinancial data that can be external or company-produced, see AS 1105.21.

AS 2305, *Substantive Analytical Procedures*

.02 Analytical procedures are an important part of the audit process and consist of evaluations of financial information made by an analysis—a study of plausible relationships among both financial and nonfinancial data that can be external or company-produced. Analytical procedures range from simple comparisons to the use of complex models involving many relationships and elements of data. A basic premise underlying the application of analytical procedures is that plausible relationships among data may reasonably be expected to exist and continue in the absence of known conditions to the contrary. Particular conditions that can cause variations in these relationships include, for example, specific unusual transactions or events, accounting changes, business changes, random fluctuations, or misstatements.

AS 2501, *Auditing Accounting Estimates, Including Fair Value Measurements*

Testing Data Used

.12 AS 1105 requires the auditor, when using information produced by the company as audit evidence, to evaluate whether the information is sufficient and appropriate for purposes of the audit by performing procedures to (1) test the accuracy and completeness of the information or test the controls over the accuracy and completeness of that information, including, where applicable, information technology general controls and automated application controls, and (2) evaluate whether the information is sufficiently precise and detailed for purposes of the audit.¹³

¹³ See AS 1105.10.

.13 If the company uses data from an external source, the auditor should evaluate the relevance and reliability of the data in accordance with AS 1105.¹⁴

¹⁴ See AS 1105.07-.08 and .10A. Appendix B of AS 1105 describes the auditor's responsibilities for obtaining sufficient appropriate audit evidence in situations in which the valuation of an investment is based on the investee's financial results.
