



# INSTRUCTIONS FOR SCIENTIFIC AND TECHNICAL REVIEW PANELS

## Function of the STRPs

OSAC Scientific and Technical Review Panels (STRPs) are vital to OSAC's mission of generating and recognizing scientifically sound standards for producing and interpreting forensic science results. STRPs provide critical and knowledgeable reviews of draft standards or revisions of standards.

STRPs prepare a draft report containing written feedback for the originating Subcommittee (SC) or Interdisciplinary Committee (IC.) After taking into account any Subcommittee responses or revisions to the standard, they issue a final report on the standard. The standard and final report are published to allow members of OSAC and the general public to comment on the standard prior to review, potential revisions, and approval by the SDO.

## Criteria for the Review

Forensic science standards are expected not only to inform scientists and technicians how to proceed in reaching results that will be of value to the legal system, but also to inform other participants in the legal system how results have been reached to build trust and confidence in the integrity of the findings. As such, the standards have more than one set of potential readers, and they must be drafted and developed with the needs of each group in mind. The writing throughout the standard should be clear, concise, linguistically correct, and free of unnecessary jargon. Consequently, STRPs are constituted to have the range of expertise to consider 1) how well a standard meets the needs of the forensic science, law enforcement, and legal communities, and 2) to recommend improvements to the standards under review.

### *Scientific and Technical Merit*

OSAC-approved standards must have strong scientific foundations so that the methods that practitioners employ are scientifically valid, and the resulting claims are trustworthy. In addition, standards for methods or interpretation of results must include the expression and communication of the uncertainties in measurements or other results.

The STRP must review the relevant scientific literature cited in the standard under review to verify that:

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- The standard describes a method for reaching results that is well grounded in theory and supported by scientific studies demonstrating that the results are fit for their intended use.
- The method is sufficiently complete, standardized, and capable of producing repeatable, reproducible, and accurate results for the uses described in the standard.
  - There must be sufficient evidence of the reliability of the method or procedure—that it produces consistent results across instruments, examiners and laboratories when used to analyze items like those encountered in casework.
  - If specialized software is used, it should be tested and validated according to accepted software engineering standards.
  - The method accuracy must be estimated, and the estimate should be supported with scientific studies. If no such studies are available, this limitation should be clearly articulated in the standard. For methods that involve detection and interpretation of features, the probative value of the features used must be stated and supported with scientific studies. If no such studies are available, this limitation should be clearly articulated in the standard.

Furthermore, the STRP should verify that the standard includes references to peer-reviewed and readily available scientific publications that (i) support its description, guidelines or requirements; (ii) establish the validity of the assumptions behind the scientific tests and the interpretations of their results; and (iii) indicate the accuracy of measurements and inferences that are part of the method. The standard should cite studies that support its requirements, guidance and claims, and link these references to the specific claims.

### *Human Factors*

All forensic science methods rely on human performance in acquiring, examining, reporting, and testifying to the results. In the examination phase, some standards rely heavily on human judgment, whereas others rely more on properly maintained and calibrated instruments and statistical analysis of data.

The STRP should verify that:

- The standard articulates a proper basis for analysis. It must clearly state what factors an examiner should consider when reaching results. If examiners are expected or allowed to consider information beyond the characteristics of the physical or digital evidence submitted for examination (such as investigative facts of the underlying case), the standard should clearly state how and when examiners should access that information and what disclosures examiners should make when they rely on such information.
- The standard describes steps to reduce potential contextual bias (e.g., unwanted influence of task-irrelevant information).
- The standard explains the effects of operator skill and other human factors on measurements.

### *Quality Assurance*

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Quality assurance covers a broad range of topics. For example, a method must include quality assurance procedures to ensure that sufficiently similar results will be obtained when the methodology is properly followed by different users in different facilities.

The STRP should verify that:

- The standard states any environmental conditions that must be present for the method to perform as described in the studies underlying its scientific basis.
- The standard contains requirements for sample handling, preparation, preservation, and storage.
- The standard specifies appropriate positive and negative controls and defines specific criteria for controls to ensure the quality of test results (e.g., frequency of control measurements).
- The standard clearly describes any calibrations or checks of equipment that need to be employed before or during sample analysis.

### *Scope and Purpose*

Standards should have a short statement of their scope and purpose. They should list the topics that they address and the related topics that they do not address. Requirements, recommendations, or statements of what is permitted or prohibited do not belong in this section.

The STRP should verify that these requirements have been met and that

- The title is consistent with the stated scope and purpose.
- The standard stays within its stated scope.
- The scope statement specifies why, and in what situations the standard should be used.

### *Terminology*

Standards should define terms that have specialized meanings. Only rarely should they give a highly restricted or specialized meaning to a term in common use among the general public. The STRP should verify that:

- Common English words are used according to their ordinary meanings.
- Terms that have specialized legal meanings are used according to those meanings unless there is a particular reason for departing from that usage.
- All specialized terms, acronyms, and abbreviations are defined.
- If the standard refers to external definitions of terms, the reference includes the author, title, and date. Hyperlinks alone are insufficient.
- All the terms in the terminology section appear elsewhere in the standard.

### *Method Description*

There is no simple rule as to the necessary level of detail in the description of the method. Some

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parts of the method may be performed in alternative ways without affecting the quality and consistency of the results. Standards should focus on standardizing steps that must be performed consistently across organizations to ensure equivalent results. Alternatively, standards can define specific performance criteria that are required to be demonstrated and met rather than specifying the exact way a task must be done. For example, it may be enough to specify the lower limit for detecting a substance without specifying the equipment or method for achieving this limit of detection.

Methods must not only be well described, scientifically sound, and comprehensive but also lead to reported results that are within the scope of the standard, appropriately caveated, and not overreaching.

The STRP should verify that

- The standard has as little ambiguity as possible; it may need to warn against unintended interpretations by readers who are not already familiar with the method and the field.
- The standard presents the steps in sufficient detail to lead to reproducible results.
- The standard enumerates any specific factors or data that need to be recorded to ensure repeatability of results.
- The standard clearly states known limitations of the method or the interpretation of results.
- The standard specifies the limitations on when the tests should be performed and when the results are suitable for further interpretation or use.

### *Reporting Results*

The STRP should verify that:

- The standard makes clear what kinds of statements should and should not be made to express the results. The statements of results and their interpretation that will be made in reports and testimony must be appropriate in light of what is known about their reliability and accuracy.
- The standard provides for estimates and expressions of the uncertainties in all qualitative and quantitative measurements. All measurements are subject to various sources of both random and systematic error. For example, calibration procedures are not perfect, and materials are always heterogeneous at some level.
  - The potential magnitude of errors in any measurement must be assessed and reported so that the measurement can be used for informed decision-making. The standard should provide adequate guidance on how to estimate the uncertainty of the measurements or point to another document that does.
  - Statistical methods can be used to estimate and express measurement uncertainty. The assumptions underlying the statistical analysis should be clearly stated, and the sensitivity of the estimates to plausible alternative assumptions should be considered.
- If the standard provides for a binary decision or other classification, it includes guidance

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on expressing the accuracy of the decision or classification method (or conversely, the risk of the wrong decision or classification).

- Estimates of accuracy (such as the sensitivity and specificity of a classification) are subject to uncertainty from sampling and other limitations. Numerical examples of computations of the estimates along with associated uncertainties may be desirable in the standard. The standard should offer guidance on how to describe the populations and samples used to estimate risk of error. When samples come from a particular population, the standard should clearly characterize the population and indicate limitations in the interpretation that result from the use of that population.
- If the standard includes opinions or interpretations, it provides guidance to ensure that the opinions or interpretations are not overstated and are understandable to lay individuals. Any standard including opinions and interpretations should include references to peer-reviewed or other literature on the estimates of accuracy mentioned in the preceding paragraph or, if the method uses likelihood ratios for interpretation, it should include the expected rates of misleading likelihood ratios or other similar measures of performance.

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