E-reporting and E-monitoring Intersessional Working Group

Considerations for a WCPFC EM Program Audit and Assurance Process

9 September 2026

Discussion paper by the ERandEM IWG Chair

Purpose

1. As referenced in Circular 2026/86, the purpose of this paper is to outline a proposed process and potential scenarios for a WCPFC EM Program audit and assurance process. These proposed processes are based on discussions and feedback both intersessionally and through meetings of the ER&EM IWG.

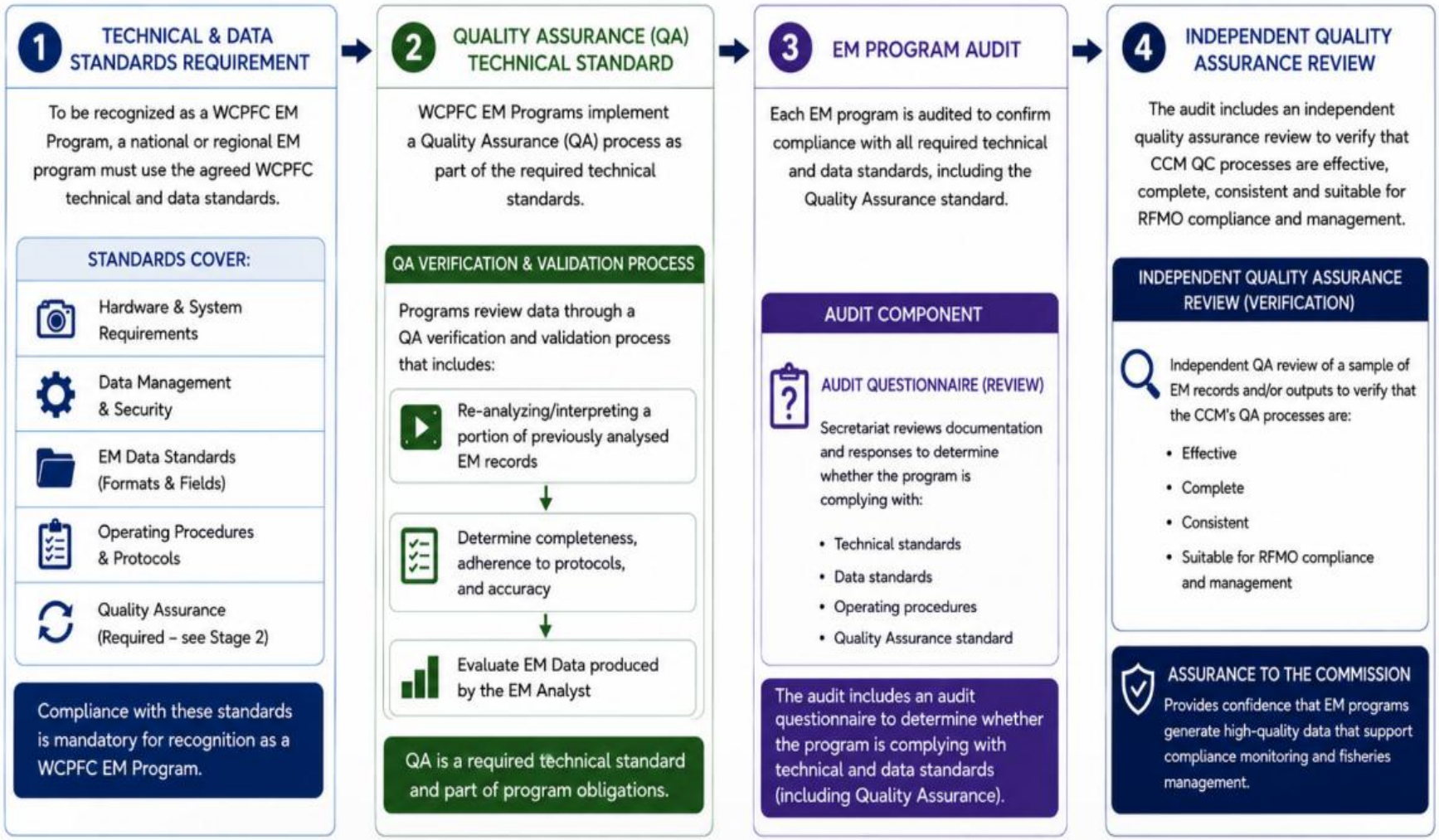
Background

2. Discussions on the audit process to date have focused largely around developing an audit process that is like that of the current WCPFC ROP audit process. During the eighth ER&EM IWG members agreed that audits should be conducted by the WCPFC Secretariat, given their responsibility for accrediting national ROP programs.
3. Regarding the assurance process, during the ninth ER&EM IWG meeting, participants highlighted the importance of distinguishing between two different forms of quality assurance processes for EM data. The first type of quality assurance was described as a process to review data quality within a national or regional EM program, analogous to debriefing or a quality assurance/quality control (QA/QC) process used in observer programs, intended to test the accuracy and consistency of data following the EM records analysis (primary review). This process would include re-analysing or interpreting a portion of previously analysed EM records to determine completeness, adherence to protocols, and accuracy of the EM data produced by the EM analyst. The second type of quality assurance was described as an independent review of some portion of EM data, which should be conducted by or under the authority of the Secretariat (e.g. through some independent third party) to verify the accuracy of the data.
4. This paper is intended to bring together the different pieces of outstanding decisions on the audit and assurance process in a way that lays out the logical order and overlapping process for each.
5. The paper is split into 4 sections:

    - Proposed modifications to the WCPFC Interim EM Standards to capture data quality assurance requirements
    - Proposed process and outstanding decisions regarding an audit process

- Proposed audit questionnaire
- Proposed process for data quality assurance through an independent review of EM data

The idea behind this format is to try to show how the elements of the EM audit and assurance framework relate to and depend on one another.


1
TECHNICAL & DATA STANDARDS REQUIREMENT
To be recognized as a WCPFC EM Program, a national or regional EM program must use the agreed WCPFC technical and data standards.
STANDARDS COVER:
Hardware & System Requirements
Data Management & Security
EM Data Standards (Formats & Fields)
Operating Procedures & Protocols
Quality Assurance (Required – see Stage 2)
Compliance with these standards is mandatory for recognition as a WCPFC EM Program.
2
QUALITY ASSURANCE (QA) TECHNICAL STANDARD
WCPFC EM Programs implement a Quality Assurance (QA) process as part of the required technical standards.
QA VERIFICATION & VALIDATION PROCESS
Programs review data through a QA verification and validation process that includes:
Re-analyzing/interpreting a portion of previously analysed EM records
Determine completeness, adherence to protocols, and accuracy
Evaluate EM Data produced by the EM Analyst
QA is a required technical standard and part of program obligations.
3
EM PROGRAM AUDIT
Each EM program is audited to confirm compliance with all required technical and data standards, including the Quality Assurance standard.
AUDIT COMPONENT
AUDIT QUESTIONNAIRE (REVIEW)
Secretariat reviews documentation and responses to determine whether the program is complying with:
Technical standards
Data standards
Operating procedures
Quality Assurance standard
The audit includes an audit questionnaire to determine whether the program is complying with technical and data standards (including Quality Assurance).
4
INDEPENDENT QUALITY ASSURANCE REVIEW
The audit includes an independent quality assurance review to verify that CCM QC processes are effective, complete, consistent and suitable for RFMO compliance and management.
INDEPENDENT QUALITY ASSURANCE REVIEW (VERIFICATION)
Independent QA review of a sample of EM records and/or outputs to verify that the CCM's QA processes are:
Effective
Complete
Consistent
Suitable for RFMO compliance and management
ASSURANCE TO THE COMMISSION
Provides confidence that EM programs generate high-quality data that support compliance monitoring and fisheries management.

Proposed modifications to the WCPFC Interim EM Standards to capture data quality assurance requirements

6. This first type of data quality assurance, the review for data quality within the national or regional EM program, is proposed to be included in the EM technical standards as Standards, Specifications, and Procedures (SSP) for EM Records Analysis and Quality Assurance. This proposal was circulated to members originally on 22 June 2026. The technical standards, including the proposed SSPs, are included for review here as attachment (ii) to the Circular.
7. Under this proposed SSP, EM records analysis is the process of an EM Analyst reviewing EM records to generate EM Data. A review for data quality is the verification and validation process of re-analysing/interpreting a portion of previously analysed EM records to determine completeness, adherence to protocols, and accuracy of the EM Data produced by the EM Analyst. The proposed standards are outlined in the table included below:

Requirement	**SSP**
1. EM Records Analysis and Development of EM Data	a. The EM Analysts MUST analyze EM Records in accordance with the Flag State's Longline EM Minimum Data Field Standards, Instructions and Protocols. b. The EM Programme MUST ensure that the EM records are analysed in accordance with the coverage and analysis rates as determined by the WCPFC.

2. EM Data Quality Review for Quality Assurance	a. The EM programme MUST establish a data quality review process and the EM data quality review MUST be conducted by a person other than the primary EM analyst. b. The EM Data Quality Reviewer SHOULD conduct the systematic quality assurance review by re-analysing/interpreting a stipulated proportion of the EM Data generated by the EM Analyst, including consideration of coverage and (field) completeness. c. The EM data quality reviewer SHOULD conduct a systematic quality assurance review through a blind assessment of a randomly selected proportion of EM records. d. EM data quality reviews of complete trips (or sets) SHOULD be conducted for [5][10] % trips in a fishery, unless the EM program demonstrates that initial EM analysis is being completed with high accuracy, requiring less frequent review for data quality in that fishery.
3. QA: Validation of EM Data with Other Sources	The following other sources of independent fishing data can either indicate misreporting issues in the vessels or observer's data, or that there has been inaccuracy in the EM data collected. Cross-validation is important to determine whether there is a need to verify the accuracy of EM data. Validation can be performed on EM Data using the following analogous, independent sources: a. VMS COULD be used to compare time and position information. b. Where available, significant discrepancies between eLogs, observer reports, and EM data SHOULD trigger verification to determine the cause, including potential misreporting of catch or species data, inaccuracies in EM data, or other compliance issues." d. Where available, significant discrepancies between catch retained or offloaded during unloading, transshipment, boarding, and port inspection reports SHOULD trigger verification to determine cause, including potential misreporting or inaccuracies in EM data." e. Automated AI analysis COULD be used to identify discrepancies between EM data and other sources where applicable.

8. Member feedback on the proposed SSP for EM Records Analysis and Quality Assurance focused on establishing appropriate obligation levels ("MUST" versus "SHOULD") while balancing regional oversight with national program flexibility. To improve clarity and reduce administrative burdens, members recommended streamlining overlapping sections, standardizing terminology, and refining protocols for recording compliance-related events. Rather than relying solely on commission-wide targets, there was strong support for allowing national programs to tailor data quality review rates and timeframes based on performance accuracy and risk. Furthermore, members emphasized that quality assurance processes should evaluate complete data sets through blind reviews to maintain overall data integrity. Building on these discussions, members agreed to mandate that the EM program must establish a formal data quality review process, and that this data quality review must be conducted by a qualified individual other than the primary EM analyst.
9. Based on member feedback to date, I would like to propose that we agree to include this SSP for EM Records Analysis and Quality Assurance in the EM technical standards.

Proposed process and outstanding decisions regarding an audit process

10. Much of what has been discussed regarding a WCPFC EM Program audit process has already been worked through in the context of the WCPFC ROP. While the suggestion is not to replicate the ROP audit process exactly, because of the operational differences between EM and the ROP, there is a great deal to learn from its design, particularly where the ROP model has worked well for CCMs.
11. During the eighth ERandEM IWG members agreed that audits should be conducted by the WCPFC Secretariat, given their responsibility for accrediting national ROP programs. While the ROP audit model operates on a five-year cycle, many members expressed concern that this interval may be too long to adequately address the rapid pace of change in EM technology. Broad support was expressed for a three-year audit cycle, with members also noting the potential value of allowing audits to be requested earlier where significant program modifications or expansion occur. Regarding audit modality, members expressed strong support for an initial in-person audit at the EM review center. An in-person audit would enable auditors to inspect workstations and workflows, assess data safeguards and review processes, verify the EM analysis process, examine sample EM data, and directly assess camera image quality. It was also suggested that the initial program accreditation audit could be required to include an in-person component, while subsequent audits could potentially be conducted through other modalities, as appropriate. Members acknowledged that the appropriate modality and frequency of audits require further consideration.
12. Based on feedback and discussions in the IWG, I would like to propose that the Secretariat be tasked with undertaking the audit process and that the audit process includes the use of an audit questionnaire to confirm programs are implementing the standards adopted by the Commission. This would be similar to the process that has been adopted for the ROP.
13. The Secretariat has developed a paper outlining indicative EM Program audit requirements and associated cost estimates, which are based largely on the existing ROP audit process. That full paper is included for review here as attachment (iii) to the Circular. Using a similar approach

as the ROP, the EM Programme audit would involve an estimated 16–20 consultant days, including pre-audit review and preparation, travel, an in-country audit, and post-audit assessment and reporting. Prior to the audit, the auditor would review the CCM's EM policies, procedures, technical specifications, equipment requirements, and data management arrangements and prepare an audit checklist. A 4–5 day in-country audit would include meetings with programme and technical staff, examination of EM equipment and systems, assessment of data handling and security arrangements, and observation of how EM data and video are received, reviewed, stored, and reported, with the CCM providing a dedicated contact to facilitate access and information. Following the audit, the auditor would review supporting information, follow up on outstanding matters, prepare a draft report for CCM comment, and finalize the audit report, with the overall time required varying depending on the size, complexity, and documentation of the EM Programme and any issues identified.

14. During the audit, the CCM would be expected to nominate a dedicated contact person who is available throughout the audit period to coordinate meetings, facilitate access to relevant programme staff, EM systems and equipment, and provide or obtain any documentation or information requested by the auditor.
15. The Secretariat has estimated that approximately $14,300 to $22,700 USD per initial EM Programme audit would be reasonable, noting that travel to some Pacific Island CCMs could push an individual audit towards the upper end of the range.
16. There are also several outstanding issues related to the audit process that require further discussion, including the following:

    - Frequency of audit
    - In person or virtual audit or some combination of the two
    - How and where to record findings of the audit
    - Use of artificial intelligence for EM record analysis

Outstanding Issue	Considerations	Points for Discussion
Substantive — what the framework needs to contain or produce		
Audit Frequency	How often should the audits occur?	Discussion is needed on the frequency by which the audits should occur once an EM program has been accredited. The ROP experience may usefully inform this. Should reaccreditation occur yearly, every five years, or on some other cycle. Cost and resource information is a relevant factor throughout and should inform these discussions.
Audit modality	Remote versus in-person audits, whether an initial accreditation audit should differ from subsequent reaccreditation, and the cost implications of different models.	Discussion is needed on what would drive whether the audit is in person or remote. Participants could discuss whether in-person site visits should be required for every audit, or only for the initial audit, with subsequent audits capable of being satisfied through remote consultation and documentary evidence and, if so, what threshold or trigger would bring a program back into needing an in-person visit.
Recording outcomes and consequences of findings	What happens after an audit occurs? Are the results of the audit made available? What follows a finding of deficiency in an audit, including corrective action periods?	CCMs need to discuss how audit findings should be reflected and communicated, and what happens if the auditor finds that a program does not meet all the standards at the time the audit is undertaken. This includes settling on a categorization approach and clarifying the consequences that follow from a finding, including any corrective action period. The ROP provides a 90-day corrective action period.

Use of artificial intelligence for EM record analysis	What frameworks, technical standards, and verification mechanisms should be established to independently assess and validate the accuracy, reliability, and precision of artificial intelligence and machine learning tools implemented by CCMs during the *EM records analysis*?	Recognizing that artificial intelligence and machine learning tools are increasingly likely to be employed by EM programs in the future, it was suggested that the audit questionnaire, under the data review center systems and processes, include explicit reference to this technology and that the audit framework should be designed to accommodate this development.

Proposed audit questionnaire

17. First introduced at the Seventh ERandEM IWG meeting, the audit questionnaire has undergone several revisions to improve its alignment with the intended purpose and scope of the EM program audit. In its initial form, the questionnaire included a range of questions focused on specific operational and technical elements. Through subsequent discussions, members recognized the need to shift toward a more program-level approach that assesses whether programs have implemented appropriate systems, processes, and controls to ensure that the applicable technical standards are consistently met. Members also agreed that EM data reporting timelines are more appropriately addressed through the development of the EM CMM, rather than through the audit framework itself. As a result, the previous reference to a 120-day EM data reporting requirement was removed from the questionnaire. This change is intended to maintain a clear distinction between the functions of the audit process, namely, assessing program compliance with applicable technical standards and the development of binding requirements governing EM data reporting.
18. Most recently, the questionnaire was restructured to establish a direct and transparent relationship between individual audit questions and the mandatory "MUST" requirements contained in the applicable SSPs. This structure is intended to make clear which requirements are being assessed, how compliance is to be demonstrated, and how audit findings relate to the underlying standards. The revised format is expected to enhance consistency and transparency in the application of the audit framework, while also improving the questionnaire's clarity and usability for CCMs, EM programs, and auditors. This updated audit questionnaire is included alongside this document for review.
19. There are two outstanding issues related to the audit process that require further discussion, including the following:

    - Who will complete the audit questionnaire, the program or the auditor?
    - Details to be provided in response to the audit questionnaire.

Outstanding Issue	Considerations	Points for Discussion
Substantive — what the framework needs to contain or produce		
Completion of the audit questionnaire	Will the program complete the questionnaire, or will the auditor complete the questionnaire?	With the new questionnaire format, the expectation is that the program would provide documentation in response to audit questions and the auditor will review and record findings. This could also be somewhat dependent upon whether the audit is in-person or online.
Details to be provided in response to the audit questionnaire	Will the review include only documentation, or some further evaluation of actual systems or data?	Discussion previously has centered around what level of information will be reviewed during the audit process and whether the audit would include a review of documentation and processes, or whether it might also include screenshots of EM records. This issue could be alleviated with the below proposed quality assurance process to be included in the audit process.

Proposed process for data quality assurance through an independent review of EM data

20. The second type of data quality assurance discussed by the IWG was described as an independent review of some portion of EM records, which should be conducted by or under the authority of the Secretariat to verify the accuracy of EM records previously reviewed and analyzed by the EM program.
21. During the ninth ERandEM IWG, CCMs emphasized that any Secretariat assurance role should be practical and proportionate and account for legal and confidentiality constraints that may prevent routine sharing of EM records. Accordingly, support was expressed for Secretariat-led independent review to occur through periodic audits, potentially conducted within a CCM's own data review center environment, rather than requiring transmission of EM records to the Secretariat.
22. There was some support expressed for the idea of a limited data quality review function to be included within the Secretariat's audit role. Support was shown for a model under which the Secretariat, during periodic program audits, could review a sample of EM records or associated outputs to assess matters such as camera placement, video quality, system functionality, and the accuracy of EM data. It was suggested that such an approach could strengthen confidence in the quality and impartiality of EM data while avoiding the cost and confidentiality implications of standing up a separate Secretariat review process. It was also noted that the scale and frequency of any such review could be adjusted over time and revisited once there is more experience with implementation.
23. In considering feedback from the IWG, I would like to propose the following process for consideration by the IWG.
24. The Secretariat could perform a targeted, risk-based independent quality assurance review to verify that CCM QC processes are effective, complete, consistent and suitable for RFMO compliance and management. The proposed process outlined below explicitly avoids duplicating routine CCM EM records analysis and review for data quality processes or establishing a resource-intensive external independent processing and review operation. Instead, Secretariat efforts could focus on targeted validation, risk-based sampling, and performance assessments of CCM quality control systems.

Proposed Scope of Assurance Review Objectives

25. The Secretariat evaluates sampled fishing sets by re-analyzing raw EM records and comparing them against primary CCM reviewer logs to ensure compliance across two main categories:

    i. **Primary Review and Data Consistency**
    - **Species Identification Accuracy:** Correct classification of target catch, bycatch, and species of special interest (SSI).
    - **Catch vs. Discard Differentiation:** Precise distinction between retained catch, discarded target species, and unwanted bycatch.
    - **Compliance Event Identification:** Verification that primary reviewers accurately report operational requirements and proper

handling of SSI.

- **Data Transcription and Formatting:** Accurate transfer of counts, timestamps, and geolocation coordinates, etc. into standardized WCPFC data formats.
- **Detection of Compliance & Handling Events (SSP 14):** Independent confirmation that crew operations align with approved Vessel Monitoring Plan (VMP) catch-handling protocols (e.g., keeping catch within camera view, proper handling/release of species).

ii. Video Quality and Technical System Integrity

a. **Video Resolution and Clarity (SSP 3):** Verification that footage meets or exceeds the mandatory 720p resolution threshold to enable accurate species identification.
b. **Geolocation Synchronization (SSP 4):** Integration of synchronized vessel GPS positions, dates, and timestamps directly onto EM records.
c. **Sufficient Field of View (SSP 3):** Verification that camera views completely capture all primary fishing activities, including gear hauling, fish sorting, deck processing, and discarding areas.**:** Confirmation that camera angles fully capture gear hauling, sorting, processing, and discarding areas.
d. **Visibility and Deck Environment (SSP 14):** Detection of obscured lenses, dirty camera glass, physical obstructions, or inadequate night deck lighting.
e. **Recording Continuity (SSP 1):** Detection of video gaps, dropped footage, or unplanned power loss events during active fishing operations.

Baseline Assurance Review

26. The Secretariat could conduct baseline assurance reviews using a **15 Discrete Set Model**. This model would target 15 discrete sets across **15 different vessels** to eliminate trip-level clustering bias (e.g., static weather, identical crews, fixed camera conditions (placement, dirty vs. clean, etc.), or single-EM analyst bias). Sampling 15 sets represent approximately one week of data for review.

a. Risk-Based EM Assurance Review

A risk-based EM assurance review is a targeted auditing strategy where independent oversight is directed toward the specific trips and fishing sets that carry the highest potential for non-compliance, environmental impact, or data error. Rather than reviewing all EM records equally or using purely random sampling, the Secretariat could use objective risk triggers to flag records for prioritized review.

High-Risk Flags include:

- **Species of Special Interest:** Reported or suspected interactions with sea turtles, marine mammals, seabirds, or non-target species.
- **Prohibited Species Handling:** Handling and discarding of prohibited species (e.g., oceanic whitetip or silky sharks).
- **High-Impact Operations:** At-sea transshipment events.
- **Spatial/Temporal Violations:** Unauthorized fishing within closed areas, marine protected zones, or boundary line incursions.
- **Data Discrepancies & Anomalies:** Significant or recurring discrepancies between EM records, logbooks, or observer reports; unusual catch/discard patterns; or large deviations from historical reporting.
- **Compliance History:** Vessels or programs with prior compliance concerns or unverified data submissions.

Flexibility for High-Risk Cases**:**

If flagged high-risk sets are drawn from fewer than 15 vessels, sampling from fewer vessels is fully acceptable to prioritize risk coverage over vessel spread.

27. The potential cost breakdown for this scenario is included in the table below:

Example Cost Scenario. EM Video & Imagery Sampling / Quality Check

EM Records Review (Interactive / Editable Cost Model)				
Review Task / Scope	**Number of Days**	**Daily Rate (USD)**	**Calculated Cost Min (USD)**	**Calculated Cost Max (USD)**
EM Records & Data Verification Review/Quality Check	**5**	$600 – $800	$3,000	$4,000

EM Records Review (Interactive / Editable Cost Model)				
Review Task / Scope	**Number of Hours**	**Hourly Rate (USD)**	**Calculated Cost Min (USD)**	**Calculated Cost Max (USD)**
EM Records & Data Verification Review/Quality Check	40	$75 – $100	$3,000	$4,000