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Mr Simon Lawrence
Manager, Analytics & Reporting
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Dear Simon

MODEL TEST PROCEDURES – CLAIMS LODGEMENT MODEL

Accident Compensation Corporation (**ACC** or **Client**) has developed a prototype version of the 'Claims Lodgement Model' (the **Model**), which uses historical data to produce probabilities which help to determine whether an ACC client's claim should be automatically accepted or needs to be processed by a person. The Model does not decline any claim.

Prior to the implementation of the Model into a live production environment, ACC has requested that Deloitte undertake certain test procedures on the model development, model validation, and data sourcing processes; and to re-perform a subset of calculations undertaken by the Model and to compare the results with the existing model validation testing. This is the **Purpose** of this engagement.

Findings

All issues raised during the course of our engagement have been resolved.

As part of this engagement, we completed the test procedures set out below on the Model. All issues identified by the process described below were presented to ACC, and where relevant, we discussed the rationale behind our conclusions. ACC has reviewed each issues raised, which have been resolved in one of the following ways:

- The Model has been updated in response to the issue raised; or
- Further clarification has been provided and the issue is considered resolved; or
- The Model Documentation has been updated to resolve the issue; or
- ACC acknowledges the issue and intends to incorporate the finding in the production version of the Model; or
- ACC considers that the issue raised relates to a matter of modelling practice or possible process improvement but considers the issue has no material impact on the Model outputs and that no change to the Model is required. ACC considers that issues in this category are not material.

We consider that all of the issues raised during the course of our engagement have been resolved in one of the ways described above.

Background

ACC has developed three versions of the Model:

- A '**prototype model'** (developed in SAS), which is the 'Model' that we have undertaken our agreed scope of work on;
- A '**test environment'** (developed in Excel), designed to replicate most of the functionality in the SAS version for demonstration and testing purposes; and
- ACC intends that a live version of the Claims Lodgement Model will be developed in a separate **Production version**, based on the logic and documentation contained in the prototype model.

The Production version of the Model is incomplete at the date of this report and is outside of the scope of this engagement. As a number of issues have been resolved on the basis that ACC intends to incorporate the finding into the Production version of the Model, ACC should consider additional testing prior to the implementation of the Production version of the Model.

The Procedures were undertaken on the following components, which collectively form the **Test Version** of the Model:

Model name:	Probability of Accept component
Version:	Prod 1.0.0
Date Stamp:	10 May 2018
Platform:	SAS version 9.3

Model name:	Complexity component
Version:	Prod 1.0.0
Date Stamp:	17 May 2018
Platform:	SAS version 9.3

Furthermore, a number of other models and processes feed into the Probability of Accept or Complexity components. This scope of work does not include testing these models or processes.

Our Approach

Our engagement was conducted in accordance with the scope and terms set out in our consultancy service order dated 8 May 2018.

(1) Procedures completed on the Test Version

We completed the following test procedures (the **Procedures**) on the Test Version:

1. Reviewed the Model Development and Testing Processes
   We discussed the approach that ACC has adopted to the model development process, including the extent of model validation testing undertaken.

2. Reviewed data sourcing processes
   We reviewed the data sourcing and transformation processes that support the Model, including any data cleansing processes, and any internal controls in place to support data quality. This included reviewing how the development team selected model parameters and how the parameter weightings were set.

3. Re-performance of claims data
   We selected a sample of claims and tested these claims against the business rules set out in the Model Documentation.

4. Reviewed any changes made as a result of the issues noted
   Where ACC made changes to the model logic, data or the Model Documentation, we discussed the proposed action by ACC.

5. Reviewed the selected development methodology.
   We reviewed the methodology adopted and discussed with ACC other possible forecasting approaches.

6. Reviewed quality and completeness of the Model Documentation
   We reviewed the coverage and completeness of the model documentation (including process documentation, user guidance and business rules). ACC made updates to the Model Documentation based on our feedback provided.

7. Reviewed model governance environment
   We reviewed the key elements of the model governance environment that support the Model, and discussed possible improvements to processes or the governance environment to be considered in the Production version.

(2) Documentation Relied Upon

You have prepared the following Model Documentation that sets out:

- A description of the methodology adopted during model development.
- Key outputs from model development process (eg. user requirements, model specification and design).
- A summary of the results of the development and model validation testing.
- The 'business rules' that describe the intended logic for formulae in the Model.
- Existing and proposed internal controls and process controls.
- User guidance on how to operate the Model.

As part of the Procedures, we have made suggestions to improve the quality or completeness of the Model Documentation. You have updated the Model and/or Documentation, which we have relied upon to complete the Procedures.

Our Responsibility

Our responsibility is to report factual findings obtained from conducting the Procedures agreed.

The Procedures do not constitute either a reasonable assurance (audit) or limited assurance (review) engagement in accordance with the New Zealand Accounting Standards Board (NZASB) standards, and as such, we do not express any conclusion and provide no assurance on the Model outputs as part of this work. Had we performed additional procedures or had we performed a reasonable or limited assurance engagement in accordance with NZASB standards, other matters might have come to our attention that would have been reported to you.

We have not verified and do not provide any opinion on the accuracy or reasonableness of the assumptions explicitly or implicitly contained in the Model and all Model assumptions remain the responsibility of ACC.

Restrictions

The Procedures undertaken in this report are subject to the terms set out in our consultancy service order dated 8 May 2018, including the following restrictions.

- The Procedures undertaken did not include a review of the formulae or calculations contained within any model.
- The Procedures undertaken are limited to the extent of the Documentation provided. Where the Model Documentation was incomplete, unclear or lacking in detail, this may have limited the effectiveness of the Procedures.
- We did not check any of the inputs back to source documents.
- The Procedures set out above were performed on the static base case of the Model. We did not review any scenarios, undertake any sensitivity analysis or flex the value of any input assumptions.
- We considered and carried out our test Procedures on the Model on a standalone basis and treated external links to other models as input assumptions.

Restrictions on Distribution and Use of the Report

This report is intended solely for the use of the addressee for the Purpose. As the intended user of our report, it is for you to assess both the scope of the Procedures and our factual findings to determine whether they provide, in combination with any other information you have obtained, a reasonable basis for any conclusions which you wish to draw on the Model. Accordingly, we expressly disclaim and do not accept any responsibility or liability to any party other than the addressee for any consequences of reliance on this report for any purpose.

Limitations

Our Procedures were performed solely in respect of the Model using the base case assumptions. Consequently, and having regard to the various limitations that any model will have, additional or different issues may arise if the Procedures were to be applied to a Model under a different set of assumptions.

There will usually be differences between the forecast and actual results, because events and circumstances frequently do not occur as expected.

We have no responsibility to update this report for events and circumstances occurring after the date of this report. We have no responsibility for changes made to the Model.

Please contact us if you wish to discuss any aspect of this report in further detail or if we can be on any further assistance.

Yours sincerely

John Tan
Partner
for Deloitte Limited (as trustee for the Deloitte Trading Trust)