



RET 301

Actuarial Topics for  
Canadian Retirement Plans  
Comprehensive Summary

1<sup>st</sup> Edition

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An SOA Exam



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Since 1972

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# NOTES

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Welcome to your preparation journey for the SOA RET101 – Retirement Plan Design / RET201 – Retirement Plan Valuation / RET301 – Actuarial Topics for Canadian Retirement Plans.

This manual follows the official syllabus and presents each topic in a clear, focused manner to help you master the material with confidence and clarity. To complement your study, a set of accompanying flashcards is available for quick reviews, reinforcing key concepts, and keeping your knowledge fresh on the go.

While every effort has been made to ensure accuracy, I warmly welcome your thoughts, suggestions, or corrections at [actuarial613@gmail.com](mailto:actuarial613@gmail.com). Remember—steady progress, disciplined practice, and a willingness to challenge yourself are the keys to success. As a final suggestion, practice is essential. Among the most common reasons for failure, not taking past exams seriously ranks as the number one issue. Candidates are strongly encouraged to attempt the relevant past-year questions published officially by the SOA to maximize their chances of passing.

Best of luck with your studies!

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**CIA CONSOLIDATED STANDARDS OF PRACTICE**  
**SECTION 1000 - 1700**

**Feb 2024**

**SECTION 1110 APPLICATION**

1. Purpose: to serve the public interest.
2. Actuaries practicing in Canada are expected to comply with these Standards.
3. Professional judgment and user needs must still be considered—standards do not replace these.
  - a. The authority of the Standards comes from recognizing bodies (e.g., professional actuarial organizations and laws governing pensions and insurance).
  - b. Courts or tribunals may consider compliance with the Standards when reviewing actuarial work.
4. Deviation from the Standards does not automatically imply malpractice.

**SECTION 1120 DEFINITIONS**

1. See the actual document

**SECTION 1130 INTERPRETATION**

1. The Standards consist of:
  - a. Recommendations (boxed text with effective dates) - Highest level of guidance.
  - b. Explanatory text (definitions, explanations, examples, and useful practices) - Supports and expands on recommendations.
2. General standards apply to all actuarial practice areas.
3. Practice-specific standards sometimes override general standards explicitly (e.g., “Notwithstanding the general standards...”)

**SECTION 1140 – JUDGMENT**

1. Actuaries must exercise reasonable judgment:
  - a. Must be Objective
  - b. Considers the spirit of the standards, ethical conduct, common sense, and time/resource constraints.
2. Judgment is needed despite standards being understandable to laypersons.
3. Judgment must be assessed at the time it is made, not in hindsight.
4. A judgment based purely on personal belief is not reasonable.
5. There may be a range of reasonable assumptions; sometimes narrowed by practice-specific standards.
6. Importance of:
  - a. Spirit and intent of the standard.
  - b. Avoiding strained interpretations.
  - c. Rejecting outlandish or impractical outcomes as misinterpretations or inapplicability.
7. If time/resources are limited:
  - a. Work may deviate from full compliance, provided:
    - i. There's a balance with accepted practice.
    - ii. Materiality and approximations are considered.
    - iii. Disclosure is made to the user.

**SECTION 1150 ACCEPTED ACTUARIAL PRACTICE**

1. Work in Canada should conform to accepted actuarial practice, unless in conflict with:
  - a. The law or the terms of a proper engagement.
2. These standards are the primary articulation of accepted practice.
  - a. Additional guidance may include:
    - i. Educational notes
    - ii. Actuarial principles/literature
    - iii. Exposure drafts
    - iv. Historical records
    - v. Common actuarial practice (as long as not conflicting with the standards)

**SECTION 1160 SCOPE**

1. Standards apply to work in Canada.
  - a. If used beyond intended scope, the actuary should consider relevant circumstances.
2. Work in Canada vs. Another Country
  - a. Determined by the ultimate purpose of the work, not location of the actuary.
  - b. Examples of work in another country:
    - i. Valuations for foreign consolidated financials.
    - ii. U.S. tax or legal work.
    - iii. Work tied to another country's jurisdiction (e.g., U.S. courts or IRS rules).
  - c. In unclear cases (e.g., cross-border products), the actuary:
    - i. Should try to agree on appropriate standards with the user.
    - ii. If no agreement, should disclose implications.
3. Work Outside Canada
  - a. Best guidance is the accepted practice of the other country.
    - i. If lacking, Canadian standards (especially general standards) may be used.
    - ii. Actuary must consider legal and cultural differences.

**SECTION 1210 CONFLICT WITH LAW**

1. If actuarial practice conflicts with the law:
  - a. The actuary must comply with the law.
  - b. The actuary should report the conflict and, if feasible, also report the result per actuarial standards.
2. Reporting results under accepted actuarial practice is practical unless:
  - a. The effort is onerous, or
  - b. The necessary data is unobtainable.
3. A verbal description is better than no disclosure.
4. Disclosure is useful to:
  - a. Show the work deviates from standards.
  - b. Clarify the work is law-compliant, not standards-compliant.
  - c. Encourage eventual legal alignment with actuarial standards.
5. No conflict exists when law mandates a practice within the acceptable actuarial range.

**SECTION 1220 – CONFLICT WITH TERMS OF ENGAGEMENT**

1. If accepted practice conflicts with the engagement terms:
  - a. The actuary may comply with the terms.
  - b. Should disclose the conflict, and if appropriate, also report the result using accepted standards.
2. Applies to engagements where:
  - a. Work or assumptions are client-specified (e.g., external software, dictated assumptions).
3. Different from conflict with law; the actuary can decline such an engagement.
4. Reporting practicality/usefulness follows the same principles as in 1210.

### **SECTION 1230 – UNUSUAL AND UNFORESEEN SITUATIONS**

1. Deviation from standards is permitted when:
  - a. The situation is unusual/unforeseen, and
  - b. Standards are inappropriate.
2. Full reporting without reservation is expected.
3. Sometimes, it may be appropriate to describe and justify the deviation.
4. Actuaries are encouraged to inform the Actuarial Standards Board of such situations.

### **1240 – MATERIALITY**

1. Deviation from standards is allowed if the effect is not material.
2. “Material” is judged from the user’s point of view, based on:
  - a. Purpose of the work.
  - b. Likely effect on decision-making or expectations.
3. When no user-specified standard exists, the actuary must exercise judgment, considering:
  - a. Use of the work.
  - b. Differences among users or uses.
  - c. Reasonable expectations.
4. Examples of varying materiality:
  - a. Same dollar amount may be material for small entities but not large ones.
  - b. Materiality may differ between financial statements and forecasts.
  - c. More rigorous for individual benefit calculations than for group-level valuations.
  - d. More rigorous when work approaches regulatory thresholds.
5. Immaterial deviations usually don’t need to be reported unless it helps the user assess appropriateness.
  - a. Applies to both calculation and reporting standards.
6. Calculation Standards
  - a. Simplified methods are acceptable if differences are not material.
  - b. Don’t net material deviations across separately reported items.
  - c. Can net components within a reported item.
  - d. Materiality judgment is the same regardless of whether result is conservative or not.
7. Reporting Standards
  - a. If disclosure provides no useful information, it can be omitted.
    - i. E.g., changes affecting trivial member classes, or
    - ii. Immaterial plan provisions.

### **SECTION 1310 – ACCEPTING AND CONTINUING AN ENGAGEMENT**

1. Initial Acceptance - the actuary should
  - a. Agree on clear terms with the client/employer.
  - b. Ensure the engagement is appropriate.
  - c. Consult the predecessor actuary, if applicable, before acceptance.
2. Clarifying the Engagement
  - a. Clearly defined terms and expectations increase the likelihood of satisfactory results.
  - b. Engagement is likely appropriate if:
    - i. Practice-specific standards exist and are followed.
    - ii. The client selects assumptions (if disclosed and sourced).
    - iii. The actuary provides “what-if” or scenario analyses with disclosure.
  - c. Engagement is less appropriate if external users are denied the opportunity to question the actuary.
3. Confidentiality
  - a. may override disclosure if
    - i. It is for a legitimate business reason,
    - ii. Scope and duration are reasonable,

- iii. Exceptions (e.g., auditor/regulator access) are allowed.
- b. Not appropriate if confidentiality is used to:
  - i. Conceal improper conduct, or
  - ii. Withhold information users reasonably expect.
- c. Law or professional rules override confidentiality when required.
- 4. Issues Found During the Engagement
  - a. If new information arises that would have prevented acceptance:
    - i. Preferably renegotiate the engagement.
    - ii. If renegotiation is impractical and engagement is inappropriate, discontinue.
    - iii. Otherwise, report the impediment and its implications, both qualitatively and quantitatively.

#### **SECTION 1320 – FINANCIAL INTEREST OF THE ACTUARY**

- 1. The actuary's personal financial interest must not influence the results of their work.

#### **SECTION 1330 – FINANCIAL INTEREST OF THE CLIENT OR EMPLOYER**

- 1. Professionalism First
  - a. Client/employer financial interest must not bias the work.
  - b. Actuary's duty of professionalism overrides service to client/employer.
- 2. Engagement Context
  - a. It is acceptable to:
    - i. Calculate a range of results, then
    - ii. Collaborate with the client in choosing a point within that range.
  - b. Assumptions or methods selected by the client may be used if:
    - i. The engagement is appropriate, and
    - ii. The actuary discloses their use.
  - c. The purpose of the work can be shaped by client interests if disclosed.

#### **SECTION 1340 – GENERAL KNOWLEDGE**

- 1. The actuary must:
  - a. Have sufficient knowledge of the practice area.
  - b. In actuarial evidence work, know both the primary and evidence practice areas.
- 2. Relevant conditions include:
  - a. Legislation, accounting/tax standards, market conditions, family law, court practices.

#### **SECTION 1350 – KNOWLEDGE OF THE CIRCUMSTANCES AFFECTING THE WORK**

- 1. The actuary must consider:
  - a. The purpose, terms of the engagement, and relevant laws.
- 2. Relevant context includes:
  - a. Entity operations, industry, or acquisition/merger details.
  - b. For benefit plans: the plan itself and sponsor's financial health (if relevant).
  - c. For individual-level work: personal demographics and context.
- 3. Extra conservatism cannot substitute for proper understanding of the circumstances.

#### **SECTION 1410 – APPROXIMATION**

- 1. Definition and Appropriateness
  - a. Approximation is appropriate if it:
    - i. Reduces cost, time, or

- ii. Improves control without materially affecting the result.
- b. Approximation is common and pervasive, even if not explicitly named.
- 2. Reporting
  - a. Appropriate approximations: Report without reservation.
  - b. Doubtful appropriateness: Report with reservation to alert users.
  - c. Don't give unintended reservations in reports when approximation is appropriate.
- 3. Areas of Application
  - a. Model selection: Simpler models can reduce complexity and error risks.
    - i. Example: Adjust investment return assumption to indirectly allow for indexing.
- 4. Assumption simplification:
  - a. Assume all deaths occur mid-year instead of continuously.
  - b. Assume all retire at age 62 instead of using a retirement pattern.
  - c. Assume pre-retirement death rate = 0 if impact is negligible.
- 5. Data approximation: Use sampling or extrapolation when data are missing or defective.
- 6. Sampling: Reduces workload vs. full data review; valid if well-chosen.
- 7. Assumption vs. approximation
  - a. If you can't assess the error of an approximation, it effectively becomes an assumption.
- 8. Reporting Guidance
  - a. Don't need to report every approximation.
  - b. If reporting an implicit assumption used as approximation:
  - c. Also report the corresponding explicit assumptions.
- 9. Avoid approximations with doubtful appropriateness, unless necessary due to data/resource limitations.

## **SECTION 1420 – EVENT DECISION TREE**

1. A decision tree (not shown here) helps actuaries determine how to treat an event in their work depending on when the event occurred and its effect on the entity.

## **SECTION 1430 – SUBSEQUENT EVENTS**

1. General Rules
  - a. Correct errors or data defects revealed by a subsequent event.
  - b. Take the event into account if:
    - i. It gives info about the entity as it was at the calculation date.
    - ii. It retroactively changes the entity at the calculation date.
    - iii. The purpose is to report on the entity as it will be after the event.
  - c. Do not take the event into account if:
    - i. It makes the entity different after the calculation date, and
    - ii. The purpose is to report on the entity as it was.
    - iii. Still, disclose the event.
2. Classification
  - a. Relevant events include:
    - i. Errors or misstatements.
    - ii. Decisions that change the entity's nature.
  - b. Entities vary by engagement (e.g., pension plan, insurance block, individual entitlement).
3. Examples
  - a. Informative events about entity as it was:
    - i. Experience study published after the calc date.
    - ii. A claim incurred before but reported after.
    - iii. Plan amendment made before but known after.
  - b. Retroactive change events:
    - i. Plan wind-up decision dated before calc date.
    - ii. Plan amendment effective before calc date.

- iii. Legal decisions altering previous understanding.
  - c. If the event affects the entity at the calculation date, treat as if known before that date.
- 4. Events Making Entity Different After
  - a. If the event changes the entity after the calculation date:
    - i. Take into account if the purpose is to report on future state.
    - ii. Do not take into account if reporting on past state, but report the event.
- 5. Unclear Classification
  - a. Some events may be ambiguous:
    - i. Stock market crash: Could be a future event or a signal of past conditions.
    - ii. Salary freeze: Could reflect correction (past) or new change (future).
    - iii. Bond default or reinsurer insolvency: Depends on whether gradual or sudden.
- 6. Dual Reporting
  - a. Actuary may show both with and without the event for comparison (e.g., early retirement post-separation in pension valuations).
  - b. Same calculations, but reporting varies by purpose.

## **SECTION 1440 – DATA**

- 1. General Obligation
  - a. The actuary must determine whether the data used is sufficient and reliable for the purpose of the work.
- 2. Types and Sources of Data
  - a. Relevant data may include:
    - i. Experience data, census/membership data, claims, policy terms, investment info, economic or operational data.
  - b. Sources may be:
    - i. Provided by: client, auditors, government/statistics bodies, financial statements, or others.
    - ii. Can be obtained through: inventory, sampling, or direct collection.
  - c. If client-specific data is not available, consider industry/population/published data, adjusted if necessary.
- 3. Sufficiency and Reliability
  - a. Sufficiency: Data contains all needed elements (e.g., dates of birth for pension valuations).
  - b. Reliability: Data is complete, consistent, and accurate enough for the work.
- 4. Validation
  - a. Validation = testing sufficiency and reliability.
    - i. Actuary is not required to conduct a full audit or detect fraud.
  - b. If validation is prohibited by the engagement, report that limitation, and any obvious data issues.
  - c. Validation procedures may include:
    - i. Reconciliation with financials/books.
    - ii. Internal and external consistency checks.
    - iii. Comparison with past periods.
    - iv. Confirmation from independent sources.
    - v. Sampling techniques.
- 5. When Data is Insufficient or Unreliable
  - a. If data cannot be verified:
    - i. Attempt to rectify (e.g., obtain more data, make assumptions/adjustments).
    - ii. If unresolved: either Report with reservation, or Decline the work.
  - b. Rectification examples
    - i. Supplementary or corrected data.
    - ii. Reasonable assumptions for missing data.
    - iii. Adjustments to reconcile inconsistencies.
- 6. Reporting Requirements
  - a. If assumptions or adjustments may introduce material uncertainty or bias, the actuary must:
    - i. Disclose this risk.

- ii. Note any limitations on the use of the results.
- b. When using data from others:
  - i. Consider the qualifications, competence, integrity, and objectivity of the data provider.
  - ii. Examples: client staff, independent administrators, auditors, government entities, associations.

## **SECTION 1450 – MODELS**

1. If work involves a model, the actuary must:
  - a. Choose a model appropriate to the purpose and requirements of the work.
  - b. Understand limitations of the model that could:
    - i. Make results inappropriate for the intended purpose.
    - ii. Produce misleading outcomes.
2. Models and Standards
  - a. Models are pervasive in actuarial work, even when the term "model" is not explicitly stated in standards.
  - b. Models affect the application of most standards.
3. Level of Diligence depends On:
  - a. Influence on decision-making (primary factor).
  - b. Complexity and nature of calculations (secondary).
  - c. Expected benefit to users from added diligence.
4. Examples of required effort based on model type:
  - a. Minimal diligence (low risk/simple models):
    - i. Manual or easily replicable models.
    - ii. Models used solely to validate other models.
  - b. Repeated-use models:
    - i. Use same model spec/implementation with different inputs/assumptions.
    - ii. One-time full validation/documentation; later runs just record: Inputs used and the model version
  - c. High-risk or complex models require greater diligence in:
    - i. Validation
    - ii. Documentation
    - iii. Risk mitigation
5. When is a Model Considered Appropriate? A model is appropriate and used appropriately if:
  - a. Captures complex reality at reasonable cost while maintaining important features.
  - b. Model specification shows the model meets its intended purpose.
  - c. Model implementation is accurate per the specification.
  - d. Inputs and assumptions align with model specification.
  - e. Interpretation of results is consistent with how the model is specified.
6. Standard Actuarial Methods
  - a. Common actuarial methods are considered appropriate without further justification, when used in proper context. Examples:
    - i. Actuarial present value method (e.g., pension valuations).
    - ii. Chain ladder method and Bornhuetter-Ferguson method (e.g., unpaid claims liabilities).

## **SECTION 1460 – QUALITY ASSURANCE**

1. Applies to quality assurance (QA) processes initiated by the actuary, including:
  - a. Internal quality control (within firm/employer)
  - b. External review (outside firm/employer)
2. Mandatory Requirement
  - a. The actuary must implement appropriate QA processes *before releasing work to users*.
3. Factors for Determining Appropriate QA Processes
  - a. Complexity of the work and use of professional judgment

- b. Purpose of the work and the likelihood of user scrutiny
- c. Significance (financial, reputational, regulatory impact)
- d. User expectations
- e. Vulnerability to errors
- f. Novelty of the work or inexperience with similar engagements
- g. Legislative/regulatory peer review requirements
- 4. QA Process Types (may vary by work element) includes:
  - a. Calculation control procedures
  - b. Model validation (see 1470)
  - c. Review of calculation results (see 1480)
  - d. Self-checks
  - e. Repetition of work
  - f. Peer review
- 5. Peer Review
  - a. Peer review = One or more components of the work are reviewed by someone else to assure quality.)
  - b. Peer Reviewer Qualifications
    - i. Reviewer must have appropriate experience and expertise.
    - ii. If qualified to do the work, they are prima facie qualified to review it.
- 6. Independent Peer Review
  - a. Consider using independent peer review, defined as:
    - i. Reviewer is not involved in the original work.
    - ii. Reviewer has suitable expertise and can effectively challenge the work.
  - b. Enhances objectivity and credibility.
- 7. Role Clarification
  - a. When multiple people are involved in QA, clearly define roles and responsibilities of each participant.
- 8. Special Case – Actuarial Evidence
  - a. Peer review may be inappropriate or impractical in certain contexts.
  - b. Lack of peer review does not imply poor QA.
  - c. If independence is required (e.g., court work), peer review should be appropriately scoped so as not to compromise independence.

## **SECTION 1470 – CONTROL**

- 1. Purpose:
  - a. Ensure calculation errors are detected and mitigated.
  - b. Validate models to manage model risk.
- 2. Key Requirements:
  - a. Apply control procedures for calculations.
  - b. Perform model validation appropriate to the financial significance and complexity of the model.
- 3. When controls are especially important:
  - a. Data-intensive or complex calculations.
  - b. Calculations involving multiple steps or platforms (e.g., manual + automated).
  - c. To ensure consistency across work (e.g., uniform cut-off dates).
- 4. Examples of control procedures:
  - a. All calculation steps are coordinated, completed, and checked.
  - b. Avoid unintended changes to established procedures.
  - c. Data processing does not corrupt inputs.
- 5. Examples of control tools: Random sampling, Spot checks, Audit trails.
- 6. Model Testing:
  - a. Test implementation to ensure it matches the model specification.
  - b. Validate methods and inputs.
  - c. Compare outputs with alternate or simplified models for reasonableness.

7. Considerations for third-party models:
  - a. Strategies are still needed even if access to internals is limited.

### **SECTION 1480 – REASONABLENESS OF RESULT**

1. Purpose:
  - a. Detects errors not caught by step-by-step checks (e.g., from flawed data, biased assumptions, or software bugs).
2. Checks include:
  - a. Compare results to:
    - i. Prior periods
    - ii. Similar cases
    - iii. Related but independent calculations
    - iv. Benchmarks (e.g., forecasted retiree ratio, loss ratio, etc.)
  - b. Use of rough approximations as a sanity check.
  - c. Ask: “Does it make common sense?”
    - i. If the answer is “no”: Indicates a need for further review or recalculations.

### **SECTION 1490 – DOCUMENTATION**

1. Requirement: Actuary should compile and retain appropriate documentation.
  - a. Documentation includes Engagement letters, working papers, notes, memos, correspondence, reports, data excerpts, and work plans.
  - b. Must demonstrate compliance with accepted actuarial practice.
2. Retention considerations:
  - a. Professional and legal obligations influence how long to keep records.
  - b. Model-specific documentation should include:
  - c. Intended purpose of the model.
  - d. Appropriateness and limitations of the specification.
  - e. Implementation testing.
  - f. Model risk mitigation strategies.
  - g. If using a third-party model, document how it was assessed for appropriateness.
3. Quality Assurance: Actuary must document QA processes used during the work

### **SECTION 1510 – ACTUARY’S USE OF ANOTHER PERSON’S WORK**

1. Actuary may use and take responsibility for another person’s work if justified. If not taking responsibility, must report accordingly.
2. Use of data by another person is governed by subsection 1440 Data
3. Common practices:
  - a. Using others’ work (e.g., colleagues, assistants) is normal and often inevitable.
  - b. Taking responsibility for external work may increase the user’s confidence but also the actuary’s legal exposure.
  - c. The actuary should not imply professional competence in other disciplines.
  - d. If responsibility is not taken, actuary must report with reservation; user may need alternative assurance.
4. Conditions to use and take responsibility:
  - a. Confidence in another person’s work must be based on:
    - i. Early and ongoing communication
    - ii. Confidence in the person’s qualifications, competence, integrity, objectivity
    - iii. Clarity on intended use
    - iv. Exchange of relevant information
    - v. Reviewing and discussing reports, especially reservations

- b. Auditor work:
  - i. Encouraged to follow the Joint Policy Statement in subsection 1520.
  - ii. Both actuaries remain individually responsible for their work.
  - iii. If using work from an actuary outside Canada: Identify practice differences and review working papers
  - iv. No need to report use if the actuary takes full responsibility, to avoid implying reservation.
- c. If Use but not take responsibility:
  - i. Examine for obvious errors
  - ii. Report findings or avoid use
  - iii. Merely using the same model does not constitute use of the model itself.

### **SECTION 1520 – AUDITOR’S USE OF AN ACTUARY’S WORK (JOINT POLICY STATEMENT)**

1. Purpose: Facilitate effective communication between actuaries and auditors during financial statement preparation.
2. When applicable:
  - a. Applies when:
    - i. Auditor audits financials with actuarial components
    - ii. Actuary uses auditor’s work to support actuarial valuation
  - b. Applies to pension, post-employment benefit plans, and insurance companies.
3. Not applicable to non-audit work or interactions between:
  - a. Auditor and auditor’s actuary
  - b. Actuary and external review actuary
4. Key definitions include:
  - a. Inquiring professional (uses the work)
  - b. Responding professional (provides the work)
  - c. Financial statements, data, external review actuary, etc.
5. Responsibilities:
  - a. Financial statements are management’s responsibility
  - b. Auditor and actuary use each other’s work to inform their own responsibilities
6. Use of work:
  - a. The inquiring professional must exercise care before using the responding professional’s work.
  - b. Using work  $\neq$  reliance — each professional remains solely responsible for their own opinion.
7. Communication process:
  - a. Begin early and ongoing communication
  - b. Seek permission from management to share relevant info.
  - c. Inquiring professional requests:
    - i. Confirmation of appointment, qualifications, and awareness of intended use
    - ii. Discussion of reporting framework, materiality, timing, etc.
  - d. Responding professional confirms:
    - i. Engagement details
    - ii. Qualifications
    - iii. Willingness to perform work
    - iv. Understanding of use and potential limitations
8. Responding professional’s findings:
  - a. After completion of work, provides:
    - i. Entity and data details
    - ii. Description of work
    - iii. Limitations (e.g., not assurance engagement if auditor provides data)
    - iv. Restrictions on disclosure/use without consent
9. Other considerations:
  - a. Questions may be raised by the inquiring professional and should be answered reasonably.
  - b. Where legally required, disclose respective responsibilities in the financial statements.

## **SECTION 1530 – REVIEW OR REPEAT OF ANOTHER ACTUARY’S WORK**

1. Applies to user-instigated reviews or repeats of another actuary’s work.
2. Does not apply to internal firm quality control, even if the reviewer is external.
3. Key definitions:
  - a. First actuary – Original actuary whose work is reviewed or repeated.
  - b. Reviewer – Actuary performing the review or repeat.
  - c. Review engagement – Engagement to review the first actuary’s work.
  - d. Repeat engagement – Engagement to repeat all or part of the first actuary’s work.
4. Duties of First Actuary and Reviewer
  - a. First actuary should cooperate if engagement terms permit.
  - b. Reviewer should:
    - i. Discuss the review with the first actuary (if practical).
    - ii. Attempt to resolve differences.
    - iii. Report results of discussion.
  - c. If disagreement exists but the work is still within accepted actuarial practice, the reviewer should report this.
  - d. If limitations (time, data, etc.) affected the first actuary’s work, the reviewer should disclose that.
  - e. If the first actuary’s work improves as a result of the review, the reviewer should report the improvement.
  - f. If the work is not within the range of accepted actuarial practice, the reviewer should report it.
5. Reviewer Selection
  - a. Reviewer may be chosen by the user or the first actuary.
    - i. Not appropriate for the first actuary to choose if a conflict of interest exists.
  - b. First actuary should consider user objectives and consult with them if selecting a reviewer.
  - c. An actuary qualified to do the work is presumed qualified to review it.
  - d. Independence enhances objectivity.
6. Timing of Review
  - a. Pre-release review – Allows for potential improvements to the original work.
  - b. Post-release review – May require revision or withdrawal of original work; improvements apply to future work.
7. Material vs. Non-Material Differences
  - a. Material findings must be reported, with explanations.
  - b. Minor differences should be avoided in reporting if they could cause unnecessary dispute.
    - i. If different data/resources were available, that must be disclosed.
  - c. If different data/resources would reduce uncertainty, the reviewer should report this.
8. Appropriate Review Engagements
  - a. Engagements without first actuary involvement can still be appropriate, especially if:
    - i. There is litigation, mediation, or conflicting interests.
    - ii. The reviewer works for a legal, judicial, or regulatory body investigating the first actuary.
    - iii. It’s a preliminary review, with discussion to follow later.
  - b. Independent reports (e.g., required by the reviewer’s client) may justify limited or delayed communication.
  - c. In legal/mediation contexts, it’s appropriate for reviewer to:
    - i. Use different assumptions, or
    - ii. Provide alternative results within accepted practice.
9. Repeat Engagements
  - a. Appropriate if the purpose is to clarify or reduce uncertainty in the first actuary’s work.
  - b. Reviewer should be cautious of opinion shopping. If suspected, the appropriateness of the engagement must be reassessed.

**SECTION 1610 – METHODS**

1. The actuary must select methods that reflect the circumstances of the work.
2. Actuarial estimates = method + assumption(s).
3. Method selection considers:
  - a. Legal requirements
  - b. Practice-specific standards
  - c. Terms of the engagement

**SECTION 1620 – ASSUMPTIONS**

1. Actuary identifies and selects assumptions except when prescribed, mandated by law, or stipulated by engagement.
2. Select best estimate assumptions, possibly adjusted for adverse deviations, and consider:
  - a. Work circumstances
  - b. Past experience
  - c. Anti-selection
  - d. Interrelationships
3. Assumptions default to status quo, unless:
  - a. No status quo exists
  - b. A change is reasonably expected (must report)
4. Model Assumptions
  - a. Quantitative, used for:
    - i. Contingent events
    - ii. Investment returns/economic indices
    - iii. Environmental parameters (e.g., tax rates)
  - b. Interactions among assumptions must be considered.
5. Data Assumptions
  - a. Fill gaps where data is insufficient or unreliable.
  - b. Example: assume age of spouses when missing from pension files.
6. Other Assumptions
  - a. Qualitative assumptions about: Legal, economic, demographic, social context (e.g., tax laws, education systems)
  - b. Default is continuation of status quo unless otherwise reported.
7. Acceptable Range
  - a. Multiple reasonable assumptions may exist for the same work.
  - b. Practice-specific standards may narrow this range for consistency.
8. Circumstances Affecting the Work
  - a. May require consultation with stakeholders (e.g., investment teams, plan administrators).
  - b. These circumstances inform assumption selection
9. Past Experience Data
  - a. Use relevant and credible data, prioritizing
    - i. Specific case data over general data
    - ii. Recent over historical
    - iii. Homogeneous over mixed data
10. Expected Future Experience
  - a. Extrapolation from past may be valid, but depends on context.
    - i. Example: future mortality may be inferred from past, but not investment returns.
    - ii. Adjust for known changes (e.g., new plan provisions, legal changes).
11. Anti-Selection
  - a. Account for optionality in user behavior that can be adverse to the other party:
    - i. Examples: Early retirement options, Term life renewals, Bond calls, mortgage prepayments

- b. Portfolio-level behavior may differ from individual behavior.
- 12. Independently Reasonable & Aggregate Appropriateness
  - a. Each assumption should be individually reasonable.
  - b. All assumptions should be reasonable in aggregate.
  - c. Avoid consistent bias or conflicting assumptions
  - d. If a prescribed assumption is used, do not offset by adjusting other assumptions.
  - e. Explicit assumptions preferred, but implicit okay if it does not cause material error (e.g., using net discount rate).
- 13. Stipulated/Mandated Assumptions
  - a. Assumptions mandated by engagement = work of another.
  - b. May report results based on anticipated legal changes, if useful.
- 14. Best estimate discount rate may reflect:
  - a. Expected investment returns
  - b. Reference interest rates
  - c. May assume either flat rates or reversion to long-term norms

### **1630 – PROVISION FOR ADVERSE DEVIATIONS**

- 1. Only include provision for adverse deviations if:
  - a. Required by engagement
  - b. Mandated by law
  - c. Prescribed by practice-specific standards

### **SECTION 1640 – COMPARISON OF CURRENT AND PRIOR ASSUMPTIONS**

- 1. For periodic work, assumptions should be consistent with prior unless reported otherwise.
- 2. Definition of "consistency" depends on practice area:
  - a. Pension funding: numerical consistency
  - b. Insurance liability valuation: must reflect conditions and risk at each valuation date and be located similarly within acceptable ranges
- 3. If not consistent:
  - a. Actuary must report the inconsistency
  - b. Report should quantify impact, if feasible

### **SECTION 1710 – REPORTING: EXTERNAL USER REPORT**

- 1. The actuary must:
  - a. Identify the client or employer
  - b. Describe the work, its purpose, and its intended users
  - c. Warn if the report may not be suitable for other purposes
  - d. State whether the work is in accordance with accepted actuarial practice (AAP)
    - i. Disclose any deviations
    - ii. Note unusual applications of AAP, if useful
  - e. Disclose model limitations, if a model is used
  - f. Identify any part of the work for which the actuary does not take responsibility
  - g. Describe each material assumption, including:
    - i. Any margin for adverse deviations
    - ii. The rationale for each assumption
  - h. Disclose non-status quo assumptions, and, if practical, their impact
  - i. Describe methods used
    - i. If periodic: Disclose any inconsistencies with prior assumptions or methods
  - j. Disclose subsequent events not reflected in the work
  - k. Disclose any reservations
  - l. Provide a formal opinion on: The assumptions, methods and results

- m. Sign and date the report
  - n. Clearly identify themselves, typically as “Fellow, Canadian Institute of Actuaries (FCIA)”
- 2. Supporting Disclosure
  - a. Disclosure can refer to supporting material, if accessible to users.
  - b. Must respond to user questions, unless contrary to engagement terms.
  - c. Must amend or withdraw report if new information invalidates it.
  - d. Confidentiality takes precedence over other disclosure requirements.
- 3. Guidance on Disclosure
  - a. External user reports are more formal and detailed than internal ones.
  - b. Disclosure must balance:
    - i. Too little = user confusion
    - ii. Too much = clutter, distraction, or misinterpretation
  - c. Focus on what best supports user decision-making, not just user requests.
  - d. Consider showing sensitivity of results to changes in key assumptions.
  - e. Important disclosure belongs in the report itself, or must be easily accessible.
- 4. Examples of Misleading Disclosure
  - a. Avoid misleading unintended reservations, e.g.:
    - i. Disclosing normal approximations
    - ii. Disclosing use of others’ work when the actuary takes full responsibility
    - iii. Disclosing immaterial deviations from standards
- 5. Work Description & Purpose
  - a. Include calculation date and numerical results
  - b. Cite legislation, if applicable
  - c. Consider different detail levels for different users (e.g., regulators)
  - d. Clearly state intended users and purpose to avoid misuse
- 6. Accepted Actuarial Practice (AAP)
  - a. Say if report is in accordance with AAP for work in Canada
  - b. Deviations must be disclosed and usually arise from: Legal conflicts and Engagement terms
- 7. Unusual or Special Cases
  - a. Don't normally disclose deviations within accepted practice ranges
  - b. Do disclose if:
    - i. Mandated by law/engagement
    - ii. Soon-to-be-excluded practice
    - iii. Inconsistent with prior report
    - iv. Relying on special legal provisions
    - v. Unusual or controversial
- 8. Must disclose responsibility and Mandated Assumptions if
  - a. Engagement terms reduce the actuary’s responsibility
  - b. Mandated methods may not suit other uses
- 9. Subsequent Events
  - a. E.g., benefit changes not retroactive → disclose but don’t reflect in current work
  - b. If material, actuary may quantify impact
  - c. If the report is affected, determine if it needs withdrawal or amendment
- 10. Reservations
  - a. Use reservations if:
    - i. Doubt about another’s work
    - ii. Data issues
    - iii. Scope limitations
    - iv. Conflict of interest
  - b. Disclose any remedies in progress
  - c. May need to consult legal or actuarial counsel
  - d. Users assume:
    - i. No reservations
    - ii. Data is reliable

- iii. Assumptions and methods are consistent unless stated otherwise

#### 11. Models

- a. Model-related content often appears in supporting documentation
- b. Report should reference the model if:
  - i. Required by engagement
  - ii. Limitations affect purpose
  - iii. Actuary can't assess model risk
- c. Disclose:
  - i. Simplifying assumptions
  - ii. Exclusions
- d. If outside typical actuarial scope and unverified → report this explicitly

#### 12. Opinion

- a. Begin with “In my opinion...”
- b. If assumptions/methods are stipulated by the engagement:
  - i. If within AAP: say they are appropriate
  - ii. If outside AAP: say so and that they are stipulated
  - iii. If uncertain: say they may not be in accordance with AAP
- c. Consider grouping opinions under “Statement of Opinion”

#### 13. Report Date

- a. Base report on all information available up to report date
- b. Report date = when work is substantially complete
- c. Must issue report promptly, but if delayed, consider additional events
- d. If new info comes in:
  - i. Must assess if it affects the report
  - ii. If yes → consider amendment or withdrawal
  - iii. Seek agreement with client to notify users
  - iv. If not possible → consider legal advice

### **SECTION 1720 – INTERNAL USER REPORT**

1. Internal user reports can abbreviate external report requirements.
2. Range of format varies from formal written reports to informal oral updates
3. Abbreviation is allowed as long as communication remains clear and complete.

### **SECTION 1730 – ORAL REPORT**

1. Oral reports are permitted, especially for internal users.
2. Recommend confirming in writing or documenting the discussion to avoid miscommunication.
3. Same standards apply as for written reports (except for signature and date).

### **SECTION 1740 – SUMMARY REPORT**

1. Required only if mandated by practice-specific standards.
2. Used to simplify communication (e.g., for financial statements).
3. May be included in a client's or employer's broader report.
4. Not considered an external user report on its own.

**CIA CONSOLIDATED STANDARDS OF PRACTICE**  
**SECTION 3100 - 3500**

**SECTION 3100 – SCOPE (STANDARDS OF PRACTICE PART 3000)**

1. General Application
  - a. Part 1000 standards apply to all work under Part 3000.
  - b. Part 3000 provides actuarial standards for pension plan advice.
2. Section Applicability
  - a. Section 3200: Applies to advice on funded status or funding excluding:
    - i. Full or partial wind-ups of pension plans.
    - ii. Financial reporting in employer or plan financial statements.
  - b. Section 3300: Applies to advice related to wind-up (full or partial) of pension plans.
  - c. Section 3400: Applies to advice on financial reporting of pension plan costs and obligations.
  - d. Section 3500: Applies to advice on computation of commuted values (as described in 3510).
3. Definition Clarification
  - a. A wind-up involves settling all plan benefits and distributing all plan assets.
  - b. Mere cessation of benefit accruals or plan termination (without settlements and distribution) is not a wind-up.
4. Sections 3200–3400
  - a. Apply to advice on any pension plan or retirement income arrangement, regardless of:
    - i. Funding status.
    - ii. Registration status.
    - iii. Private or public sector.
    - iv. Defined benefit (DB), defined contribution (DC), or hybrid plans.
5. The standards do not apply to:
  - a. Pure defined contribution (DC) plans or independent DC components of hybrid plans.
  - b. Plans where all benefits are guaranteed by a life insurer.
  - c. Social security programs: Canada/Quebec Pension Plan, Old Age Security program.

**Section 3200 – Advice on the Funded Status or Funding of a Pension Plan**

**SECTION 3210 GENERAL**

1. Applies to advice on funded status or funding of a pension plan.
2. Does NOT apply to:
  - a. Full or partial wind-ups.
  - b. Financial reporting in employer or plan financial statements.
3. Key Recommendations - Actuary's advice should:
  - a. Reflect circumstances affecting the work.
  - b. Use actuarial cost and asset valuation methods appropriate to those circumstances.
  - c. Consider benefits at the calculation date (can include pending amendments that are definitive or virtually definitive).
  - d. Include expenses if they are expected to be paid from plan assets.
  - e. Optionally consider letters of credit if relevant.
4. Funding-Specific Guidance - When advising on funding, actuary should:
  - a. Identify the next calculation date.
  - b. Ensure the advice covers the period up to the next calculation date.
5. Circumstances Affecting the Work Includes:
  - a. Whether the advice is about funded status, funding, or both.
  - b. Terms of the actuarial engagement.
  - c. Relevant legal requirements.
6. Types of Funding Advice
  - a. Valuation for letter of credit amounts.

- b. Advice on earmarked assets for benefit security.
  - c. Funding implications of plan amendments.
- 7. Engagement Considerations
  - a. Focus only on legal minimum contributions.
  - b. Include additional objectives set by sponsor or administrator.
  - c. Use a fixed contribution framework.
  - d. May specify particular:
    - i. Funding objectives (e.g., benefit security, contribution stability, intergenerational equity).
    - ii. Actuarial cost or asset valuation methods.
- 8. Actuarial Cost Methods
  - a. Cost Allocation Methods: e.g., attained age, entry age, aggregate.
  - b. Benefit Allocation Methods: e.g., unit credit, projected unit credit.
  - c. Forecast Methods: Based on present value projections from start to end of a forecast period.
- 9. Asset Valuation Methods
  - a. Market value.
  - b. Smoothed values (to reduce volatility).
  - c. Present value of future cash flows.
  - d. Assumed constant return to maturity for illiquid assets.
- 10. If pending amendment is definitive or virtually definitive:
  - i. Effective date during funding period: May ignore it before the date, but must include it after.
  - ii. Effective date after the funding period: May ignore the amendment unless required by law.
- 11. Next Calculation Date
  - a. Defined as the latest date the funding advice applies to.
  - b. Determined based on law and engagement terms.

## **SECTION 3220 - TYPES OF VALUATIONS**

- 1. The actuary must choose one or more types of valuation consistent with the circumstances.
- 2. Most common valuation types:
  - a. Going concern valuation
  - b. Hypothetical wind-up valuation
  - c. Solvency valuation

## **SECTION 3230 – GOING CONCERN VALUATION**

- 1. Assumes plan continues indefinitely (unless a definitive amendment exists to wind up/convert).
- 2. Uses:
  - a. Best estimate assumptions, possibly with margins for adverse deviations, if required by law or engagement.
  - b. Includes all known benefits, including contingent benefits, unless excluded by law or engagement.
- 3. Discount rate:
  - a. Based on expected investment return (from target asset mix), or
  - b. Based on fixed income yields aligned with expected benefit payments.
- 4. No assumed extra return from active management unless supported by reliable evidence.
- 5. If the plan is a designated plan:
  - a. Must use prescribed assumptions and benefits for maximum funding purposes.
- 6. Contingent benefits (e.g., early retirement waivers) must consider experience and expectations.

**SECTION 3240 – HYPOTHETICAL WIND-UP VALUATION**

1. Assumes plan is wound up at the calculation date.
2. Based on no surplus or deficit; benefit entitlements determined on that basis.
3. Scenario assumes:
  - a. No future contributions, and
  - b. All expenses paid from plan assets unless engagement says otherwise.
4. Takes into account:
  - a. Contingent benefits relevant to the wind-up.
  - b. Coincidence of wind-up, calculation, and settlement dates is allowed.
  - c. Annuity purchase is assumed as a method of settlement, even if capacity is limited.
  - d. Market value used for plan assets.
5. Expense assumptions must include wind-up-related costs.
6. Membership data need not be as precise as in an actual wind-up.
7. May use reasonable assumptions for missing data.
8. Postulated wind-up scenarios should be internally consistent and reflect:
  - a. Benefits contingent on wind-up,
  - b. Benefits required by law,
  - c. Benefits contingent on other factors (e.g., plan sponsor discretion).
9. May reflect subsequent events that increase benefit value or reduce asset value.
10. Can assume:
  - a. Use of replicating portfolios,
  - b. Exercise of regulatory discretion, or
  - c. Plan amendments to enable practical settlement methods.

**SECTION 3250 – SOLVENCY VALUATION**

1. Usually a form of hypothetical wind-up valuation, with legal modifications.
2. Must follow hypothetical wind-up standards unless:
  - a. Law requires different treatment, or
  - b. Law permits different treatment and the engagement allows it.
3. Examples of permitted exceptions:
  - a. Asset values  $\neq$  market value.
  - b. Non-best estimate assumptions.
  - c. Exclusion of certain benefits.

**SECTION 3255 – OTHER VALUATIONS**

1. For valuations outside of going concern, hypothetical wind-up, or solvency:
  - a. Methods and assumptions must align with the engagement terms.
  - b. If similar to a known valuation type, actuary should consider relevant standards.
2. Example: A valuation to set a letter of credit for a supplemental plan:
  - a. Often similar to a hypothetical wind-up valuation.
  - b. Apply similar principles unless otherwise instructed.

**SECTION 3260 – REPORTING: EXTERNAL USER REPORT**

1. Report must include:
  - a. Calculation date, report date, next calculation date
  - b. Sources and dates of: Membership data, Plan provisions and Plan assets
  - c. Description of data and limitations
  - d. Data sufficiency and reliability testing
  - e. Asset description and market value (by category)
  - f. Plan provisions, including any definitive/virtually definitive amendments

- g. Disclosure of subsequent events or a statement of no such events
- h. Type(s) of valuation(s) performed
- i. Any material terms of the engagement
2. Going Concern Valuations must describe or include
  - a. Rationale for assumed active management returns over passive
  - b. Any letter of credit (LoC) included
  - c. Funded status, service cost, or method for determining service cost
  - d. Any pending amendments and treatment in valuation
  - e. Contingent benefits included/excluded and rationale
  - f. Non-contingent benefits excluded and rationale
  - g. If no provision for adverse deviations, must state so
  - h. Gain/loss reconciliation since last valuation (unless extrapolated)
  - i. 1% discount rate sensitivity analysis on:
    - i. Present value of accrued benefits
    - ii. Service cost (*with some exceptions: designated / unregistered plans, extrapolated results*)
3. Hypothetical Wind-Up & Solvency Valuations must include:
  - a. Basis and amount of LoC
  - b. Funded status
  - c. Description of postulated scenario
  - d. Treatment of contingent benefits
  - e. Incremental cost to next valuation date
  - f. If no going concern valuation:
    - i. Defined contribution service cost (if applicable)
    - ii. Gain/loss reconciliation since prior valuation
  - g. 1% discount rate sensitivity analysis on liabilities (*same exceptions as above*)
4. Target Pension Arrangements – Hypothetical Wind-Up
  - a. Must show liabilities based on annuity cost of target benefits as per going concern
  - b. Even if benefits can be reduced on wind-up
5. Other Valuation Types
  - a. Must explain:
    - i. Inclusion/exclusion of contingent benefits
    - ii. Rationale for such treatment
  - b. Apply similar reporting principles from the most relevant standard valuation type
6. Funding Advice must include:
  - a. Contribution amount(s) or range until next calculation date
  - b. If contributions are fixed:
    - i. State if adequate under the law
    - ii. If not adequate, provide: Required contributions, Possible benefit reductions, or combination of increased contributions and benefit reductions
7. Statements of Opinion (must all appear in one section)
  - a. Data: “Data is sufficient and reliable...”
  - b. Assumptions: “Assumptions are appropriate...”
  - c. Methods: “Methods are appropriate...”
  - d. Conformity: “Prepared in accordance with accepted actuarial practice in Canada.”
  - e. If unable to make any of these statements → must qualify or omit and explain why
  - f. Do not include if standards are not followed, even if client requested it
8. Risk Disclosures – Plausible Adverse Scenarios
  - a. Must consider threats (unless exempt):
    - i. Interest rate risk
    - ii. Asset value deterioration
    - iii. Longevity risk
    - iv. Contribution base risk (if contributions are fixed)

- b. Must disclose impacts on:
  - i. Funded status (assets & liabilities separated)
  - ii. Service cost (for going concern)
- c. Scenarios selected in consultation with sponsor/administrator may include
  - i. Individual or combined risks
  - ii. Asset-liability modelling
  - iii. Compensating adjustments (e.g., lower margin in discount rate)
- d. Technical Disclosures
  - i. Changes from prior valuation must be explained: Assumptions, Methods (cost or asset valuation)
  - ii. Settlement method assumptions must include limitations (e.g., capacity to purchase annuities, assumptions on regulatory discretion)
  - iii. For hybrid plans (DB+DC): service cost includes both components

### **SECTION 3270 – DISCLOSURE FOR STOCHASTIC MODELS USED TO COMPLY WITH SPECIFIC REGULATORY PENSION PLAN FUNDING REQUIREMENTS**

- 1. Purpose of Disclosure
  - a. Applies to statutory funding valuations requiring stochastic models under law or regulatory policy (e.g., NB Shared Risk Plans)
  - b. Aims to:
    - i. Help users understand assumptions, methods, and outcome distributions
    - ii. Allow another actuary to assess reasonableness of the approach
- 2. Model Inputs
  - a. Governance elements included in the model:
    - i. Risk management goals
    - ii. Funding/deficit recovery/funding excess utilization policies

#### **Technical input:**

- Number of scenarios and projection period
- Modelling methodology (e.g., interest rate modeling, discount rate derivation)
- Assumptions on experience decrements (deterministic or stochastic). If stochastic: describe volatility and model
- Future decrement assumptions, if used
- New entrant assumptions: population growth, entrant profiles
- Wage increase methodology, including YMPE and DB limits under the ITA
- Valuation frequency over projection period
- Expense assumptions: Admin costs (actuarial, legal, audit), Investment management fees (if not embedded in returns)
- Discount rate treatment under economic scenarios
- Rationale for variances and inter-relationships among economic assumptions (e.g., equity returns, inflation, yields)
- Method to adjust SDs and correlations of variables
- Initial values for: Federal bond yields at 1-, 10-, 30-year terms, Provincial and corporate credit spreads (1-, 10-, 30-year terms)
- Any assumed trends or normalization of bond yields
- Changes since previous valuation must be identified and explained

### 3. Model Outputs

#### Economic variables

- a. For inflation, asset returns, wage increases (if stochastic): Mean annualized compound return, Avg. standard deviation and Avg. correlation matrix
- b. For bond yields (1-, 10-, 30-year): Mean federal bond yield and Mean provincial and corporate credit spread
- c. Total portfolio returns (net of investment fees): Percentiles: 5%, 25%, 50%, 75%, 95%, and Mean and standard deviation
- d. Disclosed: At least every 2 years for first 10 years and every 5 years thereafter
- e. Discount rate: Initial value and mean value at end of projection period
4. Demographic Outputs - At same frequencies (every 2 years for 10 years, then every 5 years):
  - a. Number of active members, with: Average age, service, and projected salary
  - b. Number of inactive members and total annual pensions paid
  - c. Mean total liabilities, and active/inactive split
5. Required Disclosure: Key Model Outputs
  - a. For liabilities, assets, funded status, and other key metrics (e.g., open group funded ratio):
  - b. Report:
    - i. 5%, 25%, 50%, 75%, 95% percentiles
    - ii. Mean
    - iii. Average below 5th percentile (for unfavorable metrics like assets or funded status)
    - iv. Average above 95th percentile (for unfavorable metrics like liabilities)
    - v. Same for 2.5th/97.5th percentile boundaries
  - c. Disclose: Every 2 years for 10 years, then every 5 years thereafter
6. Required Statements by Actuary must include:
  - a. Statement acknowledging: "Other reasonable model inputs could be used, leading to different distributions."
  - b. Statement confirming: "Disclosures are in compliance with subsection 3270."
  - c. If part of a funding valuation, Include: "The funding valuation assumptions are consistent with the stochastic model inputs."
    - i. Reference any separate stochastic modelling report, if applicable

### **SECTION 3300 – FULL OR PARTIAL WIND-UP VALUATION**

1. Scope: Applies to actuarial advice on the funded status or funding of a full or partial wind-up.
2. Requirements:
  - a. Consider the circumstances of the work.
  - b. Reflect subsequent events up to a cut-off date.
  - c. Value assets at liquidation value.
3. Excluded Topics (governed by law/plan provisions, not these standards):
  - a. Jurisdictional asset allocation
  - b. Benefit determination
  - c. PBGF contributions
  - d. Funding obligations
  - e. Surplus or asset distribution
4. Circumstances Affecting the Work include
  - a. Whether advice is on funded status, funding, or both
  - b. Terms of engagement
  - c. Relevant legislation
5. Partial Wind-ups
  - a. Applies to a subset of members; others continue.
  - b. May require valuation of continuing members' benefits.

- c. Legal treatment varies by jurisdiction.
- d. Same standards apply as for full wind-up, but materiality may be applied less rigorously (e.g., for continuing members or minor wind-up expenses)

### **SECTION 3320 – ASSUMPTIONS**

- 1. Assumptions must be:
  - a. Best estimate, or modified for margins for adverse deviation if required
  - b. Chosen as at the cut-off date
  - c. Reflect expected method of settlement
- 2. Wind-up expenses:
  - a. Must include unless it's expected they won't be paid from plan assets
  - b. Can be: Added to liabilities, or Deducted from assets

### **SECTION 3330 – REPORTING (EXTERNAL USER REPORT)**

- 1. Key Required Disclosures
  - a. Wind-up date, calculation date, cut-off date, report date
  - b. Events causing wind-up
  - c. Sources and tests for membership and asset data
  - d. Membership assumptions for missing data
  - e. Detailed individual membership data, or offer to provide
  - f. Liquidation value and asset breakdown
  - g. Plan provisions, insured benefits, post-wind-up contingencies
  - h. Wind-up expense assumptions or justification for omission
  - i. Funded status as at calculation date
  - j. Any subsequent events, or statement if none known
  - k. Statement that settlement funded status may differ
  - l. Whether an updated report will be required
- 2. If relying on external direction: Describe issue and direction received and Identify source and authority
- 3. If member choices are unknown (e.g., commuted value vs. pension): Disclose assumptions
- 4. If applicable, describe:
  - a. Asset/surplus allocation methods
  - b. Role in calculating commuted values and applicable standards
  - c. Sensitivity to market and investment policy
- 5. Required Statements of Opinion
  - a. Must appear together in a single section
    - i. Data: "In my opinion, the membership data... are sufficient and reliable..."
    - ii. Assumptions: "In my opinion, the assumptions are appropriate..."
    - iii. Methods: "In my opinion, the methods employed... are appropriate..."
    - iv. Compliance: "This report has been prepared... in accordance with accepted actuarial practice in Canada."
  - b. If unable to provide all four, statements must be qualified or omitted with explanation.
- 6. Dates
  - a. Wind-up date: Set by sponsor/administrator/regulator.
  - b. Calculation date: Usually same as wind-up date.
  - c. Member-specific dates:
    - i. Entitlement date: depends on employment/membership/wind-up context
    - ii. Settlement date: when benefits are paid
- 7. Nature of Wind-up Valuations
  - a. Purpose may be to determine
    - i. Funded status
    - ii. Total benefit entitlements (pre-funded adjustment)
    - iii. Required contributions

- iv. Settlement adjustments (e.g., due to deficits)
  - v. Surplus allocation
  - vi. Wind-ups can be lengthy and require multiple reports.
- b. Subsequent events can significantly impact: Annuity pricing, Asset value and Surplus position
- 8. Membership Data
  - a. Plan administrator's responsibility
  - b. Actuary must assess:
    - i. Sufficiency and reliability, including commuted values
    - ii. May include contingency reserve for missing members
    - iii. Must include benefit amounts and payment terms
- 9. Assumptions
  - a. Based on method of settlement:
    - i. Annuities: reflect single premium rates
    - ii. Commuted values: follow Section 3500
    - iii. Other: reflect actual method
  - b. Must consider:
    - i. Future salary increases, if employment continues
    - ii. Post-retirement employment income (affecting special early retirement benefits)
- 10. Wind-up Expenses
  - a. Include: Actuarial and legal fees, Regulator fees Admin and custodial costs
  - b. Treatment:
    - i. Usually added to liabilities or netted from assets
    - ii. Future investment expenses can be netted from return
- 11. Use of Another Person's Work
  - a. May need to rely on others for:
    - i. Legal interpretations
    - ii. Eligibility or consent assumptions
    - iii. Wind-up date
    - iv. Asset allocation
    - v. Surplus sharing
  - b. Direction must be documented and justified
- 12. Post-Wind-up Contingencies may affect benefit entitlements:
  - a. Member elections (form of benefit, retirement date), Salary changes, Marital status changes
- 13. Subsequent Events
  - a. All should ideally be recognized (unlike going concern valuations).
  - b. Select a cut-off date close to the report date.
  - c. Must check for material events after cut-off; change date if significant.
  - d. May have different cut-off dates for actives/inactives.
  - e. Examples: Contributions, Investment returns, Annuity purchase rate changes
- 14. Data corrections e.g. Member deaths, Crystallized contingencies
  - a. One method:
    - i. Value benefits at cut-off date, discount back to calc date
    - ii. Adjust assets for interim contributions/expenses
  - b. Preliminary reports may exclude subsequent events but disclose them approximately

### **SECTION 3400 – FINANCIAL REPORTING OF PENSION COSTS**

1. Applies to actuarial advice for financial statement reporting of pension plan costs and obligations, either in employer's financials, or the pension plan's financials
2. Calculations must follow an applicable financial reporting standard.

**SECTION 3410 – GENERAL STANDARDS**

1. Methods and Assumptions
  - a. Should align with:
    - i. Financial reporting basis used in statements
    - ii. Terms of engagement
    - iii. Circumstances of the work (including legal environment)
  - b. Use methods/assumptions set by the preparers of financial statements, where required.
2. Plan Provisions
  - a. Must determine provisions with sufficient accuracy using:
    - i. Plan documents
    - ii. Administrative practices
    - iii. Cost-sharing arrangements
    - iv. Sponsor/administrator communications
  - b. Include all benefits expected to be paid under the plan.
3. Anticipated Amendments
  - a. Reflect pending plan amendments if they are:
    - i. Definitive or virtually definitive, and
    - ii. Consistent with direction from the sponsor/administrator
4. Effective date = date the amended benefits take effect
5. If a known amendment is excluded, it must be disclosed as a subsequent event.
6. Data and Extrapolations
  - a. Use data relevant to retirement, disability, termination
  - b. May extrapolate from data with different effective date
  - c. Consider actual benefit payments and events between data date and calculation date
  - d. Do not:
    - i. Use membership data >4 years old
    - ii. Extrapolate >4 years beyond membership data date
7. Assumptions - Use best estimate assumptions, unless:
  - a. Specified otherwise in financial reporting standards, or
  - b. Directed by the preparers of the statements
8. Benefit Commitments
  - a. Include commitments beyond plan terms if stipulated by the preparers
9. Expenses
  - a. Must account for expenses (e.g., administration, investment), including whether or not they're paid from plan assets

**Section 3420 – Reporting: External User Report**

1. Required Disclosures
  - a. Calculation date and report date
  - b. Sources of: Membership data, Plan provisions, Pension plan assets
  - c. Dates of data compilation
  - d. Description of membership data and limitations
  - e. Assumptions about missing/incomplete data
  - f. Tests for data sufficiency/reliability
  - g. Market value of assets and summary by category
  - h. Description of plan provisions
  - i. Relevant accounting policies
  - j. Description of any:
    - i. Commitments beyond plan terms
    - ii. Pending amendments (definitive or virtually definitive)
    - iii. Subsequent events (or confirm none known)

- iv. Contingent benefits, and whether included or excluded
    - v. Non-contingent benefits that were excluded
  - k. Funded status at calculation date
  - l. Applicable service cost
  - m. Description of:
    - i. Amortization method and period
    - ii. Extrapolation method, if applicable
  - n. Statement confirming conformity with applicable financial reporting standards
- 2. Statements of Opinion
  - a. Required – All in One Section
    - i. Membership data: “In my opinion, the membership data on which the valuation is based are sufficient and reliable for the purpose of the valuation.”
    - ii. Assumptions: “In my opinion, the assumptions are appropriate for purposes of the valuation.”
    - iii. Calculations: “In my opinion, the calculations have been made in accordance with my understanding of the requirements of [name financial reporting standard].”
    - iv. Conformity: “This report has been prepared, and my opinions given, in accordance with accepted actuarial practice in Canada.”
  - b. If unable to provide one or more, statements must be adjusted and qualified, with explanation.
  - c. No opinion should be given if the work does not comply with standards, even if the engagement requires it.
- 3. Additional Notes
  - a. The report must allow another actuary to assess reasonableness.
  - b. If membership data is insufficient or unreliable, methods and assumptions used to address it must be described.
  - c. May refer to an existing funding valuation report to satisfy disclosure requirements (if applicable).

**GUIDANCE ON EVENTS OCCURRING AFTER THE CALCULATION DATE**  
**OF AN ACTUARIAL OPINION FOR A PENSION PLAN**

**CIA Education Note May 2024**

1. Purpose & Scope
  - a. Helps actuaries quantify and report on events that *make the entity different*, after the calculation date.
  - b. Does not provide guidance on how to determine *whether* an event makes the entity different — refer to SOP 1420 and 1430 for that.
  - c. Applies to regular funding valuations (going concern, solvency, hypothetical wind-up).
  - d. Excludes special cases: actual wind-ups, accounting valuations, etc.
  - e. Actuaries should also consider legislative and policy requirements.
2. Definitions (as per SOP 1120)
  - a. Calculation date: Date liabilities/assets are valued.
  - b. Report date: Date specified in the report (often later than calculation date).
  - c. Subsequent event: Known after calculation date but before report date.
  - d. Internal user: Client or employer.
  - e. External user: Anyone else.
  - f. Funded status: Assets – actuarial liabilities.
  - g. Interim actuarial opinion: Common term, not used in SOP.
3. 3 Events That Are Definitive Before the Report Date (i.e., Subsequent Event)
  - a. The event must be:
    - i. Taken into account in calculations; or
    - ii. Disclosed but excluded, with explanation and quantification (SOP 1710.24).
4. Three Methods to Reflect Events in Calculation
  - a. One actuarial opinion (single calculation date)
    - i. Value plan *including* impact of the event using assumptions valid at calculation date.
    - ii. Contributions may begin: At calculation date, or At event's effective date — but using assumptions valid at calculation date.
  - b. Two actuarial opinions (two calculation dates)
    - i. First opinion: excludes events.
    - ii. Second opinion: includes events.
    - iii. Each based on appropriate membership data and assumptions for its calculation date.
  - c. One opinion at calculation date + separate opinion for event
    - i. First: regular valuation at original calculation date.
    - ii. Second: assess the financial impact of the event (e.g., liability increase of \$X).
    - iii. Must include a hypothetical wind-up funded status at event date (SOP 3260.04)
    - iv. Does not require opining on funded status unless required.
5. Method Selection Depends On:
  - a. Type and size of event.
  - b. Funded status of plan.
  - c. Legal requirements and plan policy.
  - d. Time between calculation date and event date.
6. Observations:
  - a. Method 4a) best when the event occurs shortly after calculation date.
  - b. Method 4b) preferred for large gaps or membership changes.
  - c. Method 4c) only suitable if no full funded status opinion is required after the event.
7. Events That Are Definitive After the Report Date
  - a. No obligation to seek new info post-report date.
  - b. But if actuary becomes aware of an event: may need to withdraw or amend the report (SOP 1710.40–.43)
  - c. If not amended/withdrawn, no obligation to report on the event — unless requested.

- d. If directed to report, apply:
  - i. Method 4b): Full new report at revised date with appropriate data/methods/assumptions.
  - ii. Method 4c): Report only the event's impact, including hypothetical wind-up at revised date.
- 8. Implications for Financial Reporting
  - a. Accounting treatment may differ.
  - b. E.g. under IFRS, refer to IAS 10 and SOP 1430 for guidance on events after the reporting period.
- 9. Final Note
  - a. Membership data must be appropriate as at the calculation date, but it is acceptable to project earlier data, if sufficiently reliable for the purpose.

## **GUIDANCE ON SELECTION AND DISCLOSURE OF PLAUSIBLE ADVERSE SCENARIOS**

### **CIA Educational Note, Apr 2023**

1. Applies to funded status and, if applicable, service cost between valuation dates.
2. Focus is not a full risk analysis but rather sensitivity testing of key risks.

### **SUMMARY OF DISCLOSURE REQUIREMENTS**

1. Required when external user report includes Going concern, hypothetical wind-up, or solvency valuations.
2. Must disclose the impact of Plausible Adverse Scenarios (PAS) on:
  - a. Funded status (assets and liabilities separated); and
  - b. Service cost (if going concern valuation is included).
3. Must select PAS in consultation with the plan administrator or sponsor.
4. PAS disclosure not required if:
  - a. Plan is a “designated plan” (only connected persons).
  - b. Plan is not registered under Canadian pension standards.
  - c. Valuation is extrapolated from a previous report.
5. Risks to Consider
  - a. Interest rate risk: Rates lower than expected.
  - b. Asset value deterioration.
  - c. Longevity risk: Members live longer than expected.
  - d. Contribution base risk: For fixed/restricted contribution plans.
6. Definition and Selection of PAS
  - a. Must be plausible (non-trivial probability) and adverse.
  - b. Typically, likelihood of 1-in-10 to 1-in-20.
  - c. Can be selected using deterministic or stochastic methods.
  - d. May be supported by:
    - i. Stress testing in financial statements.
    - ii. Actuarial models or previous work.
  - e. May vary by plan and over time.
7. Flexibility in Application
  - a. Can reflect sponsor/administrator’s views.
  - b. May apply:
    - i. Individually or in combination
    - ii. With compensating adjustments (e.g., reduced discount rate margins).
  - c. Must exclude adjustments requiring changes to plan provisions.
8. Disclosure Requirements
  - a. Qualitative description of each PAS.
  - b. List of assumption changes from baseline.
  - c. Description of cross-effects if multiple risks combined.
  - d. Disclosure of:
    - i. Results before and after any permitted adjustments.
    - ii. Methodology consistent with valuation basis.
9. Guidance - Interest Rate Risk
  - a. Reflects immediate decline in market interest rates.
  - b. Impacts fixed income assets and liabilities.
  - c. Discount rate adjusted accordingly.
  - d. Smoothed or unsmoothed asset values must be consistent.
10. Guidance - Deterioration of Asset Values
  - a. Equity or total asset value drops (e.g., 15%).
  - b. No liability assumption changes.

- c. May apply to non-fixed income assets only.
- 11. Guidance - Longevity Risk
  - a. Increased life expectancy (e.g., +10%).
  - b. Various modeling approaches: mortality table, improvement rate, age offset.
  - c. Small plans may show higher variability.
  - d. May exclude commuted value portion of liabilities.
- 12. Guidance - Fixed Contribution Risk
  - a. Immediate drop in expected contributions.
  - b. Based on trade/industry or plan history.
  - c. Persistence of drop (short vs long term) considered.
  - d. May also impact demographic profile and average service cost.
- 13. Guidance -Combined Risks
  - a. Disclosure optional, but if included:
  - b. Cross-effects must be explained.

### **EXAMPLE 1 – GOING CONCERN (SINGLE-EMPLOYER)**

#### **Plan Context**

- Valuation date: Dec 31, 20xx
- Asset mix: **60% equity / 40% fixed income**
- Uses **asset smoothing**

#### **Scenarios Applied (Separately)**

1. **Interest Rate Risk**
  - 100 bps decrease in fixed income rates
  - 100 bps drop in **future expected returns**
  - **Discount rate** decreased by 100 bps
2. **Asset Value Deterioration**
  - Immediate **15% drop in equity values**
  - No change in liabilities
3. **Longevity Risk**
  - **Life expectancy increases by 10%**
  - Reflects change in mortality assumptions

#### **Results (in C\$ millions)**

<b>Metric</b>	<b>Base Case</b>	<b>Interest Rate Risk</b>	<b>Asset Value Drop</b>	<b>Longevity Risk</b>
<b>Assets (not smoothed)</b>	100	104	91	100
<b>Assets (smoothed)</b>	95	96	94	95
<b>Liabilities</b>	85	95	85	93
<b>Funded Status</b>	10	1	9	2
<b>Total Service Cost</b>	12	14	12	13
<b>Life Expectancy at 65 (yrs)</b>	20	20	20	22

**Key Observations**

- Interest rate decline leads to **higher liabilities** and **higher service cost**.
- Equity decline reduces asset values, moderately reducing funded status.
- Longevity increases liability, lowering funded status.

**EXAMPLE 2: MULTI-EMPLOYER PENSION PLAN (MEPP)****Plan Context**

- Valuation date: Dec 31, 20xx
- Asset mix: 60% equity / 40% fixed income
- **No asset smoothing**
- Includes **fixed contributions**
- Disclosure includes impact on **ability to meet funding requirements** under paragraph 3260.14

**Scenarios Applied**

1. **Interest Rate Risk:** Same as Example 1
2. **Asset Value Drop:** Same as Example 1
3. **Longevity Risk:** Same as Example 1
4. **Contribution Base Risk:**
  - 15% reduction in future contributions

**Results (in C\$ millions)**

<b>Metric</b>	<b>Base</b>	<b>Int. Rate Risk</b>	<b>Asset Value Drop</b>	<b>Longevity Risk</b>	<b>Contrib. Base Risk</b>
<b>Assets</b>	75	78	68	75	75
<b>Liabilities</b>	85	95	85	93	85
<b>Funded Status</b>	-10	-17	-17	-18	-10
<b>Expected Contributions</b>	14	14	14	14	12
<b>Total Service Cost</b>	12	14	12	13	11
<b>Total Deficit Funding</b>	1	2	2	2	1
<b>Contribution Excess/Shortfall</b>	1	-2	0	-1	0
<b>Life Expectancy (yrs)</b>	20	20	20	22	20

**Key Observations**

- Contribution base risk affects the plan's ability to meet **funding targets**.
- Adverse scenarios create a **larger deficit** and reduce contribution flexibility.
- Useful for **MEPPs** or **target benefit plans** where fixed contributions are a funding constraint.

### **EXAMPLE 3: SOLVENCY VALUATION – ANNUITY PURCHASE ASSUMPTION**

#### **Plan Context**

- Solvency valuation as at Dec 31, 20xx
- All liabilities assumed to be settled via **annuity purchase**
- Asset mix: 60% equity / 40% fixed income
- No service cost disclosed (not applicable under solvency)

#### **Scenarios Applied**

1. **Interest Rate Risk**
  - 100 bps drop in annuity and CV rates
  - Both asset and liability sides affected
2. **Asset Value Drop**
  - Immediate 15% decline in equities
3. **Longevity Risk**
  - 10% increase in life expectancy (same as previous examples)

#### **Results (in C\$ millions)**

<b>Metric</b>	<b>Base</b>	<b>Int. Rate Risk</b>	<b>Asset Value Drop</b>	<b>Longevity Risk</b>
<b>Assets</b>	100	104	91	100
<b>Liabilities</b>	85	95	85	93
<b>Funded Status</b>	15	9	6	7
<b>Life Expectancy (yrs)</b>	20	20	20	22

#### **Key Observations**

- Solvency funded status is **highly sensitive** to interest rate movements and longevity assumptions.
- Asset declines impact funded status sharply due to full annuity settlement assumption.
- Useful scenario for plans facing a **termination scenario** or where solvency funding is regulated.

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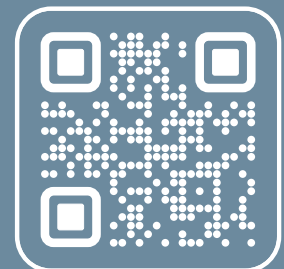
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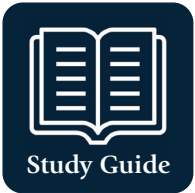


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Question Difficulty: Advanced

An airport purchases an insurance policy to offset costs associated with excessive amounts of snowfall. The insurer pays the airport 300 for every full ten inches of snow in excess of 40 inches, up to a policy maximum of 700.

The following table shows the probability function for the random variable  $X$  of annual (winter season) snowfall, in inches, at the airport.

Inches	[0,20)	[20,30)	[30,40)	[40,50)	[50,60)	[60,70)	[70,80)	[80,90)	[90,inf)
Probability	0.06	0.18	0.26	0.22	0.14	0.06	0.04	0.04	0.00

Calculate the standard deviation of the amount paid under the policy.

Possible Answers

A 134  
 ✓ 235  
 ✗ 271  
 D 313  
 E 352

Help Me Start

Find the probabilities for the four possible payment amounts: 0, 300, 600, and 700.

Solution

With the amount of snowfall as  $X$  and the amount paid under the policy as  $Y$ , we have

$y$	$f_Y(y) = P(Y = y)$
0	$P(Y = 0) = P(0 \leq X < 50) = 0.72$
300	$P(Y = 300) = P(50 \leq X < 60) = 0.14$
600	$P(Y = 600) = P(60 \leq X < 70) = 0.06$
700	$P(Y = 700) = P(X \geq 70) = 0.08$

The standard deviation of  $Y$  is  $\sqrt{E(Y^2) - [E(Y)]^2}$ .

$$E(Y) = 0.14 \times 300 + 0.06 \times 600 + 0.08 \times 700 = 134$$

$$E(Y^2) = 0.14 \times 300^2 + 0.06 \times 600^2 + 0.08 \times 700^2 = 73400$$

$$\sqrt{E(Y^2) - [E(Y)]^2} = \sqrt{73400 - 134^2} = 235.465$$

Common Questions & Errors

Students shouldn't overthink the problem with fractional payments of 300. Also, account for probabilities in which payment cap of 700 is reached.

In these problems, we must distinguish between the REALT RV (how much snow falls) and the PAYMENT RV (when does the insurer pay)? The problem states "The insurer pays the airport 300 for every full ten inches of snow in excess of 40 inches, up to a policy maximum of 700." So the insurer will not start paying UNTIL AFTER 10 full inches in excess of 40 inches of snow is reached (say at 50+ or 51). In other words, the insurer will pay nothing if  $X < 50$ .

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