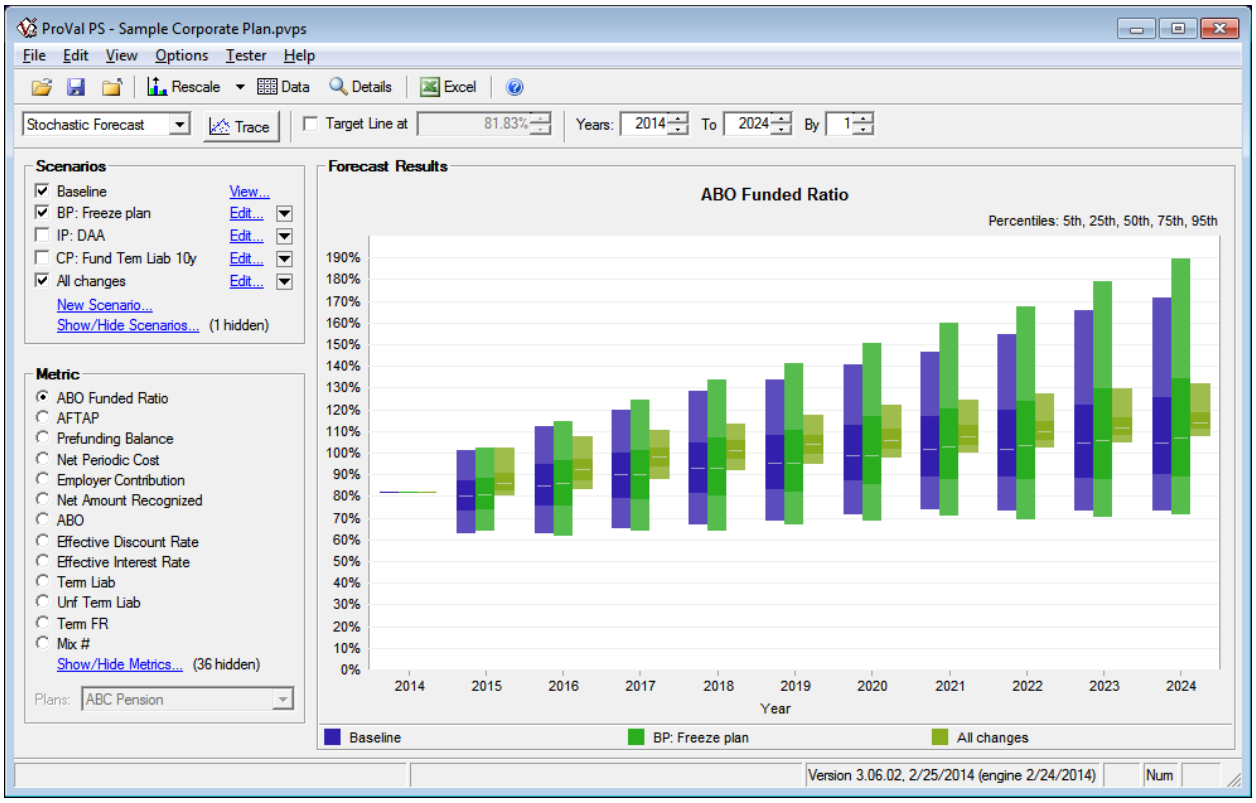
What's New in version 3.06 April 2014

ProVal version 3.06 introduces a revolutionized ProVal PS with an entirely new interface and vastly expanded capabilities, a flattened benefit interface, database renaming, distributed processing for stochastic forecasts, settlement and curtailment accounting in forecasts, interest rate sensitivity results in a valuation, support for increased PBGC premiums under the Bipartisan Budget Act, a PBGC XRA calculation tool and many other features listed below.

ProVal PS

- **ProVal PS** features an entirely new interface and vastly expanded capabilities. The interface is designed to enable decision making by letting you set up multiple scenarios based on different policies and compare them side-by-side. You can model different contribution policies, credit balance policies, benefits policies, and investment policies, seeing how they perform both deterministically and stochastically. Policy options have been kept at a high level, targeting a board room level experience. Some specific features include:
  - Deterministic and stochastic forecasts in real time, including stochastic trial trace and target probabilities.
  - Totals across plans, including different types (e.g., Pension, SERP, and OPEB).
  - Large roster of metrics (variables) to compare scenarios on.



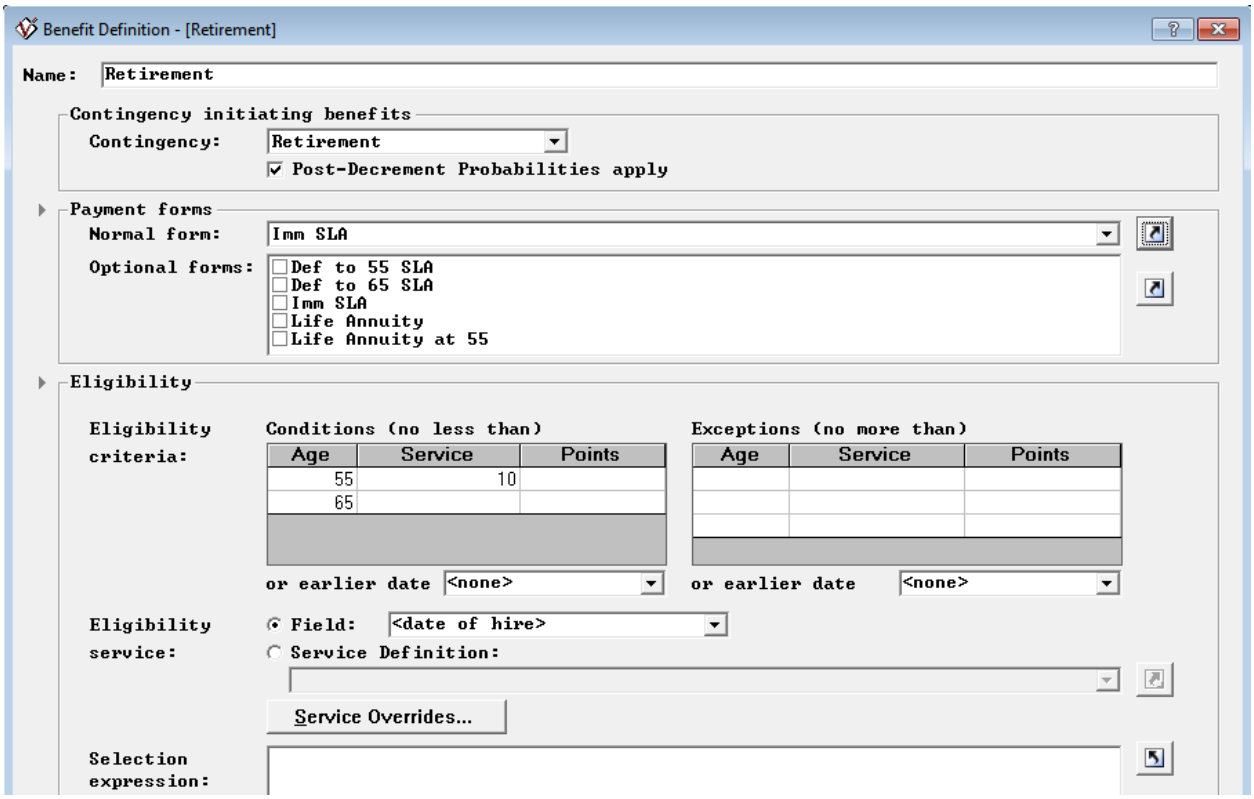
For more, see **ProVal PS** on page 10.

Census Data

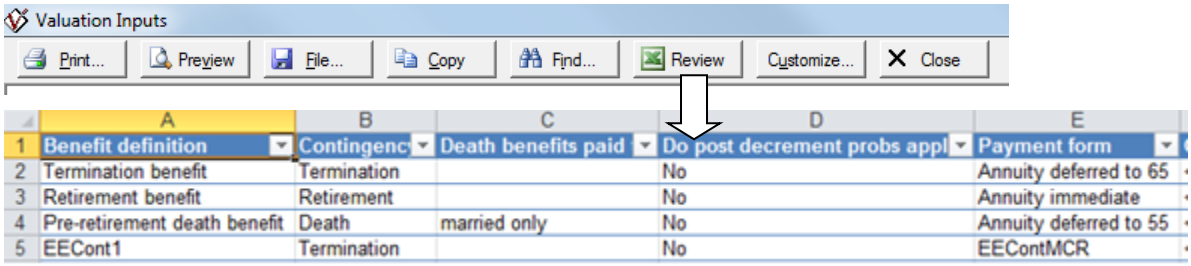
- **Database renaming.** Database files can be renamed. The new name will flow through to places where databases are referenced (e.g., valuations). Additionally, databases can no longer be erased within ProVal if there is *any* reference to it (previously, that was the case if it was referenced by something that had been run).
- **Copying large blocks of data** in spreadsheet edit is much faster. In one test, copying 261,120 records for 4 fields was reduced from over 8 minutes to 18 seconds.

Workflow

- **Flattened benefit interface.** The Benefit Definition topics have been combined into a single dialog box, with several parameters (e.g. the payable party in death benefits) rearranged into a more logical location. This eliminates clicking when setting up plans and allows all pertinent parameters to be easily viewed.



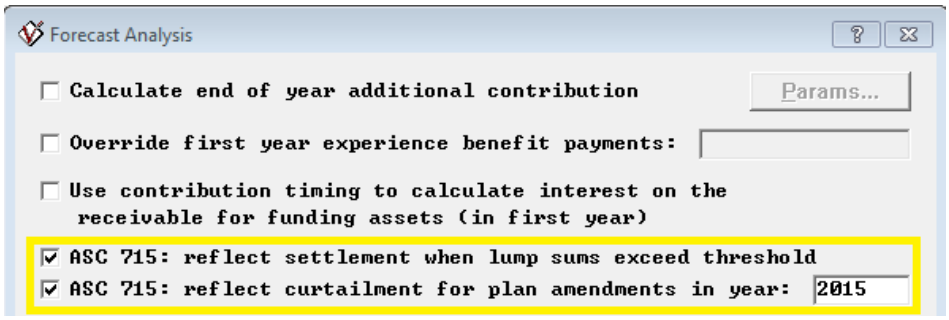
- **Scrolling for dialog boxes with many parameters.** Tall dialog boxes can be scrolled.
- **Reviewing benefits.** To make inputs easier to review:
  - The listing of benefit entries has been condensed, without sacrificing readability. This is to facilitate paper review and documentation.
  - A tabular export to Excel of benefit entries is available to facilitate interactive review with filtering, sorting, etc.



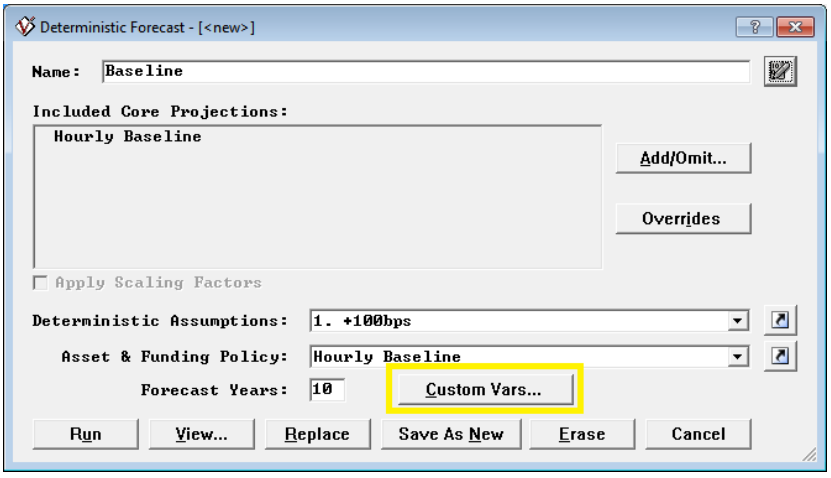
Forecasting

- **Distributed processing** via the Grid platform is available for stochastic forecasts. In addition, stochastic forecasts that use full yield curves (as opposed to parallel shifts) have been optimized and are 7-8 times faster.
- **Overrides and shifts.**
  - In Stochastic assumptions, all overrides are available for two years.
  - In Stochastic assumptions, full yield curves can be overridden.
  - In Stochastic assumptions, capital market simulated values can be shifted prior to applying the first and second year overrides.
  - A first year known asset value can be entered to override the first year investment return.

  For more, see **Enhancements to Stochastic Forecast overrides** on page 13.
- **Settlements and curtailments.**
  - ASC715 settlement charges triggered by lump sums can be reflected in forecasts. If selected, settlement calculations will be performed at the end of each year where lump sum payments exceed interest cost plus service cost.
  - ASC715 full curtailments can be reflected in a forecast by specifying the year in which the curtailment is deemed to occur.

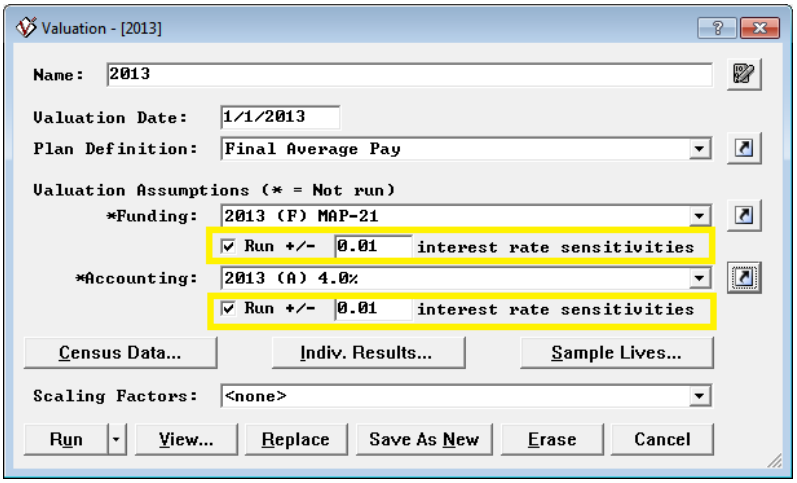


- **Custom forecast variables** are available for deterministic forecasts, not just stochastic. And, they flow through to ProVal PS.



All Plans

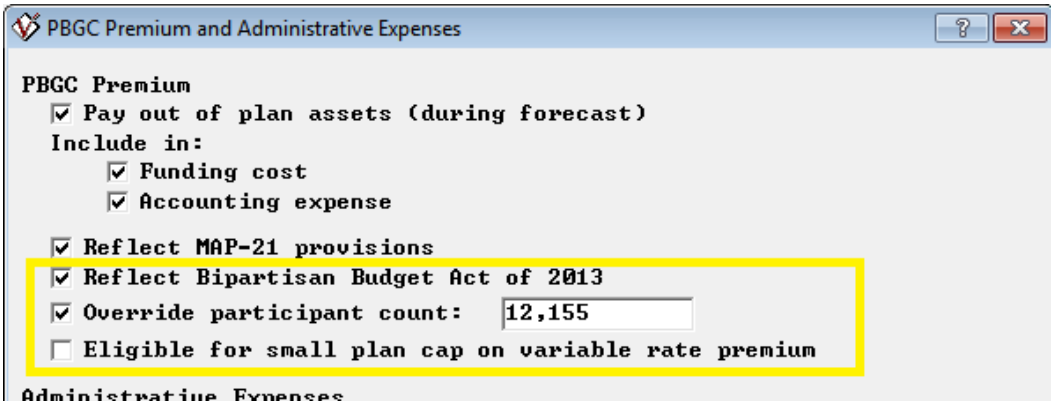
- **Interest rate sensitivities.** Valuations can automatically run +/- interest rate sensitivities useful for accounting disclosures. The interest rate change can optionally apply to lump sum factors and optional payment forms and the sensitivity results can be selected for use in a Valuation Set.



- **Children.** Inactive records less than age 15 will no longer be excluded from processing. They will be valued with zero mortality rates before age 15. This eliminates the previously used workaround of changing their birth dates and setting their payment form to a certain only annuity.
- For active participants, actual spouse date of birth can be used in lieu of the spouse setback in valuation assumptions.
- ASC715 has a new amortization option to immediately recognize gains and losses.
- There is a new contribution policy to contribute the normal cost. In U.S. Qualified mode, a second contribution policy was added to contribute the PPA target normal cost.
- Valuations that save individual results run faster. In one test, saving individual results for 1.5 million participants and 18 fields reduced the total run time by almost 5 minutes.

US Qualified Pension Plans

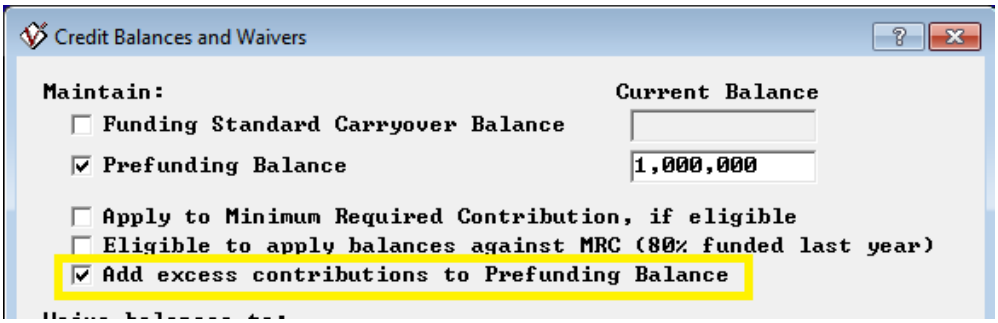
- **PBGC premiums**
  - **Bipartisan Budget Act of 2013.** A checkbox in the PBGC Premium dialog box of the Asset & Funding Policy will apply the provisions of the Bipartisan Budget Act of 2013 applicable to plan years beginning in 2015.
  - **Counts**. To ensure that the PBGC Premium is accurate:
    - There is an input to override the participant count
    - There is a checkbox to apply the PBGC small plan cap on the variable rate premium.



- **XRA Calculations tool.** A new U.S. PBGC Expected Retirement Age calculations tool calculates expected retirement ages (XRA) for 4010 and 4044 calculations.

  For more, see **U.S. PBGC Expected Retirement Age Calculations Tool** on page 15.

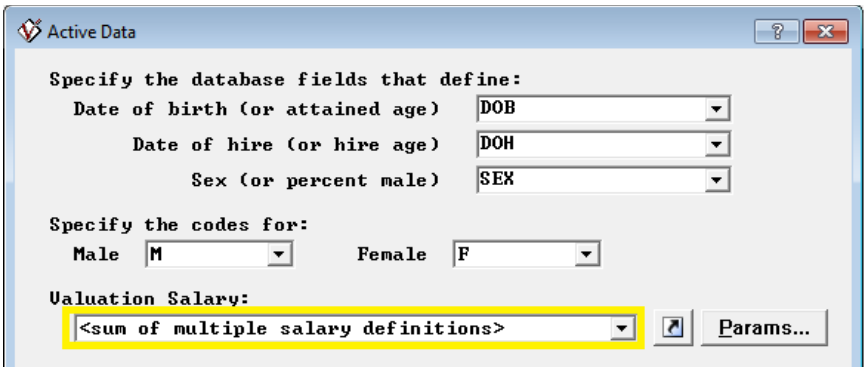
- **Credit balances.** In the Asset & Funding Policy, a new credit balance option lets you enter a prefunding balance but not add to it.



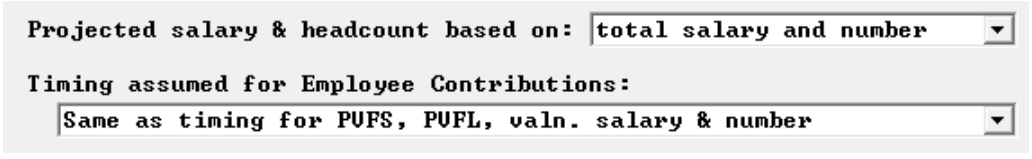
- Exhibit details
  - The Funding Target exhibit includes the development of the funding target attainment percentages.
  - In the Valuation Set Development of Employer Contribution exhibit, the cash contribution made to cover each quarterly plus the final make up payment is displayed.

US Public Pension Plans

- **Valuation Salary** can be the sum of multiple Salary Definitions. In addition, each Salary Definition can optionally apply a custom limit. This allows total control over the Present Value of Future Salary calculation which is useful for aggregate and entry age normal methods.



- **Employee contributions**
  - Projected employee contributions are available in valuation output.
  - More than 1 employee contribution benefit definition is permitted. This allows the output item present value of employee contributions to be split by benefit.
  - The Timing of Employee Contribution parameters in Valuation Assumptions > Liability methods includes additional options to be consistent with the PVFS timing adjustment.
- **Projected salaries** can be based on valuation salary by selecting an option in Valuation Assumptions > Liability methods to ensure that projected salaries discount to the Present Value of Future Salaries. Same goes for projected headcounts discounting to Present Value of Future Service.

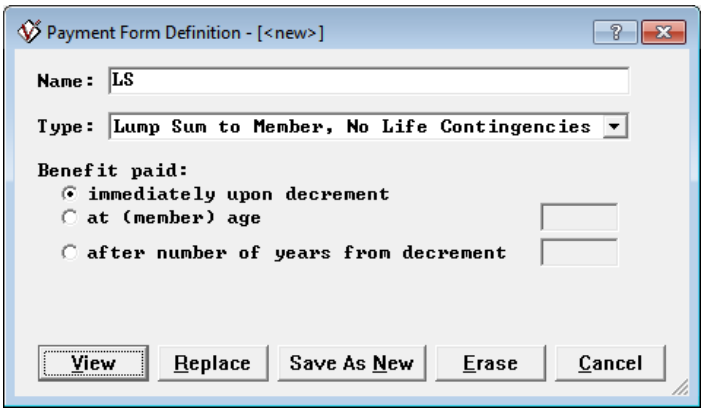


- Individual results are available for intermediate entry age normal values: Present Value of Future Benefits from funding age, Present Value of Future Salaries from funding age, and Present Value of Future Working Lifetimes from funding age.

The features above are available in all modes (where applicable), but inspired by US public pension plans.

OPEB Plans

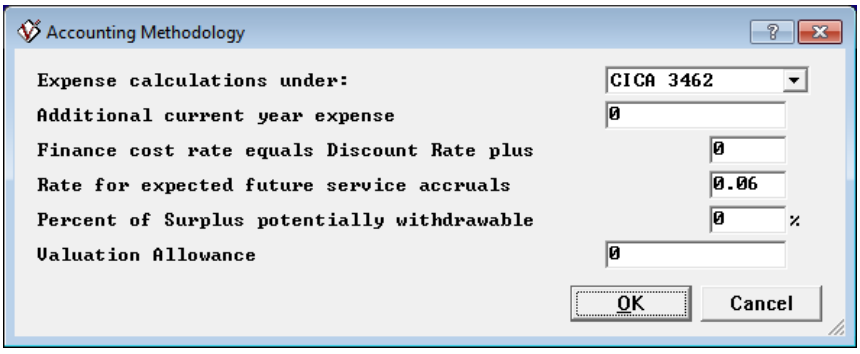
- **Inactive and emerging inactive headcounts** no longer double counts participants who are eligible for multiple benefits. Additionally, headcounts may be split by member and spouse and by benefit.
- **Lump sums.** Two new payment forms, "Lump Sum to Member, no Life Contingencies" and "Lump Sum to Member, Life Contingencies" are available. This is similar to the previous workaround of setting up a one-year temporary benefit except the payment is made at the beginning of the year.



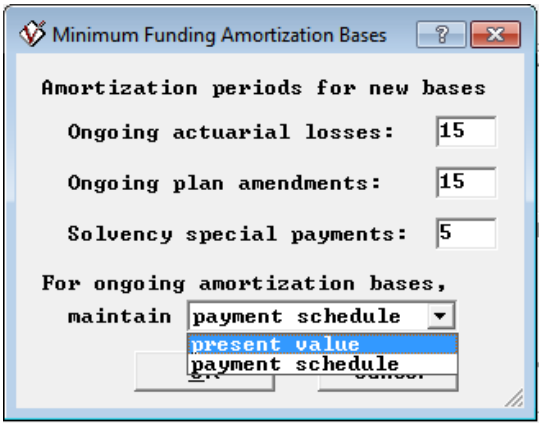
- Attained Age for Inactive Members and Attained Age for Inactive Spouses are available as individual results. The split is also available in output if member/spouse detail is selected.

Canadian Registered Pension Plans

- **The new CICA 3462 accounting standard** is available.



- **Minimum Funding amortization.** In the Asset & Funding Policy, Minimum Funding Amortization Bases, a new option allows ongoing amortization bases to maintain the payment schedule, recalculating the payment period if interest rates change.



- **Solvency amortization.** The solvency amortization rate can be based on a blend of the annuity purchase and transfer value interest rates based on the liability weightings. This option is found in the Asset & Funding Policy > Contribution Policy topic.
- Solvency liability interest rates are permitted to be negative. This will allow users to fully reflect the CIA guidance on annuity purchase interest rates which sometimes results in negative interest rates for indexed plans.
- Lump sum factors can specify pre/post-commencement interest rates. This is useful for valuing the 50/100% rule under the recommendations made by the D'Amours Committee report.
- Employee contributions have had several enhancements. Details can be found above in the section for U.S. Public Pension Plans.

UK Pension Plans

- **Streamlined tranches.** To streamline coding benefit formulas, multiple tranches can be defined within a single active or inactive benefit.

Benefit tranches

Table Library...

Tranche	Benefit Formula	Pre-88 GMP at Valuation	Post-88 GMP at Valuation	ERF table on Notional GMP	PPF Interest Category
		<none>	<none>	<none>	Pre-1997
		<none>	<none>	<none>	Pre-1997
		<none>	<none>	<none>	1997 to 2009
		<none>	<none>	<none>	1997 to 2009
		<none>	<none>	<none>	Post-2009

- **Barber Equalization.** An ERF table to be applied to the Notional GMP can be specified for the Explicit Barber equalization calculation.
- **Control periods.** In funding valuation assumptions, a new parameter, found on the Liability Methods topic, specifies the control period which may be longer than 1 year. The projected unit credit and pure unit credit normal costs will be calculated for the entire control period. The actuarial present value of salaries and employee contributions over the control period will be available in output.
- **Valuation Sets, forecasts, report writer, and ProVal PS.** Valuations Sets, Deterministic, and Stochastic Forecasts are available in UK Mode. This also means that Report Writing and ProVal PS are available for UK Pension Plans.
- You can optionally apply the postcode mortality scaling factor to post-commencement mortality only.

German Pension Plans

- **Valuation Sets, forecasts, report writer, and ProVal PS.** Valuations Sets, Deterministic, and Stochastic Forecasts are available in German Pension Mode. This also means that Report Writing and ProVal PS are available for German Pension Plans.
- In Valuations, the "calculate projected benefits and headcounts" checkbox can separately apply to tax/funding and accounting results.

Belgian Pension Plans

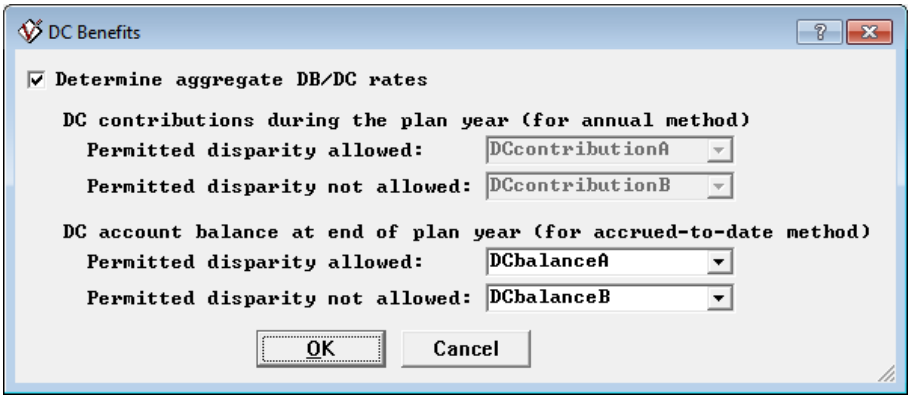
- In Universal mode, two operators available in benefit formulas, #RESERVEERPS and #RESERVEEEPS, return the profit sharing ("participation") reserve in participating insurance contracts.

Pension Plans

- Life insurance payment forms:
  - can apply COLAs
  - allow a table of adjustment factors to be applied to the benefit
- Lump sum factors, optional forms, and administrative factors can reference mortality tables with 2D improvement scales.
- Optional forms can reference age by year of birth mortality tables.

Nondiscrimination Testing

- **Permitted Disparity for aggregate DB/DC.** In the U.S. Nondiscrimination Accrual Rates tool, when aggregating DB/DC rates, the DC values not subject to permitted disparity can be specified. Individual Results will write out the Accrual Rate not subject to permitted disparity to be used as an input in the Permitted Disparity Topic of the Coverage and General Test tool.



Gain/Loss Analysis

- Gain/Loss can be run on plans with in-service benefits.

Output & Reporting

- A checkbox in Valuation Output > Liabilities > Details allows detail splits to not apply for projected benefit payments.
- In the Report Writer, customized asset data can be imported from one access database to another.
- In Sample Lives, dates are displayed in a date format for components that reference a date field. To force a component to be formatted as a date, name it with the suffix "_dt".

System

- Date/time is now formatted using 12 hour (AM/PM) or 24 hour clock per Regional Settings.
- Timestamps will now be stored relative to UTC rather than local time allowing entries to be in chronological order when work is done in different time zones.
- "Excel Binary Workbook (*.xlsb)" is an acceptable file type for exporting from or importing to ProVal.
- In Valuation and Projection Assumptions, filters have been added to the following topics:
  - A Plan Filter on the Increase Rates topic for Benefit Formula components and Accrual Basis Formula components.
  - A Plan Filter on the Valuation Assumption Sensitivities topic of Projection Assumptions for Benefit Formula components, Accrual Basis components, and lump sum and optional payment forms.
  - A Census Specifications filter on the inactive benefit tab of Cost of Living Adjustments.
- In individual results, the fields that add benefit amounts across contingencies and optional forms are no longer available. This means you can select "all" without getting warnings about nonsensical results.
- There is a "View" button on backdoor selection boxes with the same functionality as the "View" button on the command bar.

ProVal API

- Installation steps for the ProVal API have changed. ProVal.exe must be registered and the PVAPI.ini file is no longer used. See "ProVal API Users Guide.pdf" in the ProVal installation folder for more details.

Changes Log

- Be sure to read the changes log (see the "changes log.doc" file in the ProVal directory) about updates to certain calculations that may change results.

WinTech

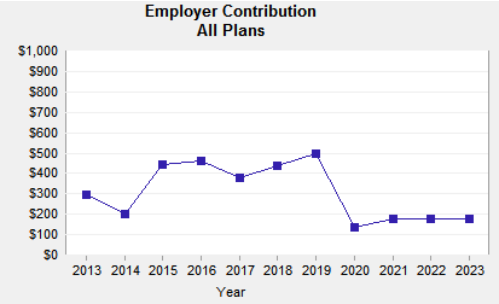
Two Greenwich Office Park
Greenwich, CT 06831

(203) 861-5530
support@winklevoss.com
www.winklevoss.com

ProVal PS is an interactive modeling application for financing pension and OPEB benefits, designed to arm decision makers with critical data and foster collaboration between the plan sponsor, their actuary, and their investment advisors. Its user experience is boardroom-friendly and requires little actuarial knowledge to run both deterministic and stochastic projections. By generating the right data, and comparing scenarios side-by-side, ProVal PS fosters a deeper understanding and develops critical documentation to support policy decisions on your plans like never before.

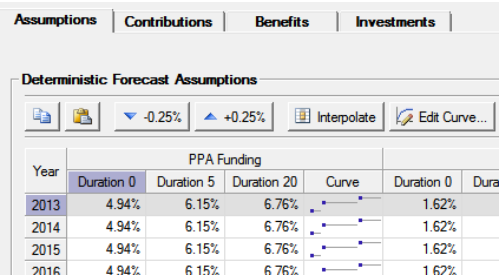
Key features and functionality

Deterministic forecasts



Deterministic forecasts are easy to setup and run. Reviewing a baseline deterministic forecast of the current state can reveal a lot about the condition and the trajectory of plan finances. It illustrates the projected value of key metrics into the future based on a discrete value for each input variable, such as investment return or interest rates. It shows the expected outcomes. The baseline Deterministic Forecast – where all of the assumptions are realized – is a ubiquitous chart in most actuarial and asset allocation work, and typically the first item of review.

What-if . . .



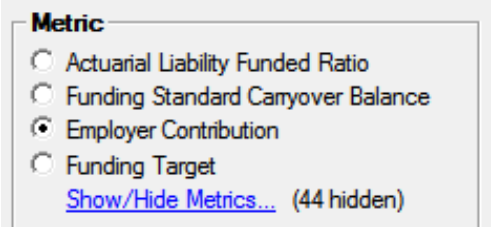
To understand the sensitivity of key results to changes in one or more the inputs, you can run what-if forecasts. You can vary virtually any aspect of the forecast:

- Economic assumptions – what happens to funded ratios if returns will be 7% instead of 7.5% as assumed?
- Contribution policy – should I accept a funding holiday when it comes, or floor contributions at the normal cost?
- Credit balance policy – how much contribution risk can be mitigated if I build up a credit balance in times when cash is available?
- Benefits policy (plan design) – what is the long term impact of adding a new tier of benefits with higher employee contributions and lower cost of living adjustments?
- Investment policy – how does contribution risk change with a new mix?
- Demographic assumptions – how fast will the credit balance be depleted if the industry

recedes further and hours worked decline by 20%?

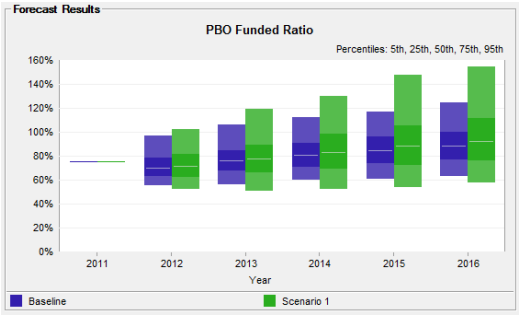
Although some alternatives have to be developed in ProVal and inserted into the PS file, most key parameters are "live" and can be changed directly in ProVal PS.

Risk & reward

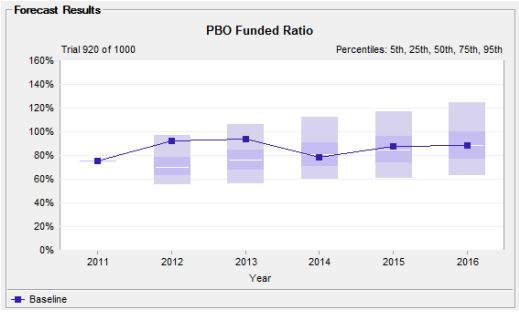


Many plan managers adopt customized (or even unique) definitions of risk and reward and accordingly, the data produced by ProVal PS can be filtered to reflect those definitions. You can tailor the list of metrics that is visible, in order to ignore the ones that just don't matter to you. You can define your own **custom variables** (and name them yourself) in ProVal and display them in ProVal PS.

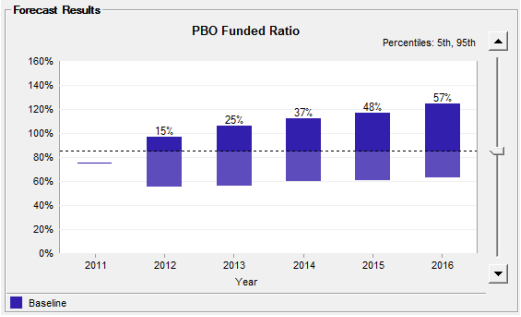
Asset liability modeling



To model plan risks by running thousands of trials of economic experience, run one or more **Stochastic Forecasts**. These create distributions of key metrics into future years. It shows the range of potential outcomes and the likelihood of their occurrence.

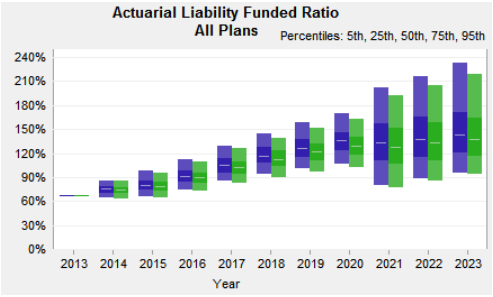


If stochastic outliers beg for questions, you can perform a **trial trace** by referencing a specific result (e.g. the worst case contribution in 2020) and revealing the details of that trial, to better understand the drivers that generated it.



By turning on the **target line** and setting to a specific value, a new line chart is overlaid onto the floating bars, separating the chart into two sections: trials that fell above or below that target value, and the approximate probability of each section. Answers questions such as: what is the chance our contribution might exceed 10M in 2015?

Side-by-side comparisons

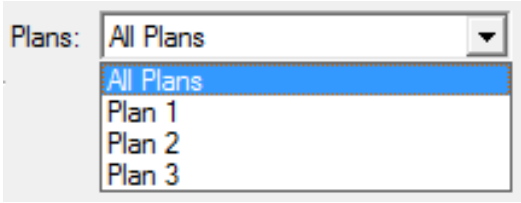


The essential value of projections lies in comparing them to other projections. As Edward Tufte wrote in *In Envisioning Information*:

At the heart of quantitative reasoning is a single question: *Compared to what?* Small multiple designs, multivariate and data bountiful, answer directly by visually enforcing comparison of changes, of the differences among objects, of the scope of alternatives.

ProVal PS allows you to establish scenarios to facilitate such comparisons and view them side by side in the same chart.

Multiple plans supported



Medium- to large-plan sponsors often have multiple plans and ideally, would analyze changes considering all of their plans together. ProVal PS allows you to aggregate as many plans as you like, even of disparate types (pension, SERP, and OPEB plans), and will show forecast results for each plan individually as well as show a total for all plans combined.

Other key features

- Export to Excel: You can dump all results into a spreadsheet with a single click, in case you want to incorporate your work with other projects or prepare a custom chart.
- Percentiles: ProVal PS calculates all stochastic results on a trial by trial basis, then percentiles them. The default presentation is to show the 5th, 25th, 50th, 75th and 95th percentile values but these may be changed in the program at any time.
- Rescale charts: It is sound graphical practice to maintain consistent y-axis values when comparing items of similar units. The rescale button allows full control over the y-axis to facilitate this.
- Details: This corresponds to ProVal's Deterministic forecast exhibits, and is available for Deterministic forecasts and when using trial trace.
- Custom code: ProVal PS will inherit and honor many custom code modules created for use in ProVal.

Licensing and fees

ProVal PS is a separate application requiring an additional license agreement. If you would like to discuss commercial arrangements, please call Colin Gilbert at (203) 861-5504.

Enhancements to Stochastic Forecast overrides

A stochastic forecast simulates thousands of future actuarial valuations under a wide range of economic conditions that reflect variation in investment returns, inflation, and interest rates. This process generates distributions of outcomes for key variables that allow for risk management, such as funded status volatility and contribution risk.

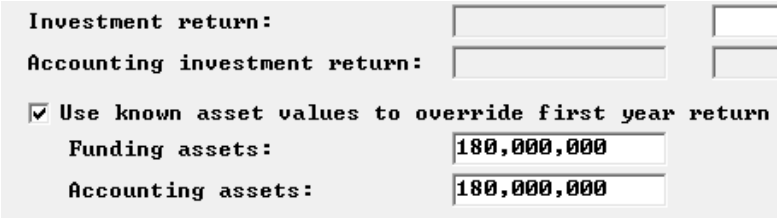
Procedurally, once the valuation date is more than a year in the past, the actual first year experience is typically available. Example, doing a forecast study in mid-2014 based off the most recent valuation date of 1/1/2013, it probably does not make sense to see a range of forecasted asset values at the first forecast date (1/1/2014) if that amount is fixed and known. In these cases it is common practice to override the first year simulated values with the known, fixed values, substituting actual for assumed experience. ProVal has had parameters to do this – in the First Year Overrides topic of Stochastic Assumptions -- virtually since its inception.

These override capabilities have been greatly enhanced in version 3.06 to allow:

- Input of the override asset value (in dollars) instead of an annual return (as a percentage)
- Specification of override yield curves
- Option to shift CMS values during an override
- Option to perform a 1-year or a 2-year override

Overriding the asset value

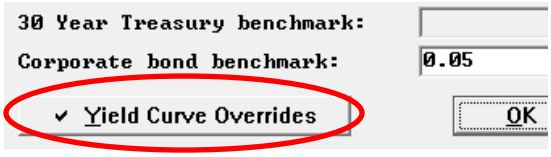
ProVal has explicit parameters to enter the first year asset values in dollars. The original option (to specify a return as a percentage) is still available.



Specifying override yield curves

Many liability interest rate assumptions are defined by market yield curves, including funding rates under PPA, solvency rates in Canada, and implicitly, discount rates for employer accounting under most standards. Effective with version 3.06, if you are forecasting to a full yield curve, you may specify specific yield curves (from the Forecast Yield Curves Library) to override simulated curves for this purpose. [Full yield curves are not used if your Stochastic Assumptions define interest rates by applying parallel shifts, or by deriving rates from a benchmark. Under these conditions, simply override the benchmarks].

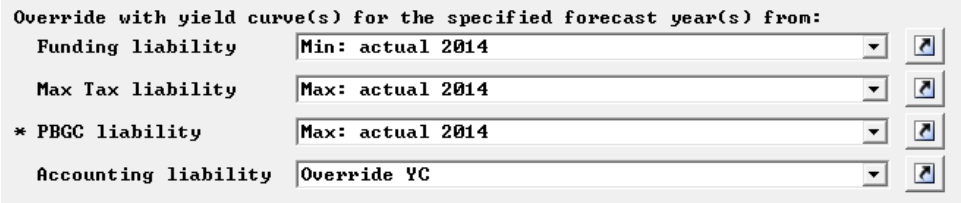
To enter the yield curve overrides, look for the new button on the bottom of the First & Second Year Simulation Overrides dialog:



The available entries will depend on your law type and will generally (but not exactly) resemble Deterministic Assumptions for Future Valuation Interest Rates. The entered curves will replace the simulated yield curves from your capital market simulation for the given liabilities.

A few important notes:

- MAP-21 – The yield curve override entered for **Max Tax liability** will feed the history of 24-month averages. The entry for **Funding liability** (optional) simply fixes the valuation assumption and has no bearing on future years. Thus it is essential to enter the appropriate unadjusted 24-month averages (as of September) for the Max Tax override in order for the subsequent forecasted averages to be correct. Merely entering the adjusted/corridor-ized segment rates for the Funding liability override will not generate appropriate rates beyond the override date.



- Canada – As the valuation interest rates for solvency are defined as forward rates, overrides must be consistent, and ProVal will issue an error if Forecast Yield Curves of other types (e.g. spot rates) are used.

Shift option

To perform an override where the valuation date is more than a year old and the Capital Market Simulation (CMS) is calibrated to current conditions, you should consider the option to shift your CMS values prior to override.

It is common for investment consultants to prepare new capital market assumptions for each year -- reflecting their forward-looking views about inflation, interest rates and investment returns -- and with it, a new ProVal capital market simulation. Thus a 10-year 2012 CMS generates trial data generally applicable for years 2012-2021, and is used in projections with 2012 valuation dates. Early in 2013, a new CMS emerges, applicable for years 2013-2022 (using same example of a 10-year forecast). And the new shift option is intended for the period of time that the 2013 CMS is available before the 1/1/2013 valuation is available. The following are some examples of overrides with and without a shift to fully illustrate their impact and application:

Case 1 – Regular override

- Most recent valuation: 1/1/2012
- Most recent CMS: **2012**

In this case, the first simulated year is 2012 experience, and a traditional override is appropriate.

Case 2 – Override with shift option

- Most recent valuation: 1/1/2012
- Most recent CMS: **2013**

In this case, the first simulated year in the 2013 CMS is 2013. If you use this simulation in a forecast with a 2012 valuation date, you are effectively applying what is presumed to be 2013 experience to the 2012 year. Thus a traditional first year override (for 2012) would wipe out this 2013 experience (not necessarily wrong).

The shift option effectively slides the 2013 CMS out one year to allow first year overrides (for 2012) to fill the new void, and allow 2013 CMS experience to be properly "lined up" in the forecast.

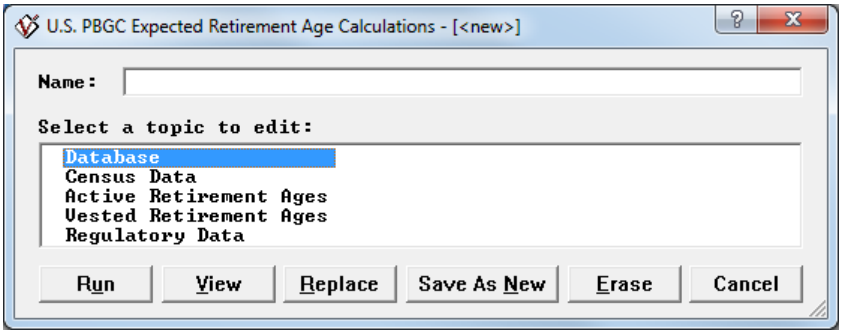
Two-year overrides

Two-year overrides are supported. When your CMS is two years "ahead" of your valuation date, a two year shift is probably appropriate.

U.S. PBGC Expected Retirement Age Calculations Tool

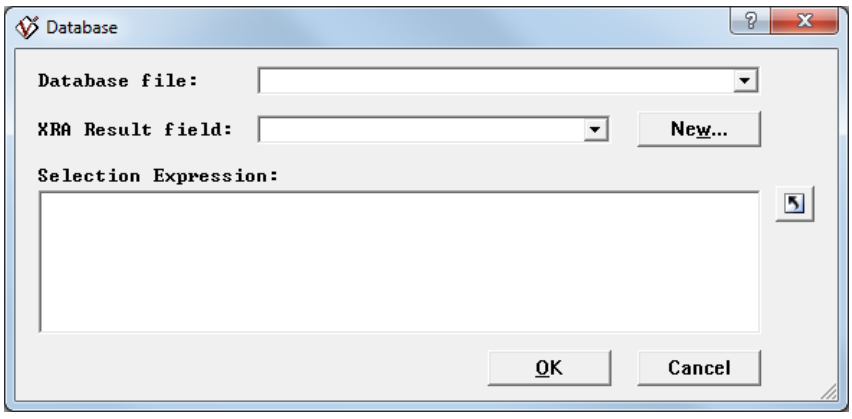
A new tool has been added to ProVal version 3.06 which greatly simplifies the process of calculating liabilities required under PBGC Regulations 4010 and 4044. This tool calculates each participant's unique Expected Retirement Age (XRA) under the single decrement approach (as outlined in the FAQ in ProVal's help entitled Plan termination liability and assets) and saves it into a database field. Once the XRA's are defined in the database field, a new valuation can be easily set up to calculate PBGC liabilities with the appropriate benefit amounts and payment timing. This article discusses the features and parameters of the new XRA tool.

The XRA tool contains 5 topics. Below is a description of the inputs required for each topic.



The Database topic specifies:

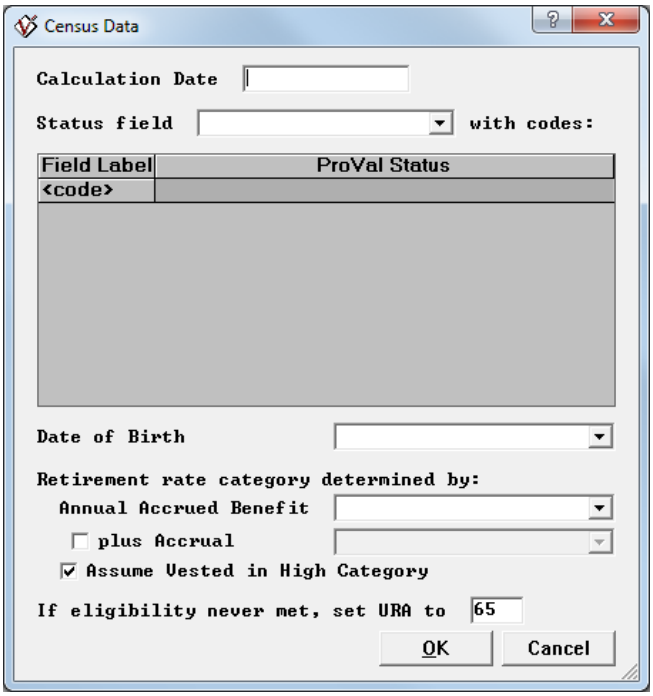
- The Database file containing the fields required for the XRA calculations.
- The XRA result field to be populated by the tool. This field will be written back to the specified database.
- A selection expression if you would like to run the tool on a subset of the population, e.g., because different classes of employees have different eligibility requirements for early or unreduced retirement ages (more on this below).



The Census Data topic contains inputs for:

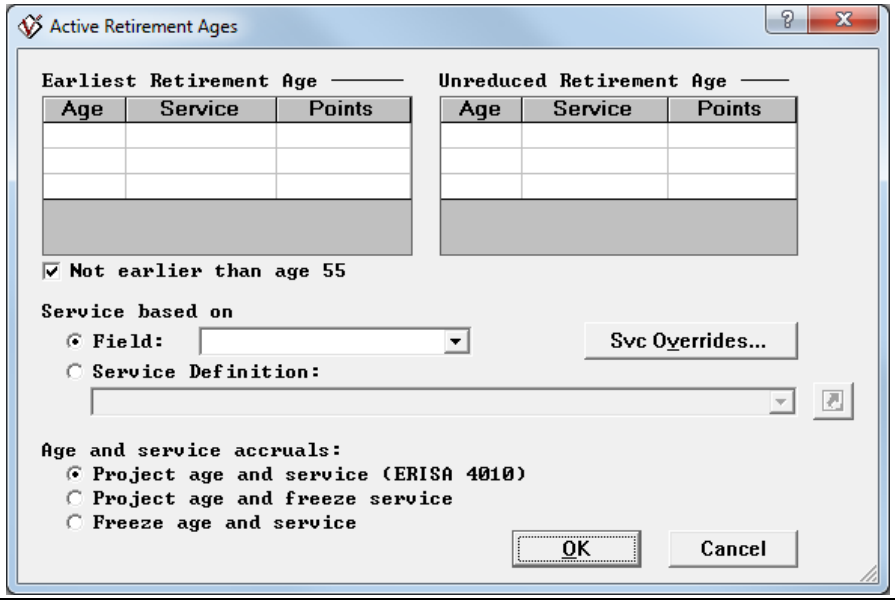
- The Calculation date. For 4010 calculations, this date would generally be the end of the information year (see section 4010.8(a) of PBGC Regulations for more information).
- The Database field that contains status and mappings to ProVal's status codes for this tool. The ProVal status code choices available are Active, Vested, and Not-applicable.
- The Date of birth used to calculate attained age at the calculation date, attained age at decrement for participants whose ProVal Status is "Vested" and the year of Unreduced Retirement Age.
- The Information needed to determine the retirement rate category:

- Annual accrued benefit (ProVal will convert it to a monthly amount)
- An option to add an accrual to the accrued benefit (this may be appropriate if the accrued benefit is a beginning of year value and the calculation date is end of year)
- An option to assume all Vested participants are in the High retirement rate category
- An input to specify the Unreduced Retirement Age (URA) to use if a participant does not satisfy the criteria for URA, discussed below.



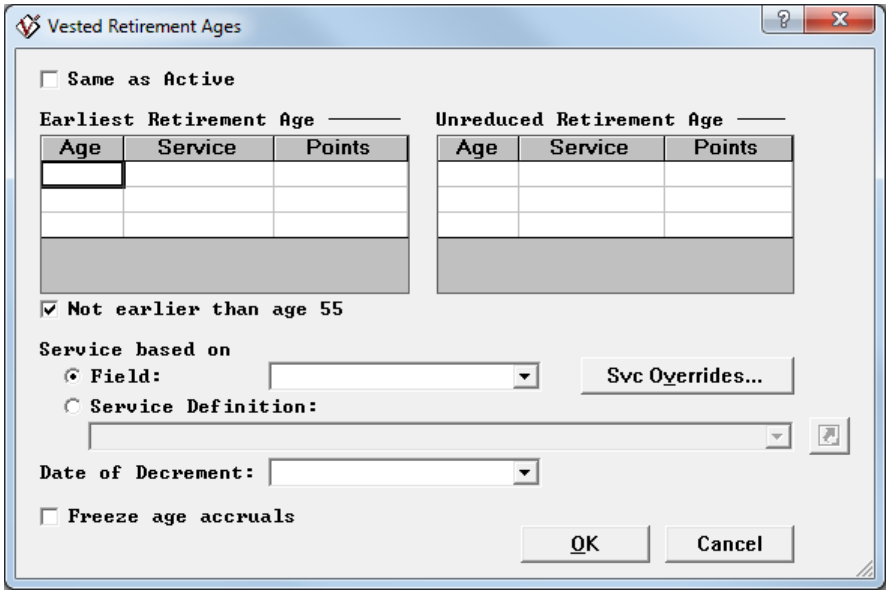
The Active Retirement Ages topic applies to participants with an "Active" ProVal status and contains inputs to specify:

- The criteria for calculating the Earliest Retirement Age (ERA) and Unreduced Retirement Age (URA) including an option to ensure that the earliest retirement age is not before age 55.
- The choice to project age and service (per 4010), project age and freeze service, or freeze age and service in calculating the earliest and unreduced retirement ages.



The Vested Retirement Ages topic pertains to participants with a "Vested" ProVal status and contains inputs to specify:

- The criteria for calculating the ERA and URA, if different than for Active participants.
- Date of decrement used to calculate service, if relevant.
- An option to freeze age accruals at decrement.



The Regulatory Data topic defines which year's Retirement Rate Category data will be used for the calculations and allows you to override ProVal's historical values for this data. The Historical Data topic displays the Retirement Rate Category data for the specified year along with Tables II-A, II-B, and II-C (the XRA tables for each category based on ERA and URA).