Variable Annuity Pension Plan—Lessons Learned

Brian J. Harper, EA, MAAA
Victor P. Harte, EA, MAAA
Richard J. Hudson, FSA, EA, FCA, MAAA

70TH ANNUAL EMPLOYEE BENEFITS CONFERENCE

International Foundation OF EMPLOYEE BENEFIT PLANS

Speakers

Brian J. Harper, EA, MAAA

Consulting Actuary

Rael & Letson

Seattle, Washington

Victor P. Harte, EA, MAAA

Principal and Consulting Actuary

Milliman Inc.

Little Falls, New Jersey

Richard J. Hudson, FSA, EA, FCA, MAAA

Principal Consulting Actuary

First Actuarial Consulting, Inc. (FACT)

New York, New York

Summary of Live Modelling

- As promised, the following slides contain results from the live modelling at the IFEBP conference session P-14
- As we learned, these variable plans are not always fully funded and key plan provisions can cause dramatic results in the operations of the plan

Summary of Live Modelling

- The following slide summarizes the baseline plan design we will be using for this summary.

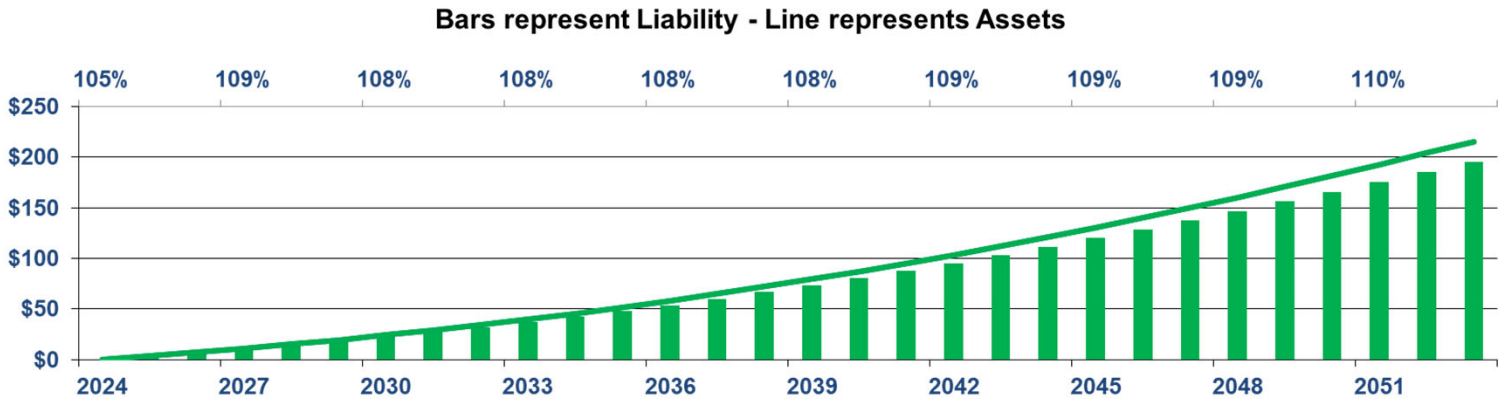
Baseline Design Features

Question	Response 1
Hurdle Rate (HR)	5%
Should retirees receive fixed benefit	No
Should retirees receive some protection	Yes
At what funding level should retirees be protected	105%
Targeted funding percentage for overall plan	110%
Cap rate for adjustments	HR + 3%
Minimum Benefit	80%
Investment lag	1 year
Investment return target	HR +2%
Asset Value (Market or Actuarial)	Market

Basic Plan Funding Assumptions

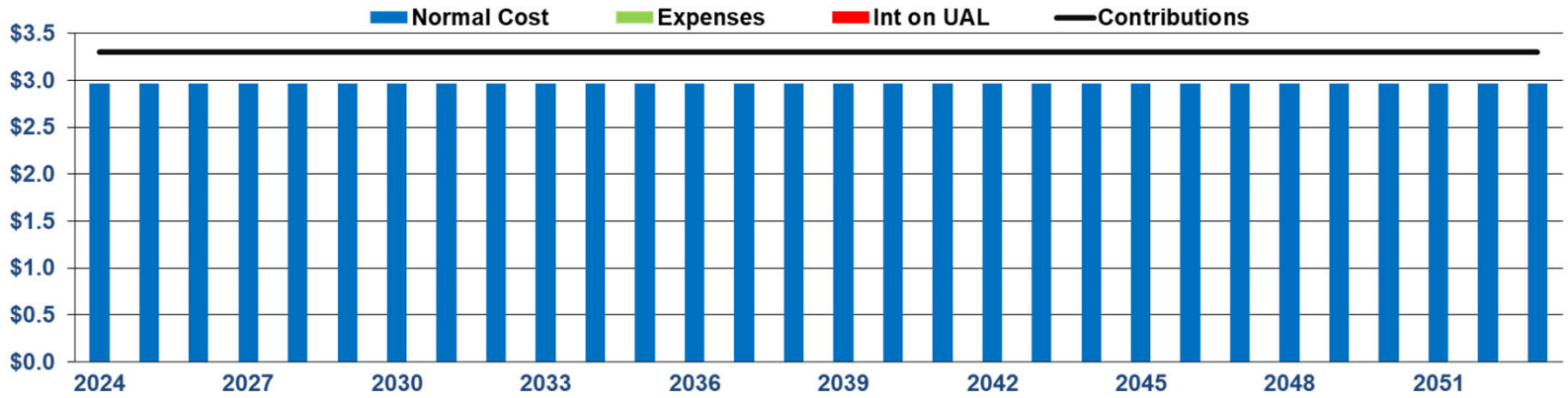
- In addition to the key design features noted in the previous slide, we also have
- Contribution Rate of $3.3 million per year
- Monthly benefit accrual $100 for each year of service
- Plan is a new start up plan with no current assets or liability

Baseline—Funding Ratio



- We can see in this graph, the Plan's long-term funding ratio is about 110% as requested by the audience

Baseline—Operating Costs

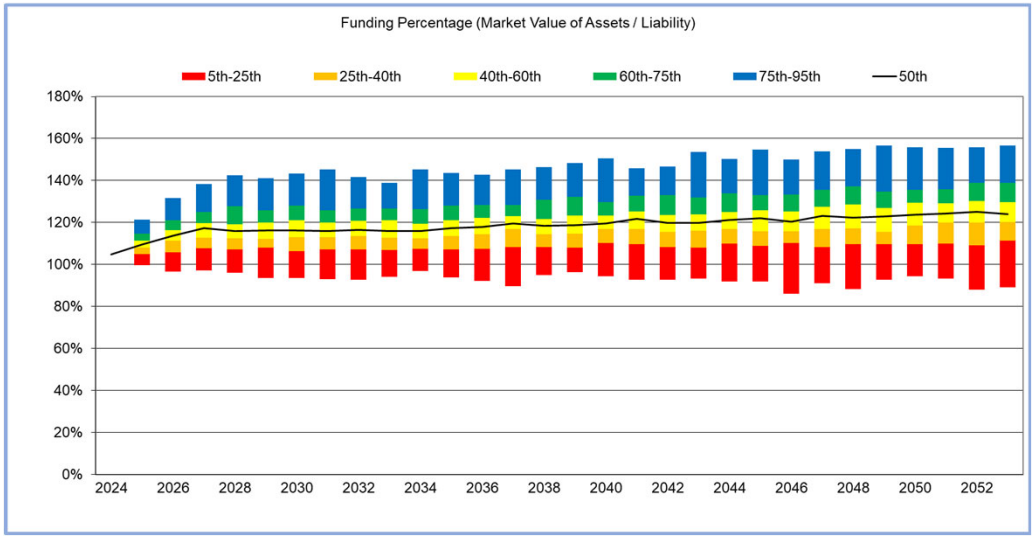


- We can see in this graph, the Plan's contributions are slightly above the Normal Cost (value of new benefit accruals) which helps maintain the plan's funding surplus

Projection Types

- The prior two slides show deterministic projections
  - These are very simplistic
  - Assumes all assumptions are met every year
  - We know this won't happen
- The next slides show stochastic projections
  - A few hundred random scenarios are run and results are summarized
  - Allows us to see best and worst case scenaros

Baseline—Operating Costs

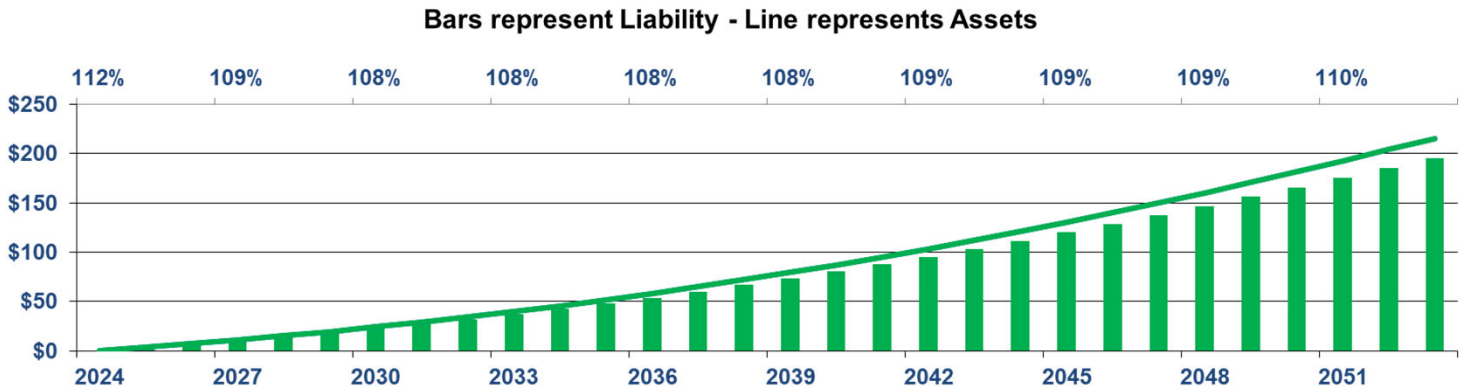


- The black line represents the 50th percentile, this shows we expect the plan will be fully funded in all years
- The bottom red bars show the worst case scenarios and we see there is a chance of underfunding in the plan

Design Considerations

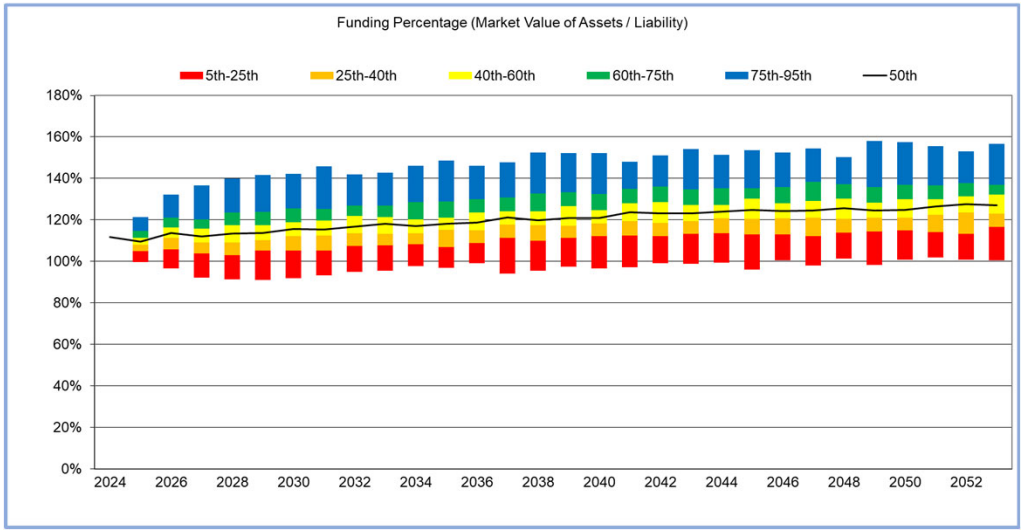
- Causes of underfunding in the Plan
  - Minimum benefit of 80%
  - Investment lag of 1 year
  - Protecting retirees at 105% funded
- Let's change one at a time and see how the results change
  - Current—Minimum benefit of 80%
  - Change—No minimum benefit

Funding Ratio—Remove Minimum Benefit



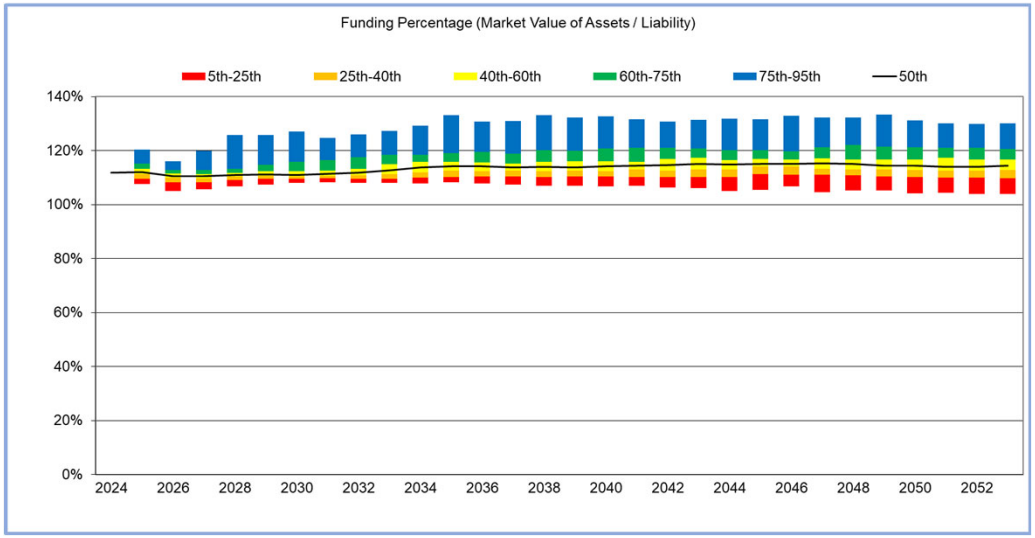
- Since the baseline projections did not assume the minimum benefit would be triggered, there is no change in the deterministic charts

Funding Ratio—Remove Minimum Benefit



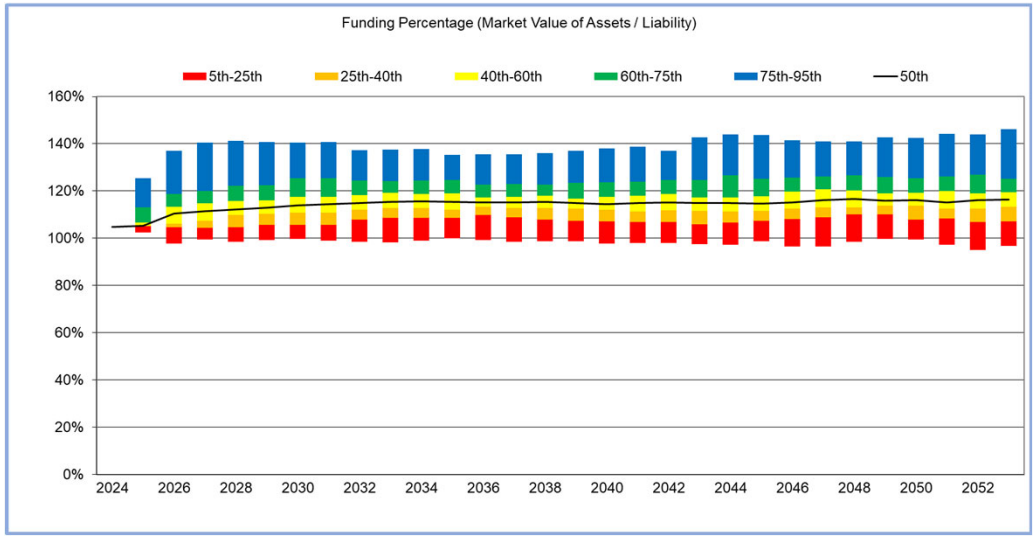
- The elimination of the minimum benefit improved the overall results, but there is still a chance of underfunding occurring in the plan
- Next, we will remove the investment lag

Funding Ratio—Remove Investment Lag



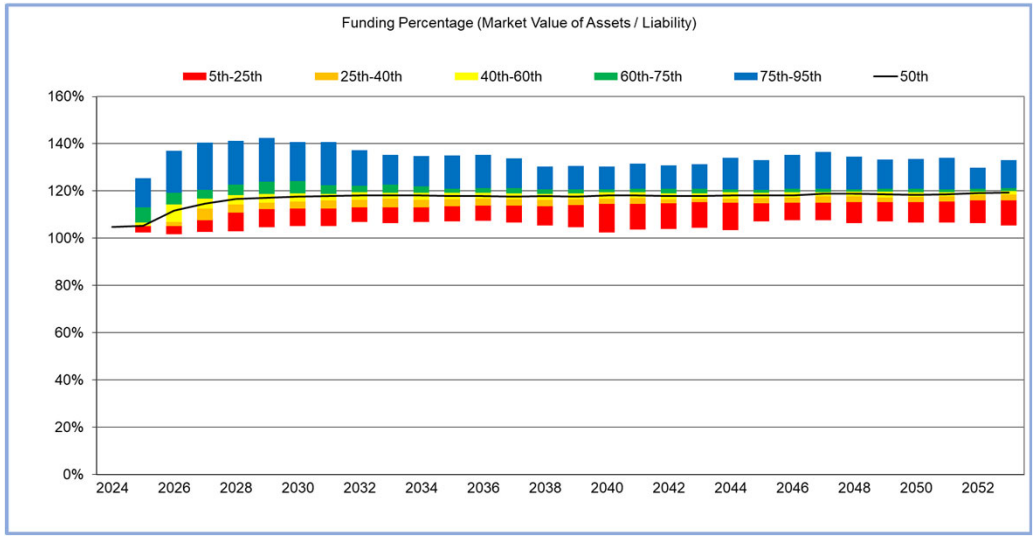
- Elimination of the investment lag fixed this particular plan
- This plan was a new startup with no cash flow risk. Let's try all the same assumptions but in a plan that is more mature

Funding Ratio—More Mature Plan



- You can see that a more mature population adds risk of underfunding to the plan—This added risk comes from negative cash flow
- Now we will use this more mature plan and change the retiree protection level from 105% funded to 120% funded

Funding Ratio—Protect Retirees If > 120%



- You can see that this improves the projected results even more

Variable Benefit—Alternative Hurdle Rate

- Another discussion focused on changing the hurdle rate
- The primary option for this was to drop from 5% to 4%
- How does this change impact the plan, first we have to look at benefit and/or contribution rates

Basic Plan Funding Assumptions

Hurdle Rate	5%	4%	4%
Annual Contribution Rate	$3.3 million	$3.3 million	$4.5 million
Monthly Benefit / year of service	$100	$75	$100

- We see in the table above, if we lower the hurdle rate from 5% to 4%, we need to either increase the contributions from $3.3 mm to $4.5 mm OR reduce the accrual rate from $100 to $75
- We could do other options by increasing the contributions and reducing the accrual rate where the combined would be in the middle of what is shown

Variable Benefit—Options

- Hopefully we have learned that various options within these variable plan designs can lead to uncertain future results
- It is very important to spend time modelling different outcomes
- Even if you are starting a new plan, you should project far enough into the future to see how possible negative cash flow may impact the plan

Key Takeaways

- Many design decisions are inter-related with tradeoffs
- Design features are available to reduce benefit volatility
- Variable designs can mitigate underfunding and be attractive to existing and new employers
- Modelling is paramount to ensure the long-term success of the new plan