1. Background

1.1 What is a DROP?

DROP stands for Deferred Retirement Option Program[1]. It is a defined benefit (DB) plan design feature that is growing in popularity while causing some controversy. The majority of DROPs are currently found in public sector plans, especially those covering police and fire employees. However, there is growing interest among other plans both in the public and private sector.

A DROP is an option provided to active participants of some retirement plans. It allows members who elect DROP the option to continue to work beyond their normal retirement date (NRD) and convert the value of part of the retirement benefit into a lump sum. The lump sum is typically defined as the accumulation of the annuity benefit the participant would have been entitled to receive at the NRD. To get the DROP lump sum, a member must give up future annuity accrual[2], often of approximately equal value to the lump sum.

As an example, many police officers or firefighters reach their NRDs by age 50 with a benefit of at least 50% of salary. Assume a final average salary of $40,000. In a traditional plan the employee could choose to retire with a benefit of $20,000/year or could continue to work and earn a higher annuity. Under a DROP plan, the $20,000 annuity is frozen but the employee begins to accumulate a lump sum. The lump sum is based on credits of the deferred $20,000/year annuity plus (in most cases) interest plus (in some cases) employee contributions. After three years, the lump sum may accumulate to $75,000. Many DROP lump

[1] Sometimes the word "deferred" is replaced with the word "delayed" and/or the word "program" is replaced with the word "plan".

[2] It would be accurate to say the participant is giving up annuity accruals to get lump sum accruals. Accruals may not end when a participant elects DROP but rather continue at a different rate and in a different form.

sums are in the $200,000+ range. Payments are made when an employee stops working.

Is a DROP participant active or retired? From the retirement plan's perspective, there are two different ways to view an employee who has elected DROP participation. One is that the employee is still active. This view may mean employer and employee contributions continue, as does eligibility for death and disability benefits. The other perspective is to view this employee as retired, and discontinue contributions and disability eligibility. A DROP can also be designed in a way that combines elements from the two perspectives; for example, a DROP participant could be eligible for death but not disability benefits. Designing or negotiating a DROP where parties have different answers to this question often creates conflicts. This is discussed later in this report.

It is the authors' view that a plan with a DROP feature retains its identity as a DB plan, even on that portion of the plan that contains the DROP lump sum. This is basically the same issue as with cash balance plans; they look like defined contribution (DC) plans but are truly DB plans because the benefits are definitely determinable and they lack certain attributes of DC plans (any plan that is not a DC plan is by definition a DB plan). One possible exception might be **self-directed DROPs** (see Section 2.3). At this point in time there are arguments over how a self-directed DROP should be viewed that this study will not resolve. Similar arguments exist with self-directed cash balance plans. See Sections 5.1 and 5.4.

1.2 Purpose of this Study

The main purpose of this study is to provide actuaries with enough information to gain a detailed understanding of the issues involved in DROP plan design and funding.

Issues with DROP designs and cost are significant. For example, a February 2002 newspaper article on a back DROP design had the following headlines:

> ***Benefits in … pension plan cause scandal***
> ***Some officials would get million-dollar payouts***

Our goals are:

- To provide a background study that actuaries can use when discussing proposed DROP plans with their clients. This includes a survey of design information (as of 2002) and a discussion of issues. Please note, this report addresses current design information. Since DROPs are an evolving plan design, new design elements appear constantly.
- To provide the actuary with the key considerations involved in estimating the cost of a DROP proposal.

Some issues will appear several times in this report as we examine them from the separate perspectives of an actuary, a plan sponsor and a DROP participant.

This study will also cover several common tax issues. This document should not be taken as legal advice. Plan sponsors should seek and retain legal counsel when considering a DROP feature.

Notes:

1) This report contains a glossary of terms. The first time a defined term is used it appears in bold.

2) We will often refer to individuals as plan participants even though in the public sector they are often referred to as members.

2. Types of DROPs and Features

2.1 Regular DROPs

The following table provides a summary of the basic provisions of a sample DROP design. This sample is not intended to be a recommended or common design; it is just a sample. An illustration of the DROP benefit under this design is shown after a summary of provisions. Throughout this study when we refer to a DROP benefit we mean a design of this type unless we specifically describe some other modification. Some or all of these provisions may vary from one DROP to another. See Section 2.4 for a discussion of typical DROP options.

Sample Basic DROP Plan Provisions

Eligibility:	An active employee will be eligible to join DROP after reaching his or her NRD[1].
DROP lump-sum account:	DROP account is credited with the monthly pension at the time of the DROP election (including COLAs) plus employee retirement contributions plus investment earnings. Interest is credited monthly at an annualized rate of seven percent.
DROP annuity:	Annuity frozen at DROP election except for "retiree" COLAs.

[1] NRD is defined as the date on which an employee is first eligible to receive an unreduced service retirement benefit.

*Term of election (**DROP participation period**):*	The DROP participation period is for a term not to exceed five years. However, employment can be terminated at any time during the DROP period.
Continued employment after completion of DROP participation period:	A participant must retire at the end of the DROP period. (See Section 7.10 regarding legal issues.)
Disability:	DROP participants are not eligible for disability benefits.
Investment of DROP funds and limitations on investments:	DROP investments will be commingled with other plan investments. There are no special limitations on the investments because of the DROP accounts. There is no employee direction over any portion of the DROP account investment.
Form of distribution of the DROP account:	The DROP account is paid at retirement as a lump sum. There is no annuity option. Lump sum can be rolled over to an IRA. Lump sum cannot be left in the plan.
Death benefits:	The participant's spouse will receive the DROP lump sum at the time of death and the same percentage of the DROP annuity that would have been paid had the participant retired at the DROP election date.
Sunset Provision:	None.

Sample Basic DROP Benefit Illustration

For our illustration we will assume that we have a "police and fire" plan that has a NRA of 50 and provides a benefit accrual rate of 2.5 percent of a three-year final average salary per year of service. The employee contribution rate is six percent of payroll and the plan provides a three-percent compound COLA. Assume that we have an employee who elects DROP on 1/1/2003 at age 50 with 20 years of service and a current salary of $50,000 with $2,000 annual pay raises. His accrued benefit is the following:

2000 Compensation	$44,000
2001 Compensation	$46,000
2002 Compensation	$48,000
Average	$46,000
	x 2.5%
	x 20 years
	$23,000/year

DROP lump sum at age 51 = ($23,000 + 6% x $50,000) x (1+.07/2) = $26,910
DROP annuity at age 51 = $23,000 x 1.03 = $23,690

DROP lump sum at age 52 = $26,910 x 1.07 + ($23,690 + 6% x $52,000) x (1+.07/2)
= $56,542
DROP annuity at age 52 = $23,690 x 1.03 = $24,401

We have simplified the calculation of seven percent interest for ease of illustration. The plan is more likely to use an $i^{(12)}$ factor monthly.

By age 55 (after 5 years in DROP), the participant must retire. By then the DROP Lump Sum would be $163,969 and the annuity would be $26,663 (= $23,000 x 1.03^5).

2.2 Back DROPs

A **back DROP** is the same as a regular DROP except that the DROP election is made retroactively at the time of retirement. Using the numbers in the prior example, the participant could make the election at age 55 and immediately get a lump sum-payment of $163,969 and begin annuity payments of $26,663.

Because the election is made at the time of retirement, there is no need to change pre-retirement death and disability benefit provisions. The back DROP would only affect what may be referred to as "age" or "service" or "regular" retirees.

When discussing different types of DROPs, regular DROPS are often called **"forward" DROPs** to avoid confusion. In this study, the term DROP will generally be referring to a forward DROP.

Back DROPs do create anti-selection issues. A person in a forward DROP who gets a big pay raise (perhaps due to a promotion) might find that the benefit would have been more valuable had they not elected a DROP. With a back DROP, the employee can adjust the timing of retirement to deal with large past increases in salary. This is especially true if the participant can elect the duration of the back DROP participation period.

2.3 Self-Directed DROPs

A self-directed DROP is a special type of a regular (forward) DROP. Under a self-directed DROP the employee is given some control over the investment of the DROP lump sum account. The money is invested at the employee's direction just like defined DC money. However, those assets are still part of the DB trust and under the control of the trustees. The trustees will select the investment options available to these employees. Fees associated with these investments are usually charged to the DROP lump-sum account but some plans have the fund pay some of the fees.

Self-directed DROPs are growing in popularity. For instance, one investment firm manages 14 self-directed DROPs at this point in time. Existing self-directed DROPs include plans sponsored by the cities of Miami and Detroit. Many of the early self-directed DROPs were found in the state of Florida.

See Section 5.4 for a discussion of whether a self-directed DROP is a DC plan.

2.4 Design Variables

There are many design variables. Many variations are driven by a desire to make the DROP cost neutral. See discussion of the meaning of cost neutral in Section 7.1.

Participation Period:

The participation period refers to the time that a participant is covered by the DROP. Most plans have a maximum period of two to five years. The DROP plan in Dallas has no limit.

Interest Crediting Rate:

Common choices include the following:

Fixed interest rate
Rate tied to funding assumption
Rate tied to outside index
Rate tied to actual investment return
No-interest credits.

Many of these same choices are found in cash balance plans. The interest rate selected may have a limited impact on cost because it usually only applies for a limited number of years and to only part of the benefit and starts with a principal balance of $0. Lowering the interest rate can reduce the cost of a DROP but often not in a material way without almost totally eliminating interest credits (which is sometimes done). When selecting an interest basis the following points are often discussed:

1. The valuation assumption is often deemed to be cost neutral. However, a more sophisticated discussion will: (1) recognize the difference in duration between the fund as a whole and the DROP account and (2) question the appropriateness of crediting a return that likely includes a risk premium when the employee is not taking the investment risk.

2. Whether the rate is based on the valuation assumption or an outside index, the interest-crediting rate might be offset (e.g., reduced by 100 basis points) to provide the plan sponsor some “profit” or a basis to offset higher administrative cost.

3. Using the actual investment return raises issues about whether this is a DC plan or a DB plan. Both this feature and self-directed DROPs have these issues as do the few self-directed cash balance plans that currently exist. Also see Sections 5.1 and 5.4.

COLAs[2]*:*

The sample DROP design described in Section 2.1 includes COLAs provided while an active DROP participant. This was done so that the DROP could be described as paying the same benefits that would have been paid had the participant retired (notwithstanding the additional employee contributions). However, in plans that provide automatic COLAs, permanently eliminating those increases that would be paid during the DROP participation period would significantly reduce the value of the benefit. This is a common approach to consider making a DROP cost neutral even though from an employee perspective it appears that something is being taken away. The Arizona DROP (see Figure A.2) is an example of a DROP that omits automatic COLA increases during the DROP participation period.

One alternative is to not credit the COLA during the DROP period, but once the DROP period has ended and the DROP lump sum has been established, the COLAs skipped during the DROP period can be credited to the annuity payment.

Employee Contributions:

Most public-sector plans require employee contributions. Some plans require employee contributions to continue during the DROP participation period while others require contributions to stop. Even if contributions continue, some plans consider them to be additions to the DROP lump sum account while others do not. The choice of whether to continue employee contributions may depend (but does not need to depend) on how the designers view DROP participants: active or retired. The impact on DROP cost can also influence this choice; i.e., to make the plan cost neutral, employee contributions may need to continue while not being added to the DROP lump sum account. However, if the choice is between discontinuing contributions and adding 100% of employee contributions to the DROP account, the cost impact is probably relatively small.

The decision to continue employee contributions may have to be a plan-wide choice to preserve the pre-tax status of employee contributions (per Section 414(h) of the Internal Revenue Code).

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[2] We are referring to post-retirement COLAs. This should not be confused with across-the-board pay raises for employees which public-sector plan sponsors often refer to as COLAs.

Later in Section 4 we discuss the actuarial cost implications of both the presence and absence of employee contributions during the DROP participation period.

Disability Benefits:

A typical "non-DROP" public-sector plan will provide a duty-related (service-connected) disability benefit of 50% or 66% of pay (tax-free) and a non-duty-related (non-service-connected) taxable disability benefit equal to the accrued benefit. These benefits often apply even if the disability occurs after NRD. For public safety employees, the duty-related benefit is very important and may account for 10% to 30% of all retirements.

Some plans do not provide disability benefits during the DROP participation period. The choice of whether to provide a disability benefit may again depend (but does not need to depend) on how the designers view DROP participants: active or retired. As with other variables, the choice may also hinge on the impact on DROP cost (DROP periods often cover ages when disability rates are high).

Because of the tax-free nature of line-of-duty disability benefits in the public sector, disability benefits are often more valuable to the employee than a DROP retirement benefit. If the DROP employee is not offered disability benefits, there may be an ADEA concern since the DROP takes away the disability benefit from older employees. However, the employee will have made a voluntary election to join DROP. The plan administrator might want to point this out on the DROP election form.

Death Benefits:

Somewhat similar issues exist for death benefits. Each plan is different enough that some thought needs to be given as to what happens if the employee dies during the DROP participation period and when an employee elects the form of their retirement benefit.

Annuity and Pay-out Options:

Even though the DROP is designed to provide a lump sum, employees may want an annuity option. Based on informal discussions, this seems more common among police than fire employees. As long as this is done on an actuarially equivalent basis (including COLAs), this can be made a cost-neutral feature of the DROP.

An even more common question is whether the DROP lump sum can be left in the plan after retirement to earn a relatively high fixed rate. Some DROP plans require the lump sum to be distributed while others require a distribution schedule if the money is left in the plan.

Eligibility:

Often a plan requires an employee to reach NRD before joining DROP. However, a plan might provide an NRD at the earlier of age 50 or attaining 20 years of service. It would not be uncommon to make the requirement 20 years of service, thus making an employee hired at age 40 wait until age 60 to join DROP.

Public plans have more service portability than do private sector plans. As a result, consideration is often given to requiring that the minimum service required to elect DROP be with the plan sponsor.

Benefit Improvements:

The DROP can reflect benefit improvements in the overall plan. For instance, if the plan is amended to give all retirees a 10% increase in their monthly benefit (not as a COLA adjustment), the DROP participants may or may not have their DROP annuity increased. Similarly, plan design can address the situation in which DROP participants are considered “active” and benefits are improved for active participants. Whether DROP participants get “retiree” improvements or “active” improvements or neither or both could be addressed when the DROP is designed. However, any decision could probably also be overridden when the improvement is enacted.

Diet DROP:

A diet DROP is a DROP with a short participation period for just a few months before retirement. This may provide a lump sum large enough to pay off some bills without a material reduction in the annuity.

2.5 Phase-in of Coverage

One possible consideration is to provide a phase-in of DROP coverage. When DROP is initially offered, there may be a large number of eligible employees. While only three percent of employees may become eligible to retire each year, there may be 15% already over NRA. The employer might not want all 15% to retire at the same time at the end of the initial DROP period. Also see Section 7.7.

2.6 Sunset Provisions

A sunset provision in a DROP allows the sponsors to evaluate the DROP after a specified time period and either renew the DROP, modify the provisions or terminate it. This provision can allow sponsors a partial[3] way out if the DROP cost has turned out to be much higher than expected.

DROPs have been in existence since the 1980s, but only in the last few years has there been a large increase in their popularity. Because of tax and cost uncertainty it was not uncommon that DROPs were adopted on a trial basis. Many public plans contain a "contract clause" that prevents the employer from negatively changing the terms of the plan for existing members. Adding a sunset provision is a way some employers have carved the DROP out of the contract clause.

2.7 Back DROPs as a Window Benefit

DROPs often come with some financial and administrative costs. Adding a back DROP is often administratively easier than a forward DROP but brings with it the chance of anti-selection. Employers usually expect to incur some financial and administrative costs when creating a temporary retirement incentive program. For this reason, a temporary back DROP may be considered in designing a window benefit.

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[3] It is partial in that the sponsor still has the cost for those participants who already elected DROP.

2.8 Partial Lump Sum Option Programs (PLOPs)

A **PLOP** can refer to any of a number of designs to provide a reduced annuity and add a lump sum benefit payment. One method would be to allow participants to take a refund of their contributions (possibly with interest) and to reduce the annuity benefit by the actuarial equivalent of the lump sum received. This often is used to: (1) avoid the more difficult cost discussions associated with DROP proposals and (2) provide the partial lump sum payment that is often the main—but possibly not the only—reason behind adding a DROP feature.

When considering adding a DROP vs. a PLOP, the following employee perspective should be considered. Employees often plan on retiring when they reach their NRA and know how much annuity income they can count on from the pension plan (e.g., 50% of salary or $20,000 per year). Electing a DROP may be interpreted as the employee saying: "I now have my annuity needs met and can begin accruing a lump sum. I needed $20,000/year of income and don't need any more annuity income." However, a PLOP might be elected at NRA. This would reduce the $20,000 "goal" that the employee may have been planning on.

We are not saying whether a PLOP or a DROP is the better design. They will have a different impact on employee retention. Differences illustrate why we stated above that providing a partial lump sum feature is not the sole purpose of the DROP.

The federal government has had a partial lump sum option in its CSRS and FERS plans since the late 1980s. Currently this option has the following features:

1. Only available to those who are terminally ill
2. Partial lump sum equals sum of past employee contributions (without interest)
3. Normal form of payment without this option is a **modified cash refund (MCR)**
4. Annuity offset based on valuation assumptions which currently are 6.75% interest and 3.75% CPI (i.e., COLAs are factored into offset)
5. Regular (healthy life) mortality is used
6. Post-retirement survivor annuity is not affected

When this feature was added in the 1980s, it initially was available to all federal government retirees. However, this universal coverage only lasted a few years. It was ended due to the cash-flow impact on funding the federal systems (which, for some purposes, is viewed as funded on a pay-as-you-go basis). Cash-flow issues are different for ERISA and state and local government plans, as compared to federal plans. Cash flow often affects investment choices more than expense or cash cost but cash flow can be a consideration in all three areas.

Please note that the first provision (terminal illness) may contain adverse selection, and if this were considered for another plan, the actuary may need to determine the cost for this provision.

Another plan that offers a PLOP-type of benefit is the plan for Louisiana state teachers. They offer either a forward DROP or an "Initial Lump Sum Benefit" (ILSB). Only members who have not participated in the DROP can elect the ILSB. The ILSB provides a lump sum equal to 36 times the full monthly annuity benefit. The full annuity benefit is then reduced by the actuarial equivalent of the lump sum paid. Using 83GAM (old 417(e)) mortality, 8.25% interest and no COLAs, we roughly matched the factors used in the conversion.

Aspects of a PLOP that actuaries should consider include:

Definition of the amount
Actuarial basis for determining the annuity offset
Mortality issues
Impact of MCR features
Impact on post-retirement survivor benefits
Allocation of after-tax money
Applicability of excise taxes

A PLOP in an ERISA setting would most likely use 417(e) interest and mortality rates to avoid 411(d)(6) problems.

3. History, Experience and Case Studies of DROPs

The first DROP design began in East Baton Rouge Parish in 1981 and covered all groups of employees (police, fire and general employees). The initial plan was intended to be cost neutral. The neutrality was partly as a result of requiring the DROP to be elected prior to a scheduled post-NRD longevity pay increase. After about three years a DROP feature was added to the Louisiana Municipal State Police plan and then to the state firefighters' plan. There were a few other DROPs started in the 1980s. DROPs began to spread in a material fashion starting in the mid-1990s. Some of the earlier plans included: Louisiana, Oklahoma, Dallas and Hollywood, Fla. Many of the early DROP plans were limited to public safety employees.

Below are some specific DROP experiences in certain jurisdictions.

3.1 Dallas Police and Fire Pension System

The Dallas plan began in 1993. It is one of the few forward DROPs that has an unlimited DROP participation period. One-hundred percent of the frozen annuity is added to the DROP account. Participants are not eligible for disability benefits during the DROP participation period. The following experiences have been reported:

- Employees have worked longer after NRA since the DROP was added.
- The plan's actuary has reported that the DROP is basically cost neutral.
- The DROP participation rate is almost 100%.
- In a 2001 survey, young members expressed concern about senior employees staying on longer.

The initial DROP was approved for only a five-year period. After the end of the five years (September 1997), a study was undertaken to measure the fiscal impact of the DROP. If the impact was negative, the DROP would be eliminated or modified. The initial 1992 cost estimate assumed that DROP would add an annual cost of 0.24% of payroll and that employees would work an average of 1.6 years longer. The results of the five-year study showed that retirement ages have increased from 52.4 before the DROP to 57.7 after the introduction of DROP.

The 1997 study stated that most members elected DROP and most did so within two months of becoming eligible. The study contains retirement rates and information on when DROP was elected after first eligibility.

Given the unlimited election period and the plan design, a high and immediate participation rate should not be surprising. Care should be taken not to assume this experience would emerge for plans with materially different provisions.

3.2 Anne Arundel County (Md.)

Anne Arundel County added a DROP feature in CY2001 for firefighters and CY2002 for police officers. The DROP required a minimum participation period of 36 months and a maximum of 60 months. Employees electing DROP must retire after 60 months. Employees that leave before being in the DROP for 36 months get the non-DROP benefit. The initial experiences of these plans have been as follows:

- In the first 16 months of the DROP existence, 40 out of 79 eligible firefighters elected to join DROP. The percentage electing to join in the future is expected to increase slightly. Current estimates are that 60%-70% will elect DROP. Officers tend to elect DROP more often than non-officers.

- After three months, only 10 out of 129 eligible police employees have elected to join DROP. It appears that police officers have materially less interest in DROP than firefighters. The current estimate is that only about 20% will elect DROP. Police tend to work less after retirement eligibility and many do not expect to stay the 36 months required to receive the DROP balance as a lump sum. Many of the senior officers who were expected to favor DROP have been

electing to retire and take senior "security" positions related to terrorist concerns (e.g., head of security for a local utility company).

3.3 Pennsylvania Plans

Lancaster, Pa.

The firefighters of Lancaster proposed a DROP plan in their contract negotiations with the city. The proposed DROP was designed to be cost neutral. The union and the city were unable to reach agreement through negotiations, and the issue went to arbitration. Actuarial testimony was presented by both the union and the city. After considering testimony and arguments put forth by both sides, the arbitrator concluded that the DROP was a reasonable benefit for the firefighters and should be offered by the City.

State Aid

In Pennsylvania, cities are generally provided per capita state aid for certain employees covered under retirement plans. In the case of Lancaster, the state aid was $5,400 for each active firefighter. Even though DROP was simply an election under the retirement plan and in no other way impacted the individual's employment, it was not clear at the time of the arbitrator's award that state aid would be continued for the firefighters who had elected DROP. The arbitrator directed the city and the union to jointly seek the opinion of the Auditor General of Pennsylvania or a final resolution from the Pennsylvania judicial system on the issue of whether state aid could be denied to Lancaster on behalf of the firefighters who were active employees and participants in the DROP program. At the time of this study, the determination of state aid has not been finalized. The arbitrator's ruling stated:

> *If it is determined with finality, that General Municipal Pension Fund State Aid may be denied to the City of Lancaster for Fire Fighters who are active employees participating in the DROP plan, the following shall occur:*
>
> *The pension that would otherwise have been payable at the time of their DROP election, had they chosen to retire then, that is credited to each participant's DROP account, shall be reduced by two-percent (.02) per one thousand dollars ($1,000.00); to a maximum of ten-percent in any year, that the City loses in General Municipal Pension Fund State Aid for each DROP participant.*

This proviso shall not be applied retroactively to DROP participants who have received the (DROP) lump sum.

There is a real possibility that state aid will not be paid for DROP participants and that the arbitrator would choose to reduce the pension increase if that were to occur.

3.4 Baltimore City

The Baltimore City Retirement System provides for a "20 & out[1]" retirement at 50% of final average earnings. Benefit credits continue after 20 years of service at a rate of two percent per year. In the early 1990s, Baltimore City was faced with the exodus of qualified police officers as soon as they met the 20 years of service requirement. The pension system also covered firefighters. Firefighters tended to continue employment well past the time of initial retirement eligibility. The system provided a post-retirement COLA using a formula based on investment earnings in excess of the actuarial assumptions.

The mayor requested ideas from the Fraternal Order of Police on ways to slow down the exodus of police officers. This led to the development of the Baltimore DROP.

The initial DROP credited the DROP account with the participant's frozen pension plus employee contributions plus interest at the pre-retirement investment return assumption of 8.25%. The accumulation period was for three years; however, retirement was not mandatory at the end of the three-year term. In order to continue the encouragement for officers to stay on, the DROP account was continued with further crediting of interest. Additional pension credits were also earned for service after the 3 year DROP period; however, no more pension amounts or employee contributions were added to the DROP account. After five post-DROP years (e.g., after 28 years of service = 20+3+5), the pre-DROP "frozen" benefit was recalculated on the new final average earnings. This was an expensive program, but it directly met the goals of continued employment. Retirements from the system had been averaging approximately 200 per year, but, during the first three years of DROP, there were less than a dozen service retirements. Retirements picked up at the end of the three-year period. Because of the significant attraction of the recalculation of the benefit, many officers continued employment past the end of the three-year period. In the late 1990s,

[1] "20 and out" refers to normal retirement after 20 years of service regardless of age.

the eight-year time period (3+5) for the recomputation of the pension benefit was reduced to four and a half years (3+1½).

DROP Cost Test

As in many jurisdictions, pension benefits in Baltimore City are subject to a contractual guarantee. Under the guarantee, the projected (not simply accrued) benefits cannot be diminished after they are granted. An exception to the contract right was put into place for the DROP benefit. The approach taken was to put a cost test in the initial DROP legislation. Under the cost test, essentially, if, after eight years of operation, the cost of DROP was not offset by net actuarial gains, the benefit would no longer be protected by the contract guarantee. The DROP benefit would still continue and it would take affirmative action by the City Council through an ordinance to reduce the DROP benefit. Moreover, the reduction of the DROP benefit could only be to the extent necessary to satisfy the DROP cost test.

While the concept is not particularly complicated, there are real complexities in practice. For example, when the plan was improved to reduce the recalculation period from eight to four and a half years, the benefit improvement was funded through actuarial gains. The DROP test language was not, and under the contract provisions could not be, amended to add a charge for the benefit improvement. The law calls for the system's actuary, in consultation with an actuary selected by the union, to make the determination of whether the cost test has been satisfied. At the time of this study, the actuaries have not agreed on the interpretations and determinations for the DROP cost test.

3.5 San Jose

In 1999 San Jose police and fire officers were negotiating for a DROP feature. Normally the benefit at retirement was 50% of final average pay plus additional accruals after 25 years of service. The city's charter required that the minimum benefit be at least 50% of final average pay. (It was noted that some alternate annuity forms could take the benefit below 50% after J&S form conversion factors were applied.) The DROP feature would freeze final average pay for benefit purposes but not for "charter" purposes. The city was not sure whether the DROP lump-sum value could be applied to pass the 50% charter requirement. A solution was to allow employees to elect a 50% current final average pay benefit without a DROP lump sum. This was never expected to be

elected since the value would almost certainly be less than that of the DROP benefit. San Jose does not currently have a DROP.

3.6 New York City

New York City has not yet adopted DROP. However, we have discussed DROP with various fire and police officials and have some observations.

Firefighters were very much in favor of adding a DROP. Most firefighters already work many years beyond their NRA.

Police officers were materially less interested in DROPs. Few work any material amount of time beyond their NRA. The plan contains a "bad-boy clause" which adversely affects several participants each year. This means that certain events (e.g. failing a drug test) result in the loss of 100% of a participant's pension. Police officers in the city generally do not view the value of a DROP as balancing the risk of losing their pension. Firefighters have the same bad-boy clause but it seldom applies.

3.7 Louisiana Teachers

About 1,800 Louisiana teachers elect DROP every year and slightly over half of the retirements have been by those who elected DROP. The system also noted that a handful of disabled members have returned to work just to join the DROP.

3.8 Milwaukee County

Milwaukee County implemented a back DROP in 2001. The plan covered general employees, had no limit on the number of post-NRD years that could be used to calculate the lump sum and used 8.5 percent to nine percent interest rates to determine DROP lump sums. The result was that some participants were immediately eligible for DROP lump sums that exceeded $1 million. The Milwaukee County DROP has been viewed by many as a pension scandal and more issues and lessons may emerge.

4. Actuarial Issues

4.1 Comparison of DROP vs. Regular Deferred Retirement Benefit

Figure 4.1 provides an example of a DROP benefit. This assumes that an employee hired at age 25 can retire at age 50 with a retirement benefit of $28,103/year. The annuity benefit is "frozen[1]" at $28,103/year. The employee begins to accumulate a lump-sum DROP account balance. In our example, the DROP account balance equals the accumulation of the $28,103/year pension (plus COLAs) plus the six percent of pay employee contributions plus interest at six percent. In this example the benefit at age 55 would be:

- an annuity of $44,076/year under the current plan (requiring a reserve of $609,713) or
- an annuity of $32,580/year plus a lump sum of $192,456 if DROP were elected.

Appendix B contains additional details on how the numbers in figure 4.1 were calculated. These details are important when writing plan provisions.

[1] Frozen may not be the correct term if COLA adjustments are provided while in the DROP.

Figure 4.1

The DROP Choice–Five-Year DROP

	Age		Current Annuity	vs.	Proposed Annuity	+	Proposed Lump Sum	Value of DROP vs. Current Benefit
NRA =	50		$ 28,103		$ 28,103		$ -	
		or	$ 423,566		$ 423,566		$ -	**100.0%**
	51		30,835		28,947		32,114	
		or	$ 457,495		$ 429,475		$ 32,114	**100.9%**
	52		33,782		29,815		67,196	
		or	$ 493,080		$ 435,175		$ 67,196	**101.9%**
	53		36,960		30,709		105,460	
		or	$ 530,324		$ 440,634		$ 105,460	**103.0%**
	54		40,386		31,631		147,132	
		or	$ 569,212		$ 445,816		$ 147,132	**104.2%**
	55		44,076		32,580		192,456	
		or	$ 609,713		$ 450,680		$ 192,456	**105.5%**

Assumptions: 8% Interest, 5.5% Salary Scale, 3% COLA, 83 GAM male mortality
6% Interest on DROP balance and contributions.

From the above we can observe that the DROP benefit is more valuable than the non-DROP benefit. Later we will cover under what conditions this relationship is reversed. However the initial point we want to make here is that a DROP benefit is usually more valuable than the regular delayed retirement benefit if the DROP is designed to preserve the value of the NRA benefit. After five years of DROP participation, the ratio of the present value of the benefits is 105.5%. It is not uncommon to see ratios after five years of over 110%. Generally the ratio increases the longer the DROP participation period. Throughout the rest of this report we will refer to these ratios (e.g., 105.5%) as the "**DROP ratio**".

The second point to remember is that the DROP benefit in the illustration is by definition of equal value to the benefit earned at NRA[2]. Therefore, it would also be fair to say that the non-DROP benefit loses 5.5 percent of its value if an employee continues to work beyond NRA. Consider that the present value of the non-DROP age 50 benefit of $423,566 with eight percent interest for five years would grow to $622,357; yet the immediate present value of the age 55 non-DROP annuity is only $609,713 and even that required post-age-50 employee contributions to continue.

As was mentioned at the beginning of the report, reasonable people will have very different perspectives on DROP benefits. Some of the arguments we have heard related to the above comparison are covered in the following two bullets. Keep in mind that these are advocacy statements and are not intended to be balanced.

- **Anti-DROP perspective:** The relatively young retirement ages for public safety employees are not really NRAs but heavily subsidized unreduced early retirement ages. DROPs are a way of preserving these early retirement subsidies for an employee who continues to work, and therefore should not be entitled to receive them.

- **Pro-DROP perspective:** The DROP benefit is free since it is no more valuable than the benefit which the employee is already entitled to receive provided he leaves and stops getting paid. This argument would only apply to a forward DROP.

Like the question "Is a DROP participant active or retired?" both perspectives have an element of truth but are more political arguments than actuarial or plan cost arguments. Actuaries need to be aware of both perspectives.

4.2 Trading Annuity Benefits for Lump Sums

Figure 4.1 illustrates that the DROP benefit consists of a trade-off of an annuity benefit for a lump-sum benefit. To compare benefits on an apples-to-apples basis we chose to convert all benefits to lump-sum present values at date of termination. We could have converted all benefits to annuities. Keep in mind

[2] Different treatments of employee contributions can affect this conclusion and are discussed later in this report.

that employees, when given the choice, will generally elect a lump sum rather than an annuity, but in either case the ratio (e.g., 105.5%) would be unchanged.

One question the actuary must ask is, "what impacts this trade-off?" This can be broken down into: (1) what is the future rate of benefit accruals under the pre-DROP plan? and (2) how valuable is one dollar of annuity?

(1) The rate of future benefit accruals is a function of the following:

The plan-specific formula:

Assume two plans both have a "20 and out" provision with a benefit of 50% of final average pay after 20 years. Assume one continues accruals at 2.5 percent per year after 20 years while the second plan lowers the accrual rate to two percent after 20 years. Assume members of both plans can elect DROP after 20 years of service. All other things being equal, the DROP benefit ratio will be higher for the second plan since employees forfeit less annuity benefit to get the same DROP lump sum.

Rate of pay increases:

Most plans with DROPs are final average pay plans. When the DROP annuity is frozen, the amount of the forgone annuity increase depends partly on future increases in pay and final average pay.

(2) The value of one dollar of annuity is a function of the following:

Does the plan provide a COLA and what is the COLA provision[3]?

What is the interest assumption being used by the actuary and what is being used by the employee in making the decision?

What is the mortality assumption or life expectancy (i.e., mortality table and age) used by the actuary and what is being used by the employee in making the decision?

[3] We use the word "provision" versus "assumption" just to emphasize that the ultimate cost is based on provisions and experience and not assumptions.

These points are discussed again in Section 4.7.

4.3 When Does Funding End?

One of the first questions asked in this study was whether a DROP participant should be viewed as an active employee or a retiree. In the funding sense the question is whether funding (i.e., normal cost) should end when a participant elects DROP[4] or later when the participant stops working. ASOP #4 says:

> The period over which the allocation is made for an individual should begin no earlier than the date of employment and not substantially later than the date of entry into the plan (e.g., completion of one year of service and attainment of age 21) and should not extend beyond the last assumed retirement age. Normally, the period of allocation should not end before the end of the period during which the participant is accruing a benefit under the plan. The period could be on an individual or group basis.

GASB statements focus on funding to an "exit age." FASB has cost attribution rules (FAS87 paragraph 40) that are based on the pattern of benefit accruals and not their present value.

DROP plans have been valued two different ways: normal cost ending when a participant elects DROP or later when the participant stops working. Ending normal cost earlier often raises the short-term cost. In situations where the DROP ratio is above 100% and prior retirement rates extended beyond NRD, it would seem incongruous to accelerate funding because of the addition of a DROP benefit that adds extra benefits for those who work beyond NRD.

Non-actuaries often think that the way DROPs "save money" is that employer funding can end when a participant elects DROP. It is often difficult to explain that current funding requirements are less the longer time there is to fund the benefit.

The issue of when funding ends is only a material issue when employees are assumed to work many years beyond NRD. Retirement rates might produce average years worked beyond NRD in the following ranges: police officers: 1-4

[4]This could refer to both (i) treating DROP participants as retirees and (ii) anticipating an earlier end of normal cost for those expected to elect DROP in the future.

years, firefighters: 2-8 years, other public and private sector employees: 0-3 years. Therefore, this issue would have the biggest impact for firefighters.

Notwithstanding our comment about later retirement ages, some actuaries and plan sponsors believe that normal cost should end at the beginning of the DROP participation period. Section 4.13 deals with techniques used under both approaches.

The topic of when does funding end also leads to a discussion of what does "cost neutral" mean. We refer the reader to approaches 1 and 2 in Section 4.7 and Section 7.1.

4.4 Significance of Retirement Rates

As this is our first section discussing the actuarial assumptions used to measure the cost of DROP, we would like to point out the fact that actuaries cannot change the cost of DROP (any more than they can change the cost of the entire plan) by changing assumptions or methods. Assumptions and methods are just tools to estimate and allocate plan cost.

Determining plan "cost" is more than just an exercise of determining whether the "DROP ratio" is less than or greater than 100%. A central question is whether having a DROP will impact retirement rates. As is generally true with traditional plan formulas, the longer a person works beyond NRD the lower the plan's cost to the employer. This occurs because: (1) payment begins at a later age, (2) the annuity is paid over a shorter lifetime and (3) there is more time to fund the benefit.

The maximum cost almost always occurs if a participant retires when first eligible. This is important to keep in mind for the following reason: a participant electing DROP is generally getting the same benefit as the "actuarially most valuable" benefit available but receiving payment (plus interest) at a later date.

Many plans have retirement rates that assume some participants retire after NRA. It would not be unusual in a public safety plan to assume 20% retire at NRA, and that on average participants who work past NRD will work an average of four to five additional years.

The actuary determining the cost of DROP may need to decide how adding a DROP feature will affect retirement rates. DROP is often seen as an

encouragement to work beyond NRD. However, DROP designs that include a mandatory retirement provision after a fixed DROP period will limit service. We have collected some actual DROP experience (see Section 4.10 below); however, it needs to be understood that experience is a function of specific DROP design and the employee group covered. Collecting experience and deciding to what extent different factors affected experience is an area that needs further study.

If the valuation actuary assumes that retirement rates are not impacted by the addition of a DROP feature, the DROP ratios and "survival rates" will determine plan cost. A simple review of the following can help produce a rough cost estimate:

Figure 4.2

(1) Age	(2) Assumed retirement rates	(3) ${}_tp_x$	(4) DROP ratio	(5) Weighted DROP ratio = (2) x (3) x (4)
NRA (t=0)	40.0%	100.0%	100.0%	40.0%
NRA + 1 (t=1)	10.0%	60.0%	100.9%	6.1%
NRA + 2	10.0%	54.0%	101.9%	5.5%
NRA + 3	10.0%	48.6%	103.0%	5.0%
NRA + 4	10.0%	43.7%	104.2%	4.6%
NRA + 5	100.0%	39.4%	105.5%	41.5%
			Total =	102.64%

Later we will bring more factors into the calculation (e.g., mortality and other pre-retirement decrements). However, we would expect the value of benefits associated with the retirement decrement[5] to increase by about 2.64 percent in this example (Note: this is based on example one in Appendix B where the actual increase in the present value of benefits (PVB) was 2.62 percent after factoring in annuity factors and benefit accruals, etc.).

Adding a DROP feature may extend the average participant's service. When this occurs we would expect the 102.64% ratio to increase. However, there is no easy way to determine the impact without a full valuation because it is difficult to determine the impact of extending the funding period. This will be illustrated below.

[5] Assuming no early retirement benefit or decrement.

There is also a special group of employees who should be considered—the group who is already beyond their NRD when the DROP feature is first added to the plan. They may have a longer or shorter expected future working lifetime than a participant just at his or her NRD. In addition, their DROP ratio tends to be higher because they are older (i.e., a dollar of annuity is not worth as much in the trade-off for the DROP lump sum). Perhaps most important for this group is that there can be a material increase in normal cost if they are no longer expected to retire immediately. (See the comparison of examples one and two in Appendix B.)

Should the actuary assume that adding a DROP will delay when participants retire?

Some have assumed that adding a DROP will change the actual retirement pattern, or more specifically, it will cause plan participants to alter the plan's experience by delaying their retirement. Caution (some would say extreme caution) should be observed in following this approach when estimating the cost impact of adopting a new DROP. There is very little definitive statistical evidence on the impact DROPs have in this area. In addition, the authors think that the impact will be materially influenced by: (1) the pre-DROP design, (2) the DROP design and (3) the type of group covered (i.e., police vs. fire vs. general employees or teachers). If the plan actuary assumes that there will be a favorable delay in retirement patterns after the adoption of a DROP and that assumption becomes a key in the decision to adopt the DROP, there may be significant problems for the plan's trustees and for the actuary if actual experience does not meet this expectation and as a result, actual costs are higher than originally estimated by the actuary. If there is a savings associated with the assumed delayed retirement age, the actuary might want to separately quantify that amount for the trustees.

The plan's actuary may believe it is more prudent to assume no change in the plan's retirement patterns when the DROP benefit is being considered. If favorable changes in retirement patterns do, in fact, occur after DROP is implemented, then actual costs will be less than estimated by the actuary, and contribution rates can then be adjusted downward. It is always better to have favorable variations after the implementation of a new benefit structure than to have unfavorable variations. While we believe this to be a natural desire of the plan actuary, it may be challenged by the "union's" actuary in a labor negotiation setting as not being the best judgment. Adding a sunset provision could limit the problem should experience be less favorable than the assumption.

If the DROP design itself includes some feature that penalizes the DROP participant if he or she does not stay in DROP a certain period of time, then it might be appropriate to assume some favorable change in retirement rates when doing the original cost estimates. An example might be where the member who elects DROP must stay in DROP a certain number of years before becoming eligible for a COLA. In this situation, it might be acceptable to assume that those employees who enter DROP will have a zero percent probability of retirement until they satisfy that requirement. Likewise, if a DROP requires an employee to retire after five years, the actuary should not assume that if a participant elects DROP they will stay for six years.

Police officers vs. Firefighters

As was mentioned earlier, firefighters tend to work longer after NRD than police officers. It would not be unusual for a significant percentage of a firefighter work force to be beyond NRD.

Public safety vs. Non-public safety

Compared to public safety employees, non-public safety employees have later NRDs, fewer work to their NRD and actuaries often assume fewer work past NRD. DROP ratios tend to be higher (due to age) for non-public safety employees. This is related to the fact that actuarial increases are greater at older ages. DROPs provide a type of actuarial increases while most non-DROP post-NRD accruals provide less (depending in part on the formula, the rate of pay increases and the length of service).

4.5 Treatment of Employee Contributions

There are three common treatments of employee contributions in DROP designs: (1) discontinue employee contributions, (2) continue contributions and add them to the DROP lump-sum account and (3) continue contributions but do not add them to the DROP lump-sum account.

Generally the first two options are roughly of equal value. There may be some difference between the interest assumption (interest lost on contributions not made) and the interest credited on contributions to the DROP account.

The third option is a lower cost option. This may be used to lower the cost of a DROP and should be factored into any DROP illustration (including the

DROP ratio). From an employee's perspective, this option will not seem fair. However, many will point out that since the DROP is an option, employees have the choice not to elect the DROP if they think the provisions are inequitable.

Some funding methods determine a gross normal cost and the employer normal cost equals the gross normal cost less the expected employee contributions (sometimes reduced for current year decrements). The issue here, under the first option, is that the gross normal cost might be level over a participant's employment but the employee normal cost will decrease and the employer normal cost will increase. This is not unique to DROPs and is discussed again in Section 4.6.

Some aggregate funding methods use the present value of future employee contributions as an offset to determine the present value of future employer normal cost. These are probably the easiest situations in which to handle all three options listed above. The present value of future employee contributions does not change under the second and third options and is reduced under the first option.

4.6 DROP Cost Discussion and Illustration

Figuring out how to determine the cost of a DROP can be difficult. Part of this difficulty can be linked to limitations of valuation software. This is particularly true with parameter-driven systems. Few, if any, currently have built-in parameters for DROP plans as they do for cash balance or career average pay plans. Variations in DROP designs related to the treatment of employee contributions and ancillary benefits during the DROP participation period also require attention. The following are some observations that may be helpful. To help make this somewhat less abstract, we have also included a discussion of the "sample life" illustrations that are contained in Appendix B.

The retirement assumption is that 100% of members retire at NRA and participants cannot elect DROP until that age. If this were the assumption both before and after the addition of the DROP feature, there would be no change in the immediate valuation result due to DROP. Any participant who elected to continue to work beyond NRA would likely generate what some would perceive to be an actuarial gain[6], either with or without electing DROP. Similarly, if the

[6] The "gain" under DROP might simply be no additional pension cost for that year of service. See discussion in Section 4.4.

assumption prior to the addition of a DROP feature was that 100% of participants retired at NRD and after the DROP that some employees will work past NRD, the immediate impact would be to reduce the current employer contribution rate. This might not be an uncommon situation where NRA is age 65. However, in public sector police and fire plans it is likely that NRA is well below age 65 and the plan already assumes that many (if not most) employees work beyond NRA.

Now assume the following:

1. The retirement assumption both prior to and after the addition of the DROP feature is that 100% of members retire three years after NRA.

2. Participants can elect a DROP only at NRD and all do make that election.

3. The DROP participation period will be exactly three years.

4. There are no ancillary benefits after NRD.

5. Employee contributions continue during the DROP participation period.

If under these conditions the DROP ratio at the end of the three-year DROP participation period equals 100%, there is no change in the employer's contribution rate. If the DROP ratio is above 100%, the contribution rate will increase and if it is below 100% the contribution rate will decrease. However, considerations should be given to deviations in all of the assumptions listed above. Below is a discussion of each of the following:

If DROP increases (or decreases) that amount of time worked beyond NRD, how will that affect plan cost?

What happens if participants delay DROP elections beyond NRD (particularly those already beyond NRD when the DROP feature is first added)?

How is the DROP cost impacted by the presence or absence of employee contributions during the DROP period?

If DROP increases (or decreases) the amount of time worked beyond NRD, how will that affect plan cost?

As a general rule, any increase in time worked beyond NRD will lower the employer contribution rate due to shortening the time over which the annuity is paid and increasing the time over which to fund the benefit. If the addition of a DROP is expected to lengthen the time worked after NRD, the contribution rate of the plan can go down even if the DROP ratio always exceeds 100%. Conversely, the contribution rate goes up if the length of time worked after NRD is expected to go down. This result is often the immediate impact in situations when a decision is made to end normal cost at NRA or at the beginning of the DROP participation period. See prior discussion in Section 4.4.

What happens if participants delay DROP elections beyond NRD (particularly those already beyond NRD when the DROP feature is first added)?

DROP ratios tend to be higher at later ages. Keep in mind that electing a DROP is often seen as trading a reduced annuity for a lump sum. As was discussed earlier, the value of the annuity is a function of several things including age. At older ages the value of the annuity given up is less. Therefore DROPs are more expensive (as measured by the DROP ratio) at older ages.

When looking to add a DROP feature, particular attention should be given to employees already beyond NRD. There are three reasons for this:

1. They will tend to have a higher DROP ratio than younger employees who are likely to make a future DROP election closer to NRD.

2. The plan's assumed retirement rates may be lower at their current age than it was at NRA. As a result, the pre-DROP expected future working lifetime of an employee at age NRA+1 might be more than for an employee at NRA. If all DROP participants are assumed to retire after a fixed period (e.g., three years), this could result in shortening the expected working lifetime for older employees but not younger employees.

3. Consideration should be given to the impact on the allocation between normal cost and actuarial liability. For employees at or beyond NRD when a DROP is added, their immediate retirement probability will decrease. This will often increase normal cost (since

there is no normal cost for the percent assumed to leave immediately). While the Actuarial Liability will often decrease when retirement rates decline, the impact on the current contribution will depend on the funding method and amortization period. If there is a significant portion of active participants beyond NRD (as may occur in a plan covering firefighters), the results can be material. This is illustrated in Appendix B.

How is the DROP cost impacted by the presence or absence of employee contributions during the DROP period?

Section 4.5 discussed different treatments of employee contributions during the DROP participation period. Often how the employer normal cost is adjusted for employee contributions[7] and how the valuation software should be coded require extra attention.

Care needs to be taken when employee contributions stop. Two common examples in which the employee contributions are discontinued prior to termination of employment include: (1) certain DROP designs and (2) when maximum accrual "rates" are achieved in a non-DROP design, e.g., 80% of pay after 30 years. Some funding methods will level out the employee contribution offset over an employee's entire career while others will only apply the offset in years when the employee contributions are made. This may be done internally by the valuation software after the software calculates the gross normal cost.

In situations where the employee contributions stop, it may be appropriate to determine the DROP ratio by including in the numerator (which represents the DROP benefit) the value of discontinued employee contributions with interest at the valuation interest rate and adjust for salary increases during the DROP period. Often this modified DROP ratio can be used as a loading factor to estimate the cost of a DROP benefit. Also see Section 4.13.

Sample Life Illustrations:

We want to show the impact of DROPs on plan cost, normal cost, actuarial liability and present value of benefits. For ease of illustration, our base-line case is an employee just reaching NRA and the funding method is PUC. We selected PUC and not entry age normal since PUC does not require using benefits and

[7] The employee contribution offset is often reduced for decrements during the current year.

decrements prior to the valuation date. Details of plan provisions, data and assumptions are shown in Appendix B.

Example 1 in Appendix B shows the following input and results for a pre-DROP valuation:

Age = NRA = 50
Service = 25 years
Expected future service = 2.5 years
Interest/salary scale/COLA/interest credit assumptions = 8%/5.5%/3%/NA
PVB = $419,784
Employer normal cost = $6,830 (13.66% of pay)
Actuarial liability = $385,174

Example 1 in Appendix B also shows the following input and results for a post-DROP valuation. The illustration assumes every participant elects DROP at NRD and uses the same retirement rates as in figure B.1. The illustration assumes the employee contributions continue during the DROP participation period and are added to the DROP account.

Age = NRA = 50
Service = 25 years
Expected future service = 2.5 years
Interest/salary scale/COLA/interest credit assumptions = 8%/NA/3%/6%
DROP ratio at age 55 = 105.5%
PVB = $ 430,768 (2.62% increase)
Employer normal cost = $7,201 (5.4% increase)
Actuarial liability = $394,454 (2.4% increase)
(Change in normal cost + 20-year amortization of change in actuarial liability)/pay = 2.49% of pay

It should not be surprising that the PVB increased by some amount between the DROP ratio at age 50 and age 55 (less 100%).

In Example 2 in Appendix B we modified the retirement rates after age 50 and assumed employees would work slightly longer with the addition of the DROP. The average expected future service increased from 2.5 years to 2.7 years.

The results compared to the non-DROP were as follow:

Age = NRA = 50
Service = 25 years
Expected future service = 2.7 years
Interest/salary scale/COLA/interest credit assumptions = 8%/NA/3%/6%
DROP ratio at age 55 = 105.5%
PVB = $ 431,489 (2.79% increase)
Employer normal cost = $7,086 (3.7% increase)
Actuarial liability = $391,569 (1.7% increase)
(Change in normal cost + 20-year amortization of change in actuarial liability)/pay = 1.72% of pay

It is interesting to see the small change in expect future service having such a material impact on the cost of the benefit change.

We have varied the above illustrations to show the impact of items discussed earlier. However, due to space limitations we have not included all of the detailed illustrations in the appendix. We are comparing the above cost (i.e., 2.49% of pay) to a revised amount.

Contribution rate using a 9% valuation interest assumption =	3.63%
Contribution rate using an 8% baseline valuation interest assumption =	2.49%
Contribution rate change (as a percentage of pay) =	1.14%

Contribution rate using a 0% valuation COLA assumption =	1.24%
Contribution rate using a 3% baseline valuation COLA assumption =	2.49%
Contribution rate change =	(1.25%)

Contribution rate using a 4.0% valuation salary assumption =	5.80%
Contribution rate using a 5.5% baseline valuation salary assumption =	2.49%
Contribution rate change =	3.31%

Contribution rate using an 8% interest credit assumption =	3.17%
Contribution rate using baseline 6% interest credit assumption =	2.49%
Contribution rate change =	0.68%

Contribution rate if employee contributions cease during DROP period =	4.61%
Contribution rate if employee contributions continue during DROP period =	2.49%
Contribution rate change =	2.12%

We also looked at assuming 100% retire at NRD. In the sample life the PVB increased slightly, the normal cost became zero and the actuarial liability increased materially (to the level of the PVB). While the normal cost might become zero for someone expected to now retire immediately, the normal cost (and actuarial liability) for younger employees would likely increase materially. A material increase is likely in the overall plan contribution rate (the extent is likely dependent on the amortization method and period used).

4.7 Pre-DROP Assumptions

One of the more interesting things about determining the cost of a DROP proposal is to realize the significance of the pre-DROP plan assumptions. An actuary could have two plans with identical plan provisions and identical DROP proposals and for one plan the actuary could determine a material cost to add a DROP feature and for the other a material savings. This can be easily understood if one plan assumed (before the addition of a DROP feature) that 100% of participants retired at NRD and the other assumed employees worked far past NRD.

Below is a discussion of how to determine the cost of DROP. The points we want to make in this section focus on the existing (pre-DROP) assumptions.

As background we would like to point out the following:

- Sometimes it is appropriate to determine plan cost associated with plan changes using existing assumptions (e.g., improving a pre-retirement death benefit). Other times it is appropriate to determine the cost by including the cost to change assumptions. An example would be changing retirement rates if the plan's NRD were proposed to be changed from age 60 to age 50. Often it is difficult to predict changes in participants' actions associated with benefit changes.

- It is often inappropriate to add to the cost of a proposed change the impact of assumption changes that are not related to proposed plan

changes. For example, if during the bargaining process a union requested an increase in the benefit rate from two percent to 2.5 percent and the plan actuary measured the cost of the current two-percent benefit using an eight-percent interest rate and the 2.5-percent proposal using a seven-percent interest rate, a dispute would likely occur.

- In most plans, actuarial assumptions do not cover all possible events. In many public plans, events that can affect benefits are often not explicitly considered due to materiality including: remarriage rates, recovery from disability, line-of-duty deaths and number of minor children post-retirement. The larger the plan the more likely some of these events will be factored into an explicit assumption. Determining the cost to change a related benefit (e.g., eliminating a remarriage penalty) often requires determining the cost using something other than the regular valuation as the base cost.

Most public plan actuaries should look at their assumptions to see if they are explicit enough to form a solid cost basis to determine the cost of a DROP. Consider the following two examples:

- "30 and out": Consider a plan that provides an NRA at the earlier of age 60 or 30 years of service. Assume also that the maximum benefit rate of 70% of pay is attained after 30 years. Because of the 70% maximum, assume that there is a material increase in retirements at 30 years of service. However, also assume that the actuary uses implicit retirement rates that only vary by age. The result is that the percent of participants assumed to retire at 30 years is likely understated. Finally, assume that the DROP ratio is only over 100% for those with more than 30 years of service. These 30+ year employees will have high DROP ratios due to the 70% maximum, and the DROP cost will likely be overstated. The overstatement is a result of assuming more participants work beyond 30 years of service than actually occurs.

- Flat salary scale: A plan could have the same pre-DROP cost using either a flat salary increase assumption (e.g., six percent) or a rate that varies by age (e.g., eight percent at younger ages and four percent at NRA). The cost of DROP depends on the salary increases only after NRD.

The cost of most proposed plan amendments is usually determined based on changes in normal cost and actuarial liability between a study "run" and the valuation baseline cost run. The valuation baseline run would normally be the same as was used to determine the most recent plan cost or valuation results. There are two alternate approaches to capturing the "true" cost of a DROP proposal if there is a question about existing assumptions or future experience. These are alternatives to a regular closed group "study" run.

> Approach 1—Revised baseline: This approach resets and/or refines the "baseline" assumptions to better reflect expected experience with a focus on assumptions that materially impact DROP cost, such as retirement rates and salary scales. Hopefully this will not materially impact the prior base line contribution rate. Once this is done the assumptions and benefits can be modified to reflect the DROP changes. The cost is simply the difference in the contribution rate between the DROP proposal and the revised baseline (usually expressed as a percentage of payroll).
>
> Approach 2—Forecast: This would start with the existing baseline assumptions and contribution rate. A baseline projection would be made that might include different projected experience vs. current assumptions. For example, the retirement assumption might be that all participants retire at NRD but the projected experience would be based on some retiring at a later age and might show a gradual actuarial gain being realized (i.e., the cost as a percentage of pay is projected to decrease over time). A similar projection would be done using the DROP benefits. The DROP projection may also include changes in both the expected and actual experience assumptions. The "cost" of DROP would be the difference between these two contribution rate projections.

Both approaches have their weaknesses. There are two concerns with the first approach. If the baseline assumptions need to be changed, the valuation actuary may have a communications problem particularly with employee unions. In addition, future changes in demographics (e.g., a large block of active participants retiring at the same time causing a material change in normal cost) can cause future variations that are difficult to demonstrate without a forecast.

The second approach may be difficult to explain to plan sponsors. There may be no initial DROP "cost". DROP cost may simply be in the form of a reduction or increase in future contribution rate.

4.8 Electing DROP at a Reduced Early Retirement Age

What happens if the DROP annuity contains an early retirement reduction? Often the result is that the DROP ratio is less than 100%. For example, assume that a participant elected DROP four years before NRA and left at NRA.

Accrued benefit at age 46 (21 years of srv):	$23,607
Early retirement factor	x 0.800
DROP annuity before COLAs:	$18,886
DROP annuity at age 50 with COLAs:	$21,256 ($18,886 x 1.03^4)
DROP lump sum:	$103,679
PV of total DROP benefit at age 50:	$424,040
Non-DROP annuity at age 50:	$34,815
PV of non-DROP annuity at age 50:	$524,725
DROP ratio:	80.8%

In these cases we have seen actuaries assume that no participant will elect a DROP when the DROP ratio is below 100%. The further below 100%, the more unreasonable it becomes to assume employees will elect DROP just as it becomes more unreasonable to assume members will not elect DROP if the ratio goes much above 100%.

The cost of DROP usually depends on a trade-off of giving up an annuity to get a lump sum. Losing the ability to grow out of the early retirement reduction usually results in the DROP being an unfavorable election (notwithstanding anti-selection issues). The forgone non-DROP annuity includes not only changes in service and pay but changes in (lessening) the early retirement reduction.

4.9 DROP Participation Rates

Many actuaries have assumed a 100% participation rate in DROPs for those who work past NRD. When the DROP ratio is over 100%, this is a worst-case cost scenario but might be a reasonable assumption.

As was discussed above, employees who elect DROPs at early retirement age often see DROP ratios under 100%, and we have seen actuaries who will not value future DROP elections that would produce a ratio of under 100%. In other situations, the DROP ratio has only exceeded 100% if elected after the maximum benefit rate is reached (e.g., 70% after 30 years of service). These situations have high DROP ratios. We have seen one situation where the "employer's" actuary[8] has only recognized these cases when determining cost during bargaining since all other situations had DROP ratios under 100%.

DROP participation rates are a function of employee needs and employee perceptions. We have focused on DROP ratios being over or under 100% (generally based on valuation assumptions) as a driving factor. From an employee's perspective, there is a different and less quantified view of annuity vs. lump-sum values, future salary increases and retirement timing. We can attempt to value some of this by developing DROP ratios using different assumptions.

Examples: We have seen DROP participation assumptions ranging from 25% to 100%.

- Baltimore City police officers and firefighters have had a DROP since 1996. Baltimore City has a very generous DROP with no mandatory retirement. DROP ratios can get up to 120%. Therefore, the DROP participation rate is high and the assumption is that 80% over NRD elect DROP. The DROP participation rate is about 80%. There are few reasons not to elect DROP since it almost always produces a better benefit, and retirement is not mandatory. Based on discussions with plan staff, we believe that the 20% who have not elected DROP: (1) may be waiting for a pay raise to factor into their average salary, (2) have elected not to work much past NRD or (3) don't trust the system.

- Anne Arundel County (Md.) has a minimum DROP period of three years and if employees leave before three years they lose their DROP benefit. Maryland State Police requires employees to retire after 28 years if they join DROP (28 years is when the maximum pre-DROP accrual rate would have been attained but there was no mandatory retirement without DROP). Both features have dampened DROP participation rates.

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[8] For bargaining the employer's actuary was not the plan's valuation actuary.

ASOP 4 requires that the assumptions selected be the actuary's "best judgment." Normally this would mean factoring in long-term future trends and past experience. Since it may be difficult to predict what kind of participation rate a retirement system will initially get when implementing a DROP (i.e., no past experience), the actuary may want to illustrate the cost using different utilization rates. Cost may be proportional to utilization rates unless the selection method is not simply an across-the-board selection percentage. The safest approach for the system may be for the actuary to assume 100% of all eligible members will elect DROP at their first opportunity (assuming the DROP ratio is greater than 100%). However, the actuary should still get input from others and ask whether this is their best estimate. Also, see related discussion of retirement rates in Section 4.4.

4.10 DROP Retirement Experience

DROPs are often touted as a way to encourage employees to continue to work past NRD. At the same time, DROPs often require retirement after a fixed number of years (e.g., three or five years). It is often difficult to predict what impact adding a DROP feature will have on the average number of years an employee will work beyond NRD. This is particularly difficult if the existing group already works an average of several years beyond their NRD. It is not uncommon for some employees[9] to work eight to 10 years beyond their NRD and for the pre-DROP plan cost to anticipate the savings associated with delayed retirements (which some trustees might not realize). In this situation it is difficult to estimate the impact on retirement rates of adding a DROP which requires retirement after three to five years.

While not quantified, Baltimore City does believe that DROP has resulted in employees working longer beyond their NRD. Their plan does contain a large incentive to work at least 4.5 years beyond NRD (see Section 3.4 for a description of Baltimore City DROP). Like Baltimore City, Dallas has a DROP that does not have a mandatory retirement rule and its employees are working longer due to DROP.

[9] The most likely situation where employees would work far beyond their NRA would be firefighters in plans that allow retirement before age 50. Expected service beyond NRA for police and general employees would likely be much less.

4.11 DROP Disability Experience

Keep in mind that for this discussion we are generally only concerned about comparing disability benefits with service retirement benefits (either pre- or post-DROP) after NRD. Are liabilities higher for disability benefits than service retirement benefits? Offsetting the fact that disability benefits at retirement ages are often higher than service retirement benefits is the fact that post-disability mortality rates might be higher than other post-retirement mortality rates.

Some DROP plans eliminate the disability benefit coverage during the DROP participation period. For public safety plans, many disabilities (30% to 60%) occur near NRD. This will affect funding.

The Dallas DROP does not allow for disability benefits and has noted a material decline in disabilities.

Baltimore City still allows a DROP participant to apply for a disability benefit in lieu of his DROP benefit. However, even here disability claims have declined materially both before and after NRD. This reflects the fact that employees are reluctant to give up their current or soon-to-be DROP lump sum and disability claims have a "voluntary" aspect to them after NRD.

Even if by electing DROP a member is no longer eligible to apply for disability (based on being retired for plan purposes), workers' compensation rules will still apply. This may be important since the pension plan may be treated as a workers' compensation offset. If the DROP benefit is less than the disability benefit, the workers' compensation offset is reduced.

4.12 Impact of DROP and Pre-DROP Design on Plan Cost

Both the design of the DROP and the pre-DROP design are important since they both impact the DROP ratio. The DROP ratio will be an important factor in how employees react.

Many fire and police plans in Pennsylvania are designed with relatively few accruals after NRD, yet many employees continue to work beyond their NRD. The result is that if a traditional type of DROP design is considered, employees show great interest but we find very high DROP ratios and DROP

cost. Conversely, a plan with high post-NRD accruals helps reduce the cost of DROP.

As was mentioned previously, DROP ratios are high when the pre-DROP benefit accrual rate is frozen. The State of Maryland Police DROP has required that the DROP participation period not extend past the point when the pre-DROP accrual rate would have ceased. Because the plan requires mandatory retirement at the end of the DROP period, it is not clear that adding mandatory retirement to the DROP feature does anything but increase plan cost (notwithstanding other personnel issues).

Whether or not a plan has a COLA will impact the DROP ratio, DROP cost and employee choice. Whether the presence of a COLA increases or decreases the cost of a DROP will depend on other factors. In Section 4.6 there was an illustration where having a COLA increases the cost of a DROP.

Everything in the design of the DROP (e.g., mandatory retirement, treatment of employee contributions, COLAs on DROP annuities, interest crediting rates and disability coverage) will have some impact on participation. Two factors that can materially keep down participation are: (1) requiring a number of years of participation in the DROP in order to be entitled to the benefit and (2) placing a reduced amount of the annuity into the DROP account.

4.13 Funding Approaches

This section is about understanding the dynamics of DROP cost. To do this we will sometimes make assumptions that do not represent the average DROP plan. We recognize that the average DROP plan does often provide a benefit improvement and a higher cost.

When does normal cost end?

As was discussed in Section 4.3, one issue is whether employer funding (i.e., normal cost) should end: (1) at the point the participants elect (or are expected to elect) DROP or (2) when they ultimately leave the payroll. Either choice could produce the higher current contribution depending on the following:

1. The value of the DROP benefit measured by the DROP ratio
2. The funding method and amortization period

3. The relative number of employees working beyond NRA

For the following discussion, assume that the DROP ratio is always 100% and there are no employee contributions either before or after the DROP period. Also assume that existing retirement rates presume that employees work beyond their NRD and that the actuarial present value of the deferred retirement benefits is equal to the present value of the benefit at NRA (or current age if later). Also ignore any issues related to pre-retirement death or disability benefits during the DROP period. (Later we will peel away some of these assumptions and deal more with short-term vs. long-term cost.) The following would occur:

1. The benefit provided would be in a different form but with the same actuarial value.

2. The cost of the plan would not change if the retirement experience did not change because of the assumption that the DROP ratio is 100%.

3. The contribution rate of the plan would change if all participants were assumed to elect DROP at their NRD (or current age if later) and funding/normal cost was targeted to end at the point when DROP is elected. More importantly the new contribution rate is identical to the contribution rate produced by assuming that no person elects DROP and that all retire at their NRD. To some this is not an unnatural position since DROP participants are often assumed to be "retired."

Consider how the "cost" might change under the following methods:

- Assume that the funding method is the aggregate funding method. As we described this plan, the present value of future benefits and present value of future normal cost remain unchanged. The spreading factor (present value of future salary/salary) is changed. We eliminate employees that are beyond their NRD thereby raising the spreading factor. However, we also shorten the factor for other employees that no longer are expected to work beyond their NRD (or more accurately are no longer expected to have a normal cost beyond their NRD). Which of these two factors will determine whether the contribution rate increases or decreases? The point is to understand that employees already working beyond their NRD when a DROP is

added need to be considered. For a firefighter plan this could be a significant percentage of all employees (20% to 30%).

- Assume that the funding method is an individual cost method such as entry age normal. We would expect that the actuarial liability would increase. The normal cost will increase for those not yet at their NRD and become zero for those at or beyond their NRD. Like the aggregate funding method, whether the total normal cost increases or decreases depends on the mix of employees above or below their NRA. Generally we would expect that the normal cost, actuarial liability and contribution rate would increase. However, why should the contribution rate increase under this type of DROP (i.e., 100% DROP ratio)? The answer is that the long term cost (cost = benefits paid + expenses – investment income) does not change. Only the current contribution amount changes in order to accelerate funding by NRD.

The above had some "unnatural" parameters: DROP ratio = 100% and no employee contributions pre or post-DROP. In addition, adding a DROP feature will have some impact on retirement rates. Next we consider how these will affect plan cost.

Some issues related to long-term vs. short-term cost

For reasons discussed earlier, DROP ratios are often greater than 100%. Assume we are looking at a DROP equal to the present value of the NRD benefit plus future employee contributions plus COLAs (DROP account value based on 100% of the NRD annuity benefit and employee contributions, with interest at the valuation rate and COLAs credited during the DROP period). Assume that the DROP ratio is always above 100% after NRD. As a general rule this implies that long- and short-term cost should be higher <u>if retirement rates are not affected</u>. Most public safety plan valuations assume some employees work beyond their NRD, and the immediate contribution rate increases due to DROP might be representative of long-term cost. However, assume that the plan's pre-DROP valuation assumes everyone retires at their NRD or current age if later (not an uncommon situation in a small plan even if it overstates the true cost).

The DROP would appear to have no "cost" or actually produce contribution rate savings if post-NRD retirement rates were added. This leads to several observations:

- The cost of DROP might be more accurately portrayed by looking at a forecast of plan contributions (as discussed in Section 4.7) rather than just the immediate impact on the current contribution requirement. This would allow adjustments for decisions made about whether normal cost ends at NRA (which can be the assumption either before or after the addition of the DROP feature). It can also factor in the impact of changes in retirement rates and timing of new hires. However, as a practical matter this type of projection may be difficult to perform.

- Should two plans with the same benefit provisions both before and after the addition of the DROP have a different cost because of differences in assumptions? The best illustration might be to assume we have separate police and fire plans with the same benefits. Police officers often retire closer to their NRD than do firefighters. This often shows up in higher retirement rates for police officers and higher pre-DROP cost. Ages further beyond NRA usually have higher DROP ratios. The result is that the cost (and benefit) of adding a DROP is higher for the average firefighters (even if they are in a plan combined with police officers).

How will DROP affect retirement rates and how will changes in retirement rates impact plan cost?

What happens if we determine the cost of DROP by: (1) assuming no change in retirement rates or (2) determining the cost after we lower retirement rates? This second situation could arise simply by assuming everyone takes DROP and retires at the end of the maximum DROP period.

In the first situation the cost of DROP will just reflect the DROP ratios. Often we think of this as a weighted DROP ratio. Figure 4.2 showed a weighted DROP ratio of 102.64%. The DROP ratios shown in this chart assume that DROP is elected at NRD. This could not be true if: age at decrement – NRA > maximum DROP period. Based on Figure 4.2, we would expect that liabilities and normal cost associated with the retirement decrement would increase by about 2.64%. This might be reduced if less than 100% were assumed to elect DROP. This might

not be a proportionate reduction, keeping in mind that in figure 4.2, 40% are assumed to retire at NRD before being able to elect DROP.

What happens if we assume that adding a DROP feature will extend the time worked beyond NRD (and funding extends beyond NRD)? Often we look at the cost of a DROP assuming no change in retirement rates and then look at the additional change in cost if retirement rates are lowered. The result will vary from plan to plan; however, we would expect to see the same type of change between the two DROP results had we made this retirement rate change using pre-DROP benefits: (1) little change in the present value of future benefits, (2) a decline in actuarial liability and (3) a decline in the normal cost. However, as mentioned earlier, the group of employees immediately eligible for DROP when the feature is added should be considered separately as described below.

It would not be unreasonable to assume that the addition of a DROP will immediately make some people delay their retirement. Under individual funding methods (e.g., entry age normal and projected unit credit), the normal cost is discounted by the current year's retirement rate which could be 100%. For these employees it would be common to find that the impact of lowering retirement rates (having already factored in DROP cost based on current retirement rates) is: (1) little change in the present value of future benefits, (2) a decline in actuarial liability and (3) an increase in the normal cost (often from $0). To some extent this is a temporary phenomenon since at the end of the first DROP period, the initial large cohort of DROP participants will all retire and their normal cost will again disappear. However, whenever there is a large group of employees already beyond their NRD, this factor should be considered and the actuary should not just look at weighted DROP ratios to estimate plan cost.

How do employee contributions factor into DROP cost?

Many DROP plans discontinue employee contributions when a DROP is elected. For those that continue contributions, some place them in the DROP lump-sum accounts and some do not (i.e., they are just used for the overall funding of the plan). How are these different situations handled? We can quote an earlier sentence that would still apply here: "If the actuary assumes normal cost ends at NRD (when DROPs are assumed to be elected) this problem is avoided but it can be argued that the true cost of the DROP might be overstated." While this may be the "safest" way around dealing with contributions we would like to offer the following thoughts assuming funding (normal cost) extends through the DROP participation period.

If employee contributions end when the employee elects DROP:

- A similar situation exists in many plans when the maximum accrual rate is reached and the plan discontinues requiring employee contributions (e.g., benefit equals 70% of average salary after 30 years of service and employee contributions are discontinued).

- One direct way of handling this under a spread gain funding method is to simply reduce the present value of the employee contribution to reflect the future discontinuation of employee contributions. Another way would be to load the retirement benefits by a DROP ratio whose numerator includes the employee contributions that are "retained" by the employee after they elect DROP.

- Under projected unit credit there is a gross normal cost developed that is then offset by the expected employee contributions for the current year. This would likely result in a jump in the normal cost when employee contributions cease (i.e., when DROP is elected).

- Under entry age normal the employer share of the plan's normal cost probably does not jump up when employee contributions stop. The discontinuation of employee contributions is often anticipated when developing a level employer normal cost. Another method is to develop a level gross normal cost and offset it by the actual anticipated employee contributions.

If employee contributions continue during the DROP period:

- These types of designs probably present few issues in this area. Treatment of employee contributions as an offset to employer normal cost can remain unchanged.

- Whether or not employee contributions are added to the DROP lump sum (or simply contributed to the fund with no direct impact on the DROP annuity or lump sum) will affect the value of the benefit and the overall cost of the plan and the DROP. However, the normal cost offset for employee contributions is probably not affected as long as the employee contributions are being made.

- The decision to continue employee contributions is generally a plan-wide choice and not made on a participant-by-participant basis. This is often required to maintain 414(h) pick-up status for governmental plans.

- DROP ratios require no adjustments if contributions continue.

How might back DROPs impact funding?

Adding a back DROP feature presents some anti-selection problems. Obvious among these is the ability to adjust the retirement date and the DROP participation period to deal with late increases in pay. However, from a funding perspective it also does the following:

1. Avoids the question about whether a participant has a normal cost during the DROP participation period.

2. Avoids dealing with treatment of discontinued employee contributions during the DROP participation period.

3. Reduces the likelihood that participants will retire sooner when under current assumptions there is a significant number of assumed retirements where: Age at decrement – NRA > maximum DROP participation period. In other words, the fact that the employee does not have to commit (at the point they elect DROP) to a fixed future retire date makes it possible to work longer.

How might an actuary factor in anti-selecting? Three thoughts:

1. Simply assuming that a person will retire when the DROP ratio is the highest is not a solution as it often will produce the latest retirement age assumption and the lowest cost.

2. One basic approach is to assume that no one will elect DROP when the ratio is under 100% and everyone will elect DROP when the ratio is over 100%.

3. Even if we have a set of fixed DROP ratios based on valuation assumptions, there will be some variation due to different histories of pay increases. The actuary could go back and determine what the

ratios would be today for those who currently are beyond their NRD (using real salary histories) and compare them to the theoretical values. An adjustment loading could be made, particularly where the theoretical ratio was under 100% but the actual exceeded 100%.

How do we measure liabilities for members who have already elected a forward DROP?

Valuing liabilities for members during their DROP participation period can be straightforward. Often this group can be valued separately with some extra data being collected (i.e., frozen DROP benefit with any COLAs at valuation date and DROP account balance at valuation date). These balances can be projected forward to expected termination date and discounted back at the valuation assumption (e.g., assume everyone retires after a four-year DROP period if the maximum DROP period is five years). Alternatively, the actuary could assume that all will retire immediately.

There can be other events the actuary might want to consider. If the assumption is not that they will retire immediately and disability benefits continue to be offered, the actuary might want to value future disability contingencies. The probability of death between the valuation date and termination might be factored in or treated as future gains and losses.

Many public plans use entry age normal as their funding method. Past decrements and the non-DROP benefit can affect the calculation of normal cost. This might be difficult to program and might require salary data not normally needed for DROP participants.

Total employer cost perspective

The actuary is often asked the question: What will this do to total employer cost? Normally we avoid quantifying a global answer since it involves issues beyond retirement plan cost. Assuming that retirement rates (or retirement experience) are changed, some of the areas discussed include:

1. Higher retirement plan cost
2. Higher/lower active employee health care cost
3. Lower/higher retiree health care cost
4. Higher payroll cost to retain senior top level employees
5. Fewer new hires and lower training cost

6. Efficiencies associated with retaining experienced employees (e.g., fewer citizen lawsuits over actions of rookie police officers, more experienced detectives)
7. Cost of blockage of promotional opportunities

Also see Section 7.2.

4.14 General Cost Formula

We believe that DROPs are complicated enough to justify a complete valuation model of plan design. However, to make some cost estimates just using a spreadsheet and to test for reasonableness of valuation output, we often follow the following steps:

- Produce a chart of DROP Ratios at various age and service combinations. An illustration is shown in Appendix B, Example #3. This can be overlaid with retirement probabilities to get a more complicated version of figure 4.2. The sum of the products provides a weighted average of your DROP ratio. This is a first approximation of the increase in liabilities associated with the retirement decrement.

- Sample lives such as those shown in Appendix B, Example #1, can be done again to check the results from the method in the prior paragraph. This sample life check can then be expanded to get an idea of the impact of changes in retirement rates (i.e., as in Appendix B, Example #2).

- Several times we have mentioned the importance of considering the impact of those immediately eligible to join the DROP <u>if the immediate retirement rate is to be lowered</u>. One quick item to look at is the sum of the immediate retirement decrements before and after a change in assumptions to get an idea of how many employees will again have an employer normal cost. In addition, if these employees elect DROP and employee contributions are discontinued, you might want to estimate the amount of lost contributions in a similar fashion. However, if this group is of a material size you will likely want a more complete valuation model to get a better idea of the immediate impact even though the long-term impact might be different.

5. IRS and Administrative Issues

There are many tax issues that have been raised concerning DROP benefits. All of these issues require legal advice. Our experience is that not all lawyers (or actuaries) will agree on the correct tax treatment. However, we did not want to ignore these issues. Therefore, we have presented common issues that need to be addressed. Many of the Web sites shown in Appendix A contain descriptions provided by plans to DROP participants concerning tax treatment and options.

5.1 DB or DC?

One issue that is often raised is whether a DROP is treated as a DB plan or a DC plan. More specifically is it a plan defined under IRC Section 414(k)? Section 414(k) deals with plans that are both DB and DC in nature. For purposes of 415 limits and 72(d) tax treatment of employee contributions, 414(k) plans are "treated as consisting of a DC plan to the extent benefits are based on the separate account of a participant and as a DB plan with respect to the remaining portion of benefits under the plan, …" (see 414(k)(2)).

One initial view was that a DROP plan is a DC plan and that the "contributions" to the DROP account are annual additions. This would be a problem since the retirement annuity amounts ("contributions") can often exceed the DC limits. Few still hold this view. A more common view is that DROP accounts retain their DB nature since they are not technically separate accounts just as cash balance plan accounts are not separate accounts. This case is strongest where the interest rate credited is not exactly equal to the actual return of the fund (see 5.4 below).

The method of crediting interest to the DROP accounts might determine whether, for IRS purposes, they are considered DC components under IRC Section 414(k) or whether they are to be treated as a DB benefit. If the interest credited to the forward DROP plan accounts is the same as the rate earned by the actual assets underlying the accounts (even if adjusted for additional expenses), then the program may be treated as a DC component as described in Section 414(k). But if the crediting rate is fixed or some other method not directly related to the earnings of the actual underlying assets, then the program is treated as a DB for IRS purposes.

For example, noncontributory DB plans often used to permit voluntary after-tax employee contributions that were credited with the earnings of the underlying fund. These were treated as DC components of the plan. Rollover contributions or trustee-to-trustee transfers into a DB plan are typically established as accounts that are allocated earnings equal to the rate experienced by the underlying plan assets (if not used to purchase DB service credits). So DROP accounts may be treated as DC components under 414(k) if they are credited with earnings that are directly related to the earnings of the actual assets underlying the accounts. These DROP plans include those crediting the actual fund rate and those self-directed plans investing in mutual funds.

On the other hand, cash balance plans are treated as DB plans because their interest credits are not equal to the actual returns of the underlying assets. The same is true of any DB plan that has employee contributions credited with a fixed rate. So DROP accounts would be treated as an additional DB feature if they are credited with a fixed rate, assumed actuarial rate, smoothed rate or an index rate.

Might self-directed DROPs be treated as DB plans? Maybe. There are some cash balance plans that credit interest based on returns of employee selected indexes (e.g., mutual funds). Plan assets might not be invested in these actual funds. DROPs could be designed the same way and be treated as DB plans. Even if interest is tied to actual returns, some still argue they are DB plans.

5.2 415 Limits

Even with the DROP feature, the total benefit package is often viewed as a DB plan subject to the defined benefit limits. The annuity equivalent of the DROP lump sum plus the DROP annuity are generally added together to compare to the Section 415 defined benefit dollar limits. Given the high limits for

public safety employees ($130,000/year at any age), Section 415 is rarely a problem.

If the DROP feature is considered part of a DB plan, then the benefits accrued and paid must be limited under IRC Section 415(b). When benefit payments are to begin, such as at the end of the DROP period, the lump-sum DROP payment should be converted to an equivalent normalized annuity using the assumptions specified for such purpose in 415(b) and added to the regular monthly annuity payable (also normalized) so that the total employer-provided benefit can be limited if necessary under IRC Section 415(b). This procedure would also be followed for back DROPs, PLOPs or other DROPs that are classified as DB features.

There seems to be a minority view that DROP accounts are to be treated as DC components under IRC Section 414(k). If this is the case, Section 415(b) limits would apply to the calculated monthly pension while Section 415(c) limits would apply to annual additions made into the DROP accounts.

The monthly DROP amounts can be thought of as plan-to-plan transfers from the DB plan to the DC component. IRC Section 415(c) limits the amount of annual additions credited to a DC account. These annual additions are, generally, defined to include employer contributions, employee contributions and forfeitures. The regulations specifically exclude plan-to-plan transfers from the definition of annual additions. Thus, while a participant's DROP account may be considered as a DC component, the only item of annual additions that might be limited under 415(c) is any employee contribution that might be made to the account.

Keep in mind that post-tax employee contributions (plus interest on them) generally are not part of the DB plan's Section 415(b) limitation for governmental plans. Also see Section 5.3.

Some have adopted the practice of limiting the amounts of the DROP "deposits" to the 415 DB limit then in affect. This would treat the deposits just as if it were paid to the participants.

5.3 Rollovers and Tax Basis Calculations

One of the favorable aspects of the DROP lump sum is that all of the plans we have seen say that it can be rolled over to an IRA. One detail to note is that

some employees have made post-tax contributions in the past. These employees have a "tax basis" which can be recovered tax-free after retirement. This usually occurs as a portion of each annuity payment based on rules contained in Section 72 of the Internal Revenue Code. However, with a DROP plan there is an issue since part of the benefit is paid as an annuity and part as a lump sum. Some plans have allocated all of the tax basis to the annuity. However, most plans have allocated a portion of the benefit to the DROP lump sum and a portion to the annuity on the basis that both forms of payment are part of the same "contract." Generally, the portion allocated to the DROP lump sum equals:

Tax basis x {DROP lump sum / (DROP lump sum + present value of annuity)}

The present value of the annuity is usually determined based on the plan's actuarial equivalence basis. Prior to 2002, the portion of the tax basis allocated to the DROP lump sum could not be rolled over (nor subject to tax).

If the lump sum is paid out and is not rolled over, the extra 10% tax will apply if the employee is under age 55 at termination of employment (not 59.5 as long as retirement is allowed at age 55). Some attorneys think that if the 10% tax applies to the DROP lump sum, it also applies to the DROP annuity.

5.4 Self-Directed DROPs

A self-directed DROP is a special type of a forward DROP. The distinction is that in a self-directed DROP the employee gets to direct how the DROP lump sum is invested. Generally this is done by actually segregating funds for the DROP lump sum into an account that the employee can direct just as an employee might direct investments in a 401(k) or 457 plan. It is possible that funds might not actually be segregated but that indexes would be chosen that would be used to determine the interest rate (as is sometimes done in cash balance plans).

Many of the initial self-directed DROPs were in the state of Florida. A few have IRS determination letters. The following are common in self-directed DROPs:

- The number of investment options varies by plan from just a few to over 500. This is similar to what we see in DC plans. The number offered is a trustee decision.

- If a DROP is to be self-directed it is likely that an outside manager will be selected that has a "turn-key system" to administer the DROP plan. However, there is at least one plan that administers its own self-directed accounts. Funds directed by the employee remain assets of the plan and under the control of the trustees.

- It is more likely that DROP lump-sum accounts will be allowed to remain in the plan after termination of employment since the employer does not bear the investment risk associated with a fixed interest credit in a non-self-directed DROP.

- Statements are usually provided quarterly and Internet access is often provided.

- While not common, some plans offer a choice between a self-directed account and a non-self-directed account.

The need for legal advice is increased when looking to add a self-directed feature. Unfortunately, it may be some time before the IRS provides any formal guidance in this area. Also see Section 5.2.

5.5 Benefit Statements/Illustrations/Retirement Counseling

Prior to making a DROP election[1], eligible participants are usually given a booklet explaining the DROP provision and providing DROP illustrations. This is often accompanied with employee meetings to explain the options. Many plans have information on their Web sites. Ideally employees would have software available to allow them to do some "what if" comparisons, e.g., using different DROP election dates and salary assumptions.

Public plans do not have the ERISA requirement that employees be allowed to request a statement of their accrued benefit once per year. Benefit statements are not uncommon in public plans; however, poor data quality may cause plans not to issue statements to all members. DROP participants generally have had their data reviewed and estimated benefit calculations done prior to making a DROP election. Therefore most plans are in a position to issue DROP statements during the DROP participation period.

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[1] DROP election means to elect to participate in DROP and not an election between different forms of an annuity at time of retirement.

Some plans are able to fully determine (at the time of the DROP election) the exact month-by-month projection of the DROP lump sum and annuity at any point in the future. This is common if there are no COLAs, the interest credit rate is fixed, and there are no issues with sick leave credit. In other cases, annual or quarterly statements may be prepared to show actual COLA increases, variable interest rate credits and adjustments for sick leave accruals.

While it is best to get involved with retirement counseling early in one's career, many in attendance at employee meetings are often within five years of retirement. For some, retirement counseling is just an explanation of their options at the time they terminate employment. When a plan has a forward DROP, an election is made several years prior to termination of employment. Usually the plan administrator will want to have one-on-one and group meetings prior to a DROP election. The one-on-one counseling will often involve individualized projections of future benefits with and without a DROP election.

5.6 Recordkeeping/Administrative Expenses

Administering a DROP plan does require extra staff time. This can sometimes be minimized by adding a back DROP vs. a forward DROP feature; however administrative cost is usually not the most material factor in the design decisions. Keep in mind that extra expense means reduction in plan assets and higher plan sponsor cost.

Most plans that we have seen do not charge employees for the extra administration associated with the DROP accounting. Where this is most likely to occur is with self-directed DROPs where a vendor fee and an investment fee might apply.

5.7 Employment Treatment

No one can predict how all legal and employment issues about DROPs will be resolved, just as it would have been difficult in 1985 to predict legal issues for cash balance plans. Generally, DROP participants are entitled to the same pay, benefits and promotional opportunities as other employees. However, how they are viewed for pension purposes might be different.

Below are a couple of legal opinions that perhaps you agree with but should appreciate that other reasonable and informed people might come up with a different decision:

> Opinion of the Arkansas Attorney General on the question of: Is a police officer participating in DROP considered retired for purposes of serving on the Arkansas Fire and Police Pension Review Board?
>
> Answer: Yes. Because of the manner in which the benefits of DROP participants are distributed, their interest in the pension system is more akin to the interest of retired members than to that of active members.

Many public sector boards of trustees have separate seats reserved for active participants vs. retired participants. Some "active" representatives are DROP participants. The issue of the DROP participant's "interest" for representation purposes is an interesting one. Would it matter if the law specifically stated whether DROP participants get the benefit of future benefit improvements or whether they could accrue benefits after their DROP participation period?

> Opinion of Pennsylvania … on the question of state aid:

The state of Pennsylvania provides an allocation of state aid directly to local retirement systems based on the number of active participants. The State Law (Act 205) classifies members as either "active" or "retired" with no classification for DROP participants. The state decided that DROP participants are not active for state aid purposes. This was apparently based on the concept that DROP participants are not earning any benefits. This does not address the issue that participants are actually losing value without a DROP and even though this total retirement benefit may be increasing more rapidly with DROP than it would without DROP. A proposal was made to change the law to clarify the situation. Also see Section 3.3.

5.8 ADEA

This is an emerging issue. Like the other legal issues discussed in this study, our intent is not to give legal advice but to make the reader aware of issues and common practice.

In December 2002, the Treasury issued a proposed regulation covering age discrimination issues in both traditional and cash balance plans. One of the examples dealt with providing actuarial increases after NRD in a traditional plan. That illustration provides the context of the following example.

Assume there is a fire and police plan that provides a benefit of 2.5% of final average salary per year of service and has an NRA of 50. Therefore, the accrued benefit after 20 years is 50% and after 23 years is 57.5% of final average salary. Now assume you have two different employees, both with 23 years of service but one age 50 and the other age 53. Assume that the 53-year-old elected DROP three years ago. Now also assume that the DROP ratio for the 53-year-old is less than 100%. This implies that the 53-year-old's benefit is worth less than 57.5% of final average salary. This would also mean that the 53-year-old's benefit is less than the 50-year-old's benefit (thus the age discrimination problem).

Two things to keep in mind: (1) age discrimination rules apply to public and private sector employers and (2) providing an employee the choice between a legal and illegal option does not make the election of an illegal option legal.

The issue of DROPs has been proposed to the Treasury and hopefully some guidance will result.

6. Employee Perspective

6.1 Why Does DROP Cost Anything?

Consider a DROP account that accumulates (with a market interest rate) 100% of the annuity that would have been paid to a participant had he retired. This would include any "retiree" COLAs. Assume that any employee contributions are discontinued after joining DROP. From the employee's perspective, this looks like a no-cost option since the ultimate payout equals what the plan would have paid out had the participant retired when he elected DROP.

Actuaries discount benefit payments to reflect events that are likely to occur. These events are not necessarily the worse-case scenarios and therefore the resulting contribution rate would be discounted. Examples include:

1. Discounting for anticipated terminations prior to vesting (in some plans there is no vesting until retirement age).

2. Assuming only a fraction of employees will be eligible for immediate disability benefits even though this benefit might require the largest immediate reserve.

3. Assuming that some employees will continue to work past NRA even though retiring at NRA may produce the largest present value (and normal cost or actuarial liability) of any service retirement assumption.

In the last two situations employees will expect to receive a disability or service retirement benefit when they qualify even if this creates plan experience that is less favorable than assumed. In the common DROP context it is only natural that employees not appreciate the distinction that there is a cost since: (1) the DROP ratio is greater than 100% and (2) they did not actually retire when they elected DROP. This can become a real communication problem when you have identical police and fire plans but the police have higher retirement rates (and experience). Adding a DROP might only have a cost for firefighters and not police officers.

To create cost neutrality, two changes commonly considered are: (1) "deposit" less than 100% of the annuity into the DROP account and (2) delay the DROP eligibility age from NRA to an age closer to the actuary's assumed retirement age. The first option will appear to be "unfair" to many employees but creates what many actuaries think is close to true cost neutrality assuming the DROP ratios are close to 100%. The second option will still create DROP ratios of over 100%, even if at ages that active employees seldom reach.

In the prior paragraph we have been intentionally vague on the definition of cost neutrality. To some cost neutrality means that the DROP ratio is always 100%. Using that definition, option two (delaying DROP eligibility age) fails the neutrality test. To others the definition of cost neutrality means that the current contribution rate does not change. By this definition a DROP can be cost neutral (or a cost reducer) if the DROP eligibility age is after the latest assumed retirement age. For others a more sophisticated measure may be required such as the two approaches discussed in Section 4.7.

6.2 Factors Influencing an Individual's Selection

Employees early in their careers often plan on working until NRA. As they get closer to NRA, they may like the comfort and security of being able to quit when they want to but decide to continue to work on a year-by-year (or month-by-month) basis. In their planning, an employee often factors in the annuity benefit they will receive beginning at NRA (e.g., 50% of pay plus a COLA). Any amount in excess of this might be treated as a windfall or extra cushion. By choosing to participate in DROP, employees may be saying that they are locking in the annuity they planned on and converting the extra cushion into a lump-sum form of payout.

Other designs that provide a partial lump-sum payout might not provide the same level of annuity income on which the employee planned. For example, a PLOP, where the employee gets a reduced annuity at NRA in exchange for a lump sum equal to their contributions would not accomplish the same result.

Employees might delay joining a DROP if they have a large pay raise they want factored into their final average salary before their annuity is frozen.

Specific plan design issues can be a factor. One plan required employees to be in the DROP for at least three years before becoming entitled to DROP benefits (i.e., if the employee retired after being in the DROP for less than three years they got a non-DROP benefit offset by missed employee contributions). This design was less popular among police officers than firefighters since many police did not want to make that commitment to stay at least three years beyond their NRD to get a DROP lump sum. Similarly a plan that requires mandatory retirement at the end of the DROP period might cause some employees to delay entry into the DROP.

If a member who has reached his maximum accrual rate (e.g., 70% of final average salary after 30 years of service) can elect the DROP, the choice is an easy one, and the DROP ratio can be expected to be high.

Many DROPs require employee contributions to stop at the beginning of the DROP participation period. This will increase take-home pay and can be a factor.

6.3 How Lump Sum Money is Used

Common discussions between retirees and investment advisors include:

1. Rollover to an IRA
2. Seed money to start up a business
3. Buying a boat or a car
4. Paying off a mortgage
5. Paying for a child's college cost

Under the Baltimore City DROP, fire and police employees have options with their DROP lump sums that include:(1) taking a lump sum and paying the income tax immediately, (2) rolling over the lump sum to an IRA or (3) buying

an annuity from the plan. Most firefighters tend to retire in their 50s and are more likely to roll over the lump sum than are police officers.

Because of the pressure of their jobs, police officers usually retire in their 40s if they are eligible and are more likely to elect the annuity option or to take cash. Differences seem to be related to both age at retirement and a lower level of trust by police officers in either investment advisors or the stock market.

Some participants might initially roll over their DROP lump sum into an IRA but then follow one of the following withdrawal approaches:

- Some employees withdraw the IRA money over two or more tax years to avoid ending up in a higher tax bracket. Care should be taken if termination of employment is between age 55 and 59.5. The 10% tax penalty could have been avoided on money taken directly out of the plan (and not rolled over) at time of retirement.

- Some employees wait a year or so to see what their cash needs are after retirement. They then begin to take level annual payments from their IRA in a fashion designed to avoid the 10% penalty even if they are not yet age 59½. See IRS Revenue Ruling 2002-62 for more details on methods to avoid the 10% penalty.

Many of the issues involving lump sum vs. annuity payout in DB plans exist with DROPs including: tax issues, investment risks and mortality risks. Common discussions when designing a DROP include whether to allow alternate payout forms for the DROP lump sum. While an annuity payout has some logic it begs the question of why the member elected DROP; and if the DROP was to be cost neutral (by some definition), doesn't offering an annuity question why a DROP is offered? Perhaps the DROP could provide a better death benefit or some other type of enhanced annuity.

7. Employer Issues

7.1 Cost Neutrality

A very common situation is that when an employer is first presented with a DROP proposal, the advocates argue that there is "no cost"[1]. It is just as common that the employer would give a preliminary go-ahead to look into a cost-neutral DROP option. However, this is where the complications discussed in "Section 4: Actuarial Issues" often cause reality to fail to live up to expectations. Initial plan designs may be found to actually increase the contribution rate. Next, plan designs may be changed to reduce or eliminate cost. However, disagreements may exist over how these changes should be valued.

Three common ways to reduce or eliminate DROP costs are (1) delay DROP eligibility, (2) reduce the percentage of the benefit added to the DROP account (e.g., 70% goes in the DROP account) or (3) eliminating COLAs during DROP period. These types of changes will reduce the cost of a DROP (either by reducing the number eligible or the benefit amount) but different sets of assumptions will produce different answers to the questions: (1) by how much? and (2) will DROP be cost neutral?

One of the most difficult questions for either the plan sponsor or the actuary to answer is the impact DROP will have on how long employees work. The plan sponsor should understand that if employees retire sooner, contribution rates will increase and if they work longer, contribution rates will decrease. A particular DROP cost estimate might be based on savings associated with employees who are assumed to work longer. We urge caution in this area

[1] We have used the vague term "no cost" (and "cost neutral" in the next sentence) since that is the degree of specificity given the argument by most non-actuaries. It then becomes the actuary's role to add the required specificity.

and refer back to the section on "Should the actuary assume that adding a DROP will delay when participants retire?" in Section 4.4. Sponsors should be aware of changes in retirement assumptions.

Many employers think that employer cost ends when a member retires or elects DROP. Some plans state on their Web site that both employee and employer contributions end when a member elects DROP[2]. This may indicate a fundamental misunderstanding of employer cost in a DB plan.

7.2 Estimating Non-Pension Cost/Savings

Estimating non-pension cost/savings is difficult. If adding a DROP is not expected to impact the length of time that an employee works, there is probably little to be done. If employees are expected to work longer due to the DROP, the reverse of the same types of questions that are often asked when considering a retirement incentive program should be asked. We have never seen a non-pension cost estimate that was any more than a good first approximation and subject to some criticism. However, factors to consider, include the following:

- Salary for continued employment of senior high paid employees
- Loss of promotional opportunities
- Non-pension benefit cost
- Deferred training cost
- Increase in internal efficiency due to keeping senior staff

Whether fortunate or not, in most cases the actuary is not involved in determining non-pension costs and sometimes the client does not care to have it measured.

[2] Some plans may determine cost as a percentage of payroll, but simply removing the pay of DROP participants from the denominator increases the rate but does not affect the total cost.

7.3 Cost Uncertainty

Determining cost of benefits under a DB plan depends on a variety of assumptions and methods. Setting assumptions to determine the cost of adding a DROP feature is more difficult than most changes since the impact the retirement rates have on DROP cost is both material and uncertain. Some strategies to deal with this include:

- Make a "best estimate" of the cost (i.e., don't make the most conservative assumptions) and combine with a sunset provision and a scheduled review of the cost of the DROP. An example is the Dallas DROP that was reviewed after five years. The sunset provision allows the DROP to be a non-permanent part of the plan and limits unanticipated cost increases.

- Provide a maximum cost estimate. The maximum cost[3] might be that no one elects DROP and that all retire at NRD. A second "maximum" cost is that everyone elects DROP as soon as eligible and retires at the earlier of the current assumed retirement age or at the end of the maximum DROP period.

- Some DROP designs will result in a combination of DROP ratios above and below 100% (depending primarily on combinations of age and service). While individual choice will not solely be a function of the DROP ratio, it might be a good idea to identify where the ratio is under 100% and decide where it is appropriate to assume employees will make such elections that would not be in their favor. Finding low ratios is common when DROP can be elected at a reduced early retirement age.

7.4 Tax Treatment Uncertainty

In the mid-1990s there were few DROP plans and even fewer had IRS determination letters. Some plans (e.g., State of Maryland Police Retirement System) conditioned the implementation of their DROP on obtaining a favorable IRS ruling.

Beyond the broad concept of keeping the plan "qualified" are the detailed tax treatments, some of which may depend on individual plan designs. As was

[3] This could represent a material cost increase since anticipated gains from those that were expected to work beyond their NRA are lost (at least when determining the current contribution rate).

stated earlier, no one can predict how every legal issue about DROPs will be resolved, just as it would have been difficult in 1985 to predict legal issues for cash balance plans.

We believe that any public plan could adopt a DROP without material plan qualification problems. The plan sponsor may want to condition implementation on obtaining a favorable determination letter or other IRS opinion statement. However, many public sector plan sponsors intentionally avoid requesting a determination letter, sometimes arguing a lack of federal jurisdiction over their plans.

Beyond qualification is the issue of tax treatment. Both plan administrators (see IRC Section 402(f)) and employees require advice on how benefits can be rolled over or taxed. Often this comes in the form of formal or informal legal advice from the plan's legal counsel, possibly based in part on a private letter ruling from the IRS. New or unusual plan features (e.g., employee contributions continuing through retirement) often require extra legal consideration.

At this point we do not believe that tax treatment uncertainty should keep any public sector employer from adopting some type of DROP. Hopefully Section 5 covered most of the areas at issue. However, like any design to which the IRS has not provided regulations, more issues may emerge. Unusual features or taking the time to assure qualification and clarify issues should be handled prudently.

ERISA contains additional requirements that must be dealt with. A private-sector employer adding a DROP plan needs even more legal review than a public-sector employer. However, ultimately some type of DROP design is possible. See Section 8.1.

7.5 The Bargaining Process

Employer needs for employees at later ages

One of the real issues that employers need to address when considering adding a DROP feature is the existing retirement ages and "early" retirement subsidies. In the past an employer may have wanted to encourage early retirement. Whether the employer still does may differ for different groups of employees:

- Public safety employees have generally been allowed to retire early because of the physical requirements of their job. These physical requirements are still largely valid today. This early retirement age also kept many of these groups out of Social Security.

- School systems (like many large private sector employers) have seen their employment needs change (cycle) over time. This has made the desire to pay for large early retirement subsidies change.

A DROP can be a way to encourage employees to work longer (depending on how the DROP is designed). In a corporate/ERISA environment this can occur within a generation of employees by simply eliminating early retirement subsidies while protecting accrued benefits. This has often been criticized as being unfair to "current employees who have relied on them in retirement planning" (August 18, 2000 Testimony of Norman Stein, professor, University of Alabama to the ERISA Advisory Council). In the public sector this rarely happens since benefit protection usually extends beyond accrued benefits. A public-sector employer could set up a new "tier" of benefits that establishes a later retirement age for new employees. However, since the impact on employment might take 30 years (fewer years for plan cost), adding a tier does little to change employment patterns.

Adding a DROP has the potential for a more immediate change in employment continuation patterns. A sunset provision might deal with cycles in employment needs.

Cost neutrality perspectives

A second key issue is whether to assume employees will work longer thereby offsetting the cost of having the DROP ratio above 100%. Some actuaries prefer to design the DROP so that the ratio is very close to 100% and avoid changes in retirement rates. One article made the following points:

> While a well-designed DROP can be inexpensive to plan sponsors, it is also difficult to design a truly cost-neutral plan that is popular with employees. Those who expect to come out ahead financially are most likely to participate … the member's DROP account may be credited with pension payments that are less than 100% of the member's frozen benefit at the DROP date. This is often done to make the DROP cost-neutral. As a

result of this reduction, however, plan members may feel that they are being penalized for participating in the deferred retirement option plan.[4]

Perhaps not surprisingly, we have seen several instances where the plan actuary has accepted a definition of cost neutrally only when such designs (i.e. putting less than $1 into the DROP lump-sum account for every $1 of DROP annuity) were used to keep the DROP ratio at close to 100%. As predicted, these were not popular with employee groups.

Realities of collective bargaining

In one jurisdiction, a member of the employer's collective bargaining team presented to the County Council the following negotiated proposed changes to the firefighters' retirement plan:

1. Lowered the NRA (from 50 to 50 or 20 years at any age), and

2. Added a DROP feature

The question asked by the council was whether the aim of public policy was to encourage firefighters to retire younger or work longer? The bill was clearly at cross-purposes. The short answers were: (1) this is what was negotiated, (2) they can afford the changes and (3) they wanted comparability with police who already had 20 & out and were getting a DROP. The point is that what the employer wants and what the employer will agree to may be two different things.

Many non-actuaries have incorrectly assumed that adding a DROP will "save the employer costs simply by eliminating any pension accrual during the DROP period and no longer being required to fund the benefit." Often one of the first steps in the bargaining process is correcting both sides' understanding on this issue.

[4] Norman L. Jones and Judith A. Kermans, Gabriel, Roder, Smith & Company; *Plan Sponsor* April 1999, "Before you DROP: A guide for public plans".

7.6 Promotional Opportunities

If adding a DROP encourages senior employees to work longer, it will also limit promotional opportunities. This is usually a concern of younger employees. It may also be a concern for those looking for promotional opportunities for minorities and women who may have less seniority.

7.7 Phase-in of Coverage

One concern is that if an initial cohort signs up at the same time they will also retire at the same time. This may cause problems with staffing and training. This is sometimes dealt with by staggering the entry into DROP. For example, the number that can enter DROP in any given month is limited to a fixed number with selection based on seniority.

7.8 Human Resources Issues

Employers may find the following advantages to DROPs:

- Retains experienced employees.
- Provides relatively fixed retirement dates that can be used to plan when new hires are needed. However this would not be true for either (1) a back DROP or (2) a forward DROP with an unlimited DROP participation period.

7.9 Why Trustees Might Like DROP

Trustees need to deal with the administrative issues of running a DROP plan, but these are often offset by the following:

- Both employers and employees like DROPs
- Adding a DROP will reduce the pressure to eliminate their plan and replace it with a DC plan
- The addition of DROP may be viewed as progressive

7.10 Mandatory Retirement

It is beyond the scope of this paper to decide whether or not a DROP participant can be forced to retire at the end of the DROP period. Generally, those DROPs that require employees to retire at the end of a fixed period of time write the DROP election form, in part, as a voluntary resignation letter with a delayed effective date. This is often an irrevocable election (after a short "cooling off" period). Plan counsel can usually get the election forms used by other DROP plans as a starting point when: (1) drafting a specific plan's forms and (2) considering the legality of these provisions. To the best of our knowledge there has been no legal challenge to the mandatory retirement provision by an employee that has decided they did not want to retire.

8. Feasibility of DROPs for Certain Plans

8.1 ERISA Plans

It has been pointed out in several articles that adding a DROP feature to a plan covered by ERISA creates several issues that non-ERISA plans do not have to face:

- Carol V. Calhoun, Calhoun Law Group PC, "Deferred Retirement Option Plans," October 13, 1998 *Pension and Benefits Week*: "DROP plans adopted by private sector employers need to consider a host of additional legal issues under both the Code and ERISA."

- *AFSCME Collective Bargaining Reporter*, 1999 Number 3 (Revised April 2001): "Private employer plans are subject to much more complicated tax laws, and, therefore, it is unlikely that DROP plans will be offered to members working for private or nonprofit employers."

- June 1, 2000 Testimony of Sylvester Schieber and Kyle Brown of Watson Wyatt Worldwide to the ERISA Advisory Council: "DROP plans are not used in the private sector, possibly because of their expense."

- Norman L. Jones and Judith A. Kermans, Gabriel, Roeder, Smith & Company; *Plan Sponsor* April 1999, "Before you DROP: A guide for public plans." This article covers the point that private sector plans tend to have more lump-sum options already than do public plans. This would reduce the desire for DROPs in private sector plans.

We do not intend to provide a complete road map of how to design a DROP that foresees all of the potential "ERISA-only" issues that public plans are exempt from. However, here is a start.

Back loading: This is sometimes raised as an issue. The authors believe that back-loading issues end at NRA. This is based in part on the definition of an accrued benefit in IRC Section 411(a)(7)(A)(i) (defining the benefit as an annuity at NRD) and the nature of the back-loading rules in 411(b)(1)(A)-(C) (which tie the rule to NRD benefits). Therefore a DROP period that begins at normal retirement should have few issues. Some DROPs allow benefits at early retirement ages. In these cases, back loading should be considered. However, for the reasons discussed earlier, electing DROP at an early retirement age usually produces a DROP ratio of less than 100%, which implies a reduction in the rate of benefit accrual. Keep in mind that the interest, mortality and salary assumptions used to determine the DROP ratio might not be appropriate for testing back loading.

Providing an annuity form of benefit: ERISA requires that the automatic form of benefit be an annuity (either a J&S form for married participants or a life annuity for single participants). While this seems to be contrary to the idea of providing a lump sum, the DROP lump sum can be converted to an annuity using 417(e) rates with very little cost concern.

Timing of form of benefit election and spouse consent: In public plans there is usually no spousal consent requirement, and the form of benefit election can be made at the time of DROP or at the time of actual retirement with the normal form being credited to the DROP account in the meantime. Many public sector consultants recommend that the election be delayed until the time of benefit commencement. ERISA plans would likely require two elections. The first would be the DROP election at the beginning of the DROP election period. Second, would be the election of the form of annuity to be made at the point of the annuity commencement (while crediting the normal form[1] to the DROP account).

415 limits: It is more common to find Section 415 limits impacting benefits in ERISA plans. This is true partly because public plans have special limits and grandfather rules that do not exist for ERISA plans. The 415 limits do not present an obstacle for adding a DROP feature but complicate the calculations because of the presence of a partial lump sum.

[1] By "normal form" we mean the form associated with the amount produced by the benefit formula. Often the normal form is a life annuity and the "automatic" form for a married participant is a reduced Joint & Survivor form.

Testing for nondiscrimination: To the extent that the DROP benefit is simply the actuarial equivalent of the NRD benefit, the non-discrimination result would appear to be the same as the pre-DROP plan. Limiting availability (through a window period) could present a coverage problem.

One area where there has been some interest is with collectively bargained plans. Many trades are not attracting young workers and need to find a way to retain older employees. These plans also have fewer non-discrimination issues than plans that are non-collectively bargained.

8.2 Canadian Plans

The laws in Canada can differ among 11 different jurisdictions (federal and ten provinces). In the area of post-retirement accruals, Quebec has the most relevant law to the discussion of DROPs. Below is a comparison to U.S. ERISA rules.

ERISA requires plans to provide employees who work beyond NRD with either: (1) a notice that payments will not begin until they terminate employment and a continuation of regular benefit accruals or (2) no notice of suspension of benefits but an actuarial increase in their benefit accrual until they actually terminate employment and benefits commence. For a long service employee the actuarial increase would provide the larger benefit (just as DROP ratios are often over 100%) but can be avoided by providing a prior notice.

In Quebec, traditional annuity accruals can stop at age 65; i.e., service and final average salary are frozen. Benefit payments are suspended until termination of employment. However, the benefit that would have been paid at age 65 is credited to a bookkeeping account (just as in most DROPs). Interest is credited at a fixed income rate set by legislation (similar to the 417(e) rate). At retirement the lump-sum account value is annuitized at the same legislated rate. It is paid in the same form as the base annuity at termination of employment.

In Canada, employees who terminate prior to age 55 must be offered the lump-sum option. Those who terminate after age 55 generally are not offered the lump sums. Therefore, it could be said that Canada has more DROP plans than the United States but generally requires payment in the form of an annuity.

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Appendices

Appendix A: Survey of DROP designs

Below is a survey of basic design features in 24 different cities, counties or states. All are public-sector plans in the United States and most have more detailed information on Web sites. Web sites are shown below the name of the plan sponsor on the summaries. In addition, we found a Web site (www.prb.state.tx.us/txdropsl.html) that summarized 38 plans in the state of Texas alone. The following is a summary of some of the information from these surveys.

In many of the plan summaries we found there was nothing specific about disability benefits. This is likely because participants are treated as "retirees" during the DROP participation period.

Our summaries have not been verified by the plan sponsor and several of the DROPs have changed their provisions since inception. The following summaries are included for survey purposes only and should not be used by participants in these plans.

Figure A.1

	U.S. Survey	Texas Survey
Number of Plans	24	38
Number of forward DROPs	22	16
Number of back DROPs	3 (1 can be both Forward and Back)	27 (5 can be both Forward and Back)
Number of fire plans	11	32
Number of police plans	11	4
Number of general employees/teachers	10	4
Number with 24-month max DROP period	0	22
Number with 36-month max DROP period	6	8
Number with 48-month max DROP period	3	1
Number with 60-month max DROP period	9	4
Do member contributions continue during DROP?	7 yes (1 is voluntary)	36
Are member contributions added to DROP account?	6	36

Figure A.2

City/State	**Alabama** www.rsa.state.al.us	**Anne Arundel County (Md.)**	**Arizona** *www.psprs.com*
Type of DROP	Forward	Forward	Forward
Groups covered	Teachers and general employees	Police and fire	Public safety personnel
Eligibility	25 Years of service and age 55	20 years of service	20 years of service
DROP period	Min of 3 years, max of 5 years	36 to 60 months	Max of 60 months
Interest credit rate	Same as active accounts (currently 4%)	8%	9.0% currently – Rate of return determined by fund manager
COLAs	No	Yes	No
Mandatory retirement	No	Yes	No, but penalized by loss of all interest credited to DROP account
Employee contributions	Yes	No	No
Treatment of EE contribs.	Deposited into the DROP account	N/A	N/A
Disability benefits	No, the employee would just be considered retired on the date of disability (LS of DROP account)	Yes	Yes
Death benefits	DROP account goes to beneficiary, any contributions, and depending on benefit election	DROP benefit	Yes, but based on amount calculated at beginning of DROP plus DROP account
Annuity and pay-out options	Lump sum	Lump sum only	Lump sum of account balance and monthly annuity of retirement benefit
Phase-in of coverage	No	Limit on new members per month	No
Sunset provisions/ future cost analysis	No	No	Yes. 06/30/2006
Effective date of DROP	06/01/2002	01/01/2001	07/01/2001
Notes	If termination occurs within the first three years of DROP, the retirement allowance payments will be forfeited and they will only receive employee contributions and interest. Additional benefits can be earned after DROP participation period.	Must be in DROP a minimum of 36 months	Must take money at the end of DROP (within 30 days)

Figure A.2 (continued)

City/State	Austin	City of Baton Rouge	Dallas	Denver *www.derp.org*
Type of DROP	Forward and back	Forward	Forward	Forward
Groups covered	Fire	Police, fire and general employees	Police and firefighters	General employees
Eligibility	45 years of age and 10 years of service or 20 years of Service	Actively contributing and eligible for service retirement	Age 50 and eligible for retirement	Normal retirement (age 65) or rule-of-75 (and age 55)
DROP period	Max of 7 years	Maximum of 60 months	No limit	Max of 48 months
Interest credit rate	5%	5-year average of investment returns	At actuarial rate – 8.75%	7.75% currently (plan's assumption for investment return)
COLAs	Yes	No	Yes	N/A
Mandatory retirement	Yes	No	N/A	No
Employee contributions	Yes	Not during DROP	No	N/A
Treatment of EE contribs.	Credited to the DROP account	Offset against pension amount over member's life expectancy	N/A	N/A
Disability benefits	No	Not after DROP entry	No	No
Death benefits	Yes	Yes	DROP Benefit	Yes, same as actives plus DROP account
Annuity and pay-out options	Lump sum of account balance (or periodic payment) and monthly annuity of retirement benefit	Mandatory minimum withdrawals if under age55 at retirement	Lump sum of account balance (or periodic payments)	Lump sum of account balance (or periodic payment) and monthly annuity of retirement benefit
Phase-in of coverage	No	No		No
Sunset provisions/future cost analysis	01/01/2002	None		Yes. 12/31/2004
Effective date of DROP	1995	01/01/1981	01/01/1993	01/01/2001
Notes		Member cannot earn additional service credits following DROP participation		Social Security make-up benefit added to DROP if born 1938 or later. Extra accruals if continue to work after 48 months.

Figure A.2 (continued)

City/State	**Florida** *www.frs.state.fl.us*	**Hollywood (FL)** *www.hollywoodpolicepensionfund.com*	**Houston** *www.hfrrf.org*
Type of DROP	Forward	Forward	Forward
Groups covered	Teachers and general employees	Police	Firefighters
Eligibility	Normal retirement (vested and age 62) or 30 years of service	Eligible to receive a service retirement and at least age 50 and 25 years of service (but less than 28)	Retirement eligible
DROP period	Max of 60 months	30 years less pre-DROP service (max of 60 months)	1 month to 10 years
Interest credit rate	6.50%	Investment return on assets in which such amounts are invested by the board	5-year average of pension fund
COLAs	Yes, 3%	Yes	Yes (if you are eligible)
Mandatory retirement	Yes	No	No
Employee contributions	No	Yes	Yes, 7.7% of pay
Treatment of EE contribs.	N/A	Employee contributions are credited to DROP account	Employee contributions are credited to DROP account each month plus interest
Disability benefits	No	No	Occupational disability – only general
Death benefits	Yes, DROP benefits and continuing monthly benefit	Yes	On-duty death
Annuity and pay-out options	Lump sum of account balance (or partial) and monthly annuity of retirement benefit	Lump sum of account balance (or periodic pay-ment) and monthly annuity of retirement benefit	Lump sum of account balance (or periodic payment) and monthly annuity of retirement benefit
Phase-in of coverage	No	No	No
Sunset provisions/future cost analysis	No	No	No
Effective date of DROP	07/01/1998	01/01/1991	09/01/1995
Notes		Voluntary after-tax contribution allowed	Can continue to work after 10 years with frozen account

Figure A.2 (continued)

City/State	**Louisiana** *www.trsl.state.la.us*	**Louisiana** *www.lasers.state.la.us*	**Louisiana** *www.lsprs.state.la.us*
Type of DROP	Forward	Forward	Forward
Groups covered	Teachers	General employees	Police
Eligibility	Earliest of: 30 years of service, 55 and 25 or 60 and 10 (depends on the plan) and member must be employed for entire DROP period (service does not include unused sick or annual leave)	Eligible for regular retirement only: 30 years of service, 25 years of service and age 55 or 10 years of service and age 60	Eligible for regular retirement only: 25 years of service or 20 years of service and age 50
DROP period	1 month to 36 months	Max of 36 months	Max of 36 months
Interest credit rate	None – only after DROP period ends	None – only after DROP period ends	None – only after DROP period ends
COLAs	No – only after termination	No	No
Mandatory retirement	No	No	No
Employee contributions	No	No	No
Treatment of EE contribs.	N/A	N/A	N/A
Disability benefits		No	No, the employee would just be considered retired on the date of disability
Death benefits	Yes	No	No, DROP account goes to beneficiary
Annuity and pay-out options	Lump sum of account balance (or periodic payment – total, annual or monthly)	Lump sum of account balance (or periodic payment)	Lump sum of account balance (or periodic payment)
Phase-in of coverage	No	No	No
Sunset provisions/future cost analysis	No	No	No
Effective date of DROP	01/01/1992	07/01/1992	07/01/1992
Notes	Has alternative partial lump sum option called ILSB	Window of eligibility is only 3 years and 60 days from earliest eligible date DROP period is reduced by waiting time after eligibility begins – once you enter DROP you are considered a retiree	Once you enter DROP you are considered a retiree

Figure A.2 (continued)

City/State	**Maryland**	**Memphis** *www.memphisfirefighters.org*	**Miami**
Type of DROP	Forward	Forward	Forward self-directed
Groups Covered	Police	Fire fighters	General employees
Eligibility	At least 22 years of credited service but less than 28	NRA and 25 years of service	Age 55 with 10 years or age + service at least 70
DROP Period	Max of 48 months	Max of 36 months	Max of 36 months
Interest Credit Rate	6.00%	25% of 90-day Treasury Bill yield paid quarterly	Investment options – employee chooses
COLAs	Yes		Yes
Mandatory Retirement	Yes	Yes	Yes
Employee Contributions	No	No	No
Treatment of EE Contribs.	N/A	N/A	N/A
Disability Benefits	Yes, DROP is then revoked.	Yes, DROP is then revoked	No
Death Benefits	Yes	Yes, DROP is then revoked	No special line-of-duty benefit
Annuity and Pay-out Options	Lump sum only	Lump sum of account balance	Lump sum, annuity, periodic payments, rollover
Phase-in of Coverage	No	No	None
Sunset Provisions/Future Cost Analysis	No		None
Effective Date of DROP	2000		2002
Notes		Quarterly entry dates	Also offers a back DROP with maximum 36 months, interest based on "assumed investment return" but benefit to be actuarially equivalent to benefit earned at date of retirement. They also have a police and fire plan.

Figure A.2 (continued)

City/State	**Milwaukee County**	**Missouri**	**Ohio** *www.op-f.org*
Type of DROP	Back (retroactive)	Forward	Forward – Not available until 2003
Groups Covered	General employees	Police	Police and fire fighters
Eligibility	Election can be made back to the earliest date eligible to retire.	20 years of service or age55	25 years of service and age 48
DROP Period	No limit	Max of 60 months	Min of 3 years, max of 8 years
Interest Credit Rate	Based on annual rate of return 8.5% 2001; 9.0% 2002	Based on annual rate of return	5.00%
COLAs	Yes, 2%	No	Yes
Mandatory Retirement	N/A	No	No, but DROP benefits will be forfeited
Employee Contributions	N/A	Yes, voluntary, 7% of pay	Yes, 10% of pay
Treatment of EE Contribs.	N/A	Employee contributions are credited to DROP account	Employee contributions credited to DROP: Year 1: 50%, Year 2: 50%, Year 3: 75%, Year 4: 100%
Disability Benefits	N/A	Yes, but DROP is forfeited	Yes, DROP is either revoked and disability retirement accepted or stay in DROP and decline disability retirement
Death Benefits	N/A	Yes	Yes
Annuity and Pay-out Options	Lump sum of account balance and monthly annuity of retirement benefit	Lump sum of account balance or monthly installments over 10 years and monthly annuity of retirement benefit	Lump sum of account balance (or periodic payments)
Phase-in of Coverage	No	No	No
Sunset Provisions/Future Cost Analysis	No		The board will review the DROP program each quintennial
Effective Date of DROP	2001	08/28/1997	01/01/2003
Notes	Under investigation		Employer makes no additional contributions for DROP employees – net zero cost – member receives 50% J&S coverage at no charge

Figure A.2 (continued)

City/State	**Oklahoma**	**Philadelphia** *www.fop5.org*	**San Antonio**
Type of DROP	Forward	Forward	Back
Groups Covered	Firefighters	Police and fire	Police and fire
Eligibility	20 years of service	NRA and 10 years of service	20 years of service
DROP Period	60 months	48 Months	Maximum of 36 months
Interest Credit Rate	Maximum of actuarial assumption and 2% below actual return	Yes	N/A
COLAs	Yes	No	No
Mandatory Retirement	Yes	Yes	No
Employee Contributions	No	No	N/A
Treatment of EE Contribs.	N/A	N/A	N/A
Disability Benefits		Yes	N/A
Death Benefits	DROP benefit	Yes, death benefit and DROP account	N/A
Annuity and Pay-out Options	Lump sum only	Lump sum of account balance and monthly annuity of retirement benefit	Lump sum and monthly annuity of retirement benefit
Phase-in of Coverage		No	No
Sunset Provisions/Future Cost Analysis		Test period is 4 years	01/01/1999
Effective Date of DROP		06/28/1999	10/01/1995
Notes			

Figure A.2 (continued)

City/State	**San Diego**	**Texas** *www.trs.state.tx.us*
Type of DROP	Forward	Forward
Groups Covered	General Employees	Teachers
Eligibility	Eligible for service retirement	Actively contributing, eligible for service retirement annuity unreduced and have 25 years of service
DROP Period	Max of 60 months	1 to 5 years (in yearly increments)
Interest Credit Rate	Decided by the board	5.00%
COLAs	Yes	No
Mandatory Retirement	Yes	No
Employee Contributions	No	Yes, 6.65% of pay
Treatment of EE Contribs.	Looks like employer contributions are put into DROP account	Not deposited into the member's contribution account or the DROP account
Disability Benefits	Yes, using factors the day before the effective date of DROP and DROP account is distributed	
Death Benefits	Yes	Yes
Annuity and Pay-out Options	Lump sum of account balance (or periodic payment)	Lump sum of account balance (or periodic payment) and monthly annuity of retirement benefit
Phase-in of Coverage	No	No
Sunset Provisions/Future Cost Analysis	03/31/2000	Previously changed rules for those entering in the future
Effective Date of DROP	04/01/1997	Rules changed 09/01/1999
Notes		Can continue after DROP and earn additional benefits – 60%-79% of standard annuity deposited to account

Appendix B: Sample Life Cost Comparison

Attached are a series of sample life comparisons. Generally they compare the benefits and funding before versus after the addition of the DROP feature.

Example #1:

The top of this example shows the pre-DROP sample life results. The employee's age on the valuation date is age 50 (NRA) and the salary for the coming year is $50,000. The columns and formulas are as follow:

Pre-DROP Valuation:

Column (1): Age

Column (2): Years of Service

Column (3): Salary

Column (4): Three-year Average Salary

Column (5): Employee contribution = 6% times salary(x)

Column (6): Accrued benefit = 2.5% times (2) x (4)

Column (7): ax = Single life annuity factor at age x. Note: many police and fire plans often have unreduced J&S forms of payment.

Column (8): Retirement rates

Column (9): 1px = probability of continuing to be employed a year later. Note: most valuations factor in death and disability probabilities and benefits. We have focused only on the retirement decrement.

Column (10): tp50 = probability of continuing to be employed from age 50 to "t" years later where t = age at decrement – 50.

Column (11): v^{x-50} = Interest discount from age at decrement to valuation age 50.

Column (12): PVB ret = Present value of retirement benefit at age 50 = (6) times (7) times (8) times (10) times (11). Sum from all ages is shown at the bottom of the column.

Column (13): Present value of future salary. Shown for information purposes to see one impact of retirement rate changes. Not a direct factor in PUC valuation.

Column (14): PUC service allocation basis

Column (15): PUC actuarial liability = (12) times {service at valuation age 50/(14)}

Column (16): PUC normal cost = (12)/(14); value is zero at valuation age assuming beginning of year decrement.

The gross (employer and employee) actuarial liability and normal cost are $385,174 and $8,630 respectively. We assume that the employer normal cost is determined as the gross normal cost less the expected employee contribution of $1,800 ($6,830 = $8,630 less ($3,000 times 0.6000)). There are other ways to offset for employee contributions.

Post-DROP Valuation:

Column (6): Accrued benefit = 2.5% time (2) x (4). The DROP benefit only depends on the value at age 50. Other values are shown just for illustration purposes and to determine the DROP ratio.

Column (7): DROP annuity with COLA. Equals annuity at DROP participation age (=50) increased with three percent annual COLA.

Column (8): DROP lump sum (x) = DROP lump sum(x-1) times 1.06 + {DROP annuity(x-1) + employee contribution(x-1)} times (1+.06 times 13/24). This is an approximation and assumes employee contributions continue and are added to DROP account.

Columns (9, 13, 14, 15, 16, 18, 19, 20 and 21): Same in function to those in pre-DROP valuation.

Column (10) PV non-DROP benefit = (6) times (9). Not valued, just for illustration purposes and to determine the DROP ratio.

Column (11): PV DROP benefit at age x = {(8) + (7) times (9)}

Column (12): DROP ratio = (11)/(10)

Column (17): PV DROP benefit at age 50 = (11) times (13) times (15) times (16)

The result is that the present value of benefits increases (since the DROP ratio is greater than 100% and retirement rates were not changed) and the normal cost and actuarial liability both increase. Assuming a 20-year level dollar amortization of the increase in the unfunded liability, the contribution rate increased by 2.5 percent of pay for this person.

This is a fairly typical DROP result. Usually a more accurate study should be done that factors in:

- Death and disability benefits
- Recognizes actual employee distributions including those that are already well beyond NRA and may elect DROP late
- Treatment of employee contributions. Often employee contributions stop when an employee elects DROP. Some consideration should be given to how this impacts the net employer normal cost.

Example #2 considers the impact of changing retirement rates.

Example 1

DROP Cost Illustration

Salary Scale =	5.5%
Interest Rate =	8.0%
COLA =	3.0%
Interest Credit Rate =	6.0%

Pre-DROP Valuation Sample Life

	(1) Age (x)	(2) Service	(3) Annual salary	(4) 3 yr. final average salary	(5) Employee contrib.	(6) 2.50% annual accrued benefit	(7) $\ddot{a}_x$	(8) Retirement rates	(9) ${}_tp_x$	(10) ${}_tp_{50}$	(11) v^{x-50}	(12) PVB ret	(13) PVPS	(14) # of past PUC NC payments	(15) PUC AL retirement	(16) PUC NC retirement
	47		42,581													
	48		44,923													
	49		47,393													
age now	50	25.00	50,000	44,966	3,000	28,103	15.072	40%	1.00000	1.00000	1.00000	169,427	50,000	25	169,427	
	51	26.00	52,750	47,439	3,165	30,835	14.837	10%	0.90000	0.60000	0.92593	25,416	29,306	26	24,485	970
	52	27.00	55,651	50,048	2,229	32,702	14.596	10%	0.90000	0.54000	0.85734	22,028	25,764	27	21,137	945
	53	28.00	58,712	52,800	3,523	36,960	14.348	10%	0.90000	0.48600	0.79383	20,468	22,651	28	18,268	731
	54	29.00	61,941	55,704	3,716	40,286	14.094	10%	0.90000	0.43740	0.73503	18,308	19,914	29	15,776	631
	55	30.00	65,348	58,768	3,921	44,076	13.833	100%	0.00000	0.39366	0.68058	163,358		30	136,128	5,445
											Total =	419,704	147,636		385,174	8,630

Discounted employee contribution = **1,800**

Net employer normal cost = **6,830**

PUC NC/Pay = **13.7%**

Post-DROP Valuation Sample Life

	(1) Age (x)	(2) Service	(3) Annual salary	(4) 3 yr. final average salary	(5) Employee contrib.	(6) 2.50% Annual accrued benefit	(7) DROP annuity w/ COLA	(8) DROP LS	(9) $\ddot{a}_x$	(10) PV non DROP benefit	(11) PV DROP benefit	(12) DROP ratio	(13) Retirement rates	(14) ${}_tp_x$	(15) ${}_tp_{50}$	(16) v^{x-50}	(17) PVB ret	(18) PVPS	(19) # of past PUC NC payments	(20) PUC AL retirement	(21) PUC NC retirement
	47		42,581																		
	48		44,923																		
	49		47,393																		
age now	50	25.00	50,000	44,966	3,000	28,103	28,110	-	15.072	421,566	421,566	100.0%	40%	1.00000	1.00000	1.00000	169,427	50,000	25	169,427	
	51	26.00	52,750	47,439	3,165	30,839	28,947	32,114	14.887	457,495	461,589	100.9%	10%	0.90000	0.60000	0.92593	25,644	29,306	26	24,658	956
	52	27.00	55,651	50,048	3,339	33,787	29,815	67,196	14.596	495,880	502,371	101.9%	10%	0.90000	0.54000	0.85734	23,258	25,764	27	21,535	863
	53	28.00	58,712	52,800	3,523	36,669	30,709	105,460	14.348	538,224	546,059	103.0%	10%	0.90000	0.48600	0.79383	21,868	22,651	28	18,811	752
	54	29.00	61,941	55,704	3,716	40,586	31,631	147,132	14.094	568,212	592,948	104.2%	10%	0.90000	0.43740	0.73503	19,863	19,914	29	16,434	657
	55	30.00	65,348	58,768	3,921	44,079	32,580	192,456	13.833	606,713	643,126	105.6%	100%	0.00000	0.39366	0.68058	172,308		30	142,590	5,744
																Total =	430,760	147,636		394,454	9,001

Numbers in box for illustration and DROP ratio purposes only

Discounted employee contribution = **1,800**

Net employer normal cost = **7,201**

14.4%

PUC NC/Pay =

Change in PUC actuarial liability = 9,280

30-year amortization of change in PUC actuarial liability = 875

Change in PUC normal cost = 371

Contribution increase = 1,246

Increase/Pay = 2.49%

Example #2:

In this illustration we lowered the probability of retirement at ages 51-53. The result (compared to the post-DROP results in Example #1) was an increase in the present value of future salary and a reduction in normal cost and actuarial liability. The present value of future benefits changed very little. The result on the contribution was a reduction in DROP cost from 2.5 percent of payroll to 1.7 percent of payroll. The DROP ratios are unaffected.

One interesting fact is that if the retirement rate at age 50 is lowered from 40% to 30% in Example #2 (post-DROP only), the DROP cost actually increases from 2.5 percent to 3.1 percent. This illustrates two important factors:

1. The normal cost will increase (possibly materially) if the retirement rates for decrements in the year of valuation are lowered.

2. The impact may appear very different for (i) employees far from retirement, (ii) employees just becoming eligible for retirement and (iii) employees that have already worked many years beyond their NRD.

3. Some argue that the true cost of DROP can only be understood using a forecast type of valuation that can better reflect changes in retirement rates, delays in hiring new employees and other factors such as item two above.

Example 2

DROP Cost Illustration

Salary Scale =	3.5%
Interest Rate =	8.0%
COLA =	3.0%
Interest Credit Rate =	6.0%

Pre-DROP Valuation Sample Life

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Age (x)	Service	Annual salary	3 yr. final average salary	Employee contrib.	3.50% annual accrued benefit	a_x	Retirement rates	$_tp_x$	$_{k}p_{x+t}$	v^{x+t}	PVB ret	PVPS	# of past PUC NC payments	PUC AL retirement	PUC NC retirement
	47		42,581													
	48		44,525													
	49		47,398													
age now	50	25.00	50,000	48,966	3,000	28,000	19.0372	40%	1.00000	1.00000	1.00000	380,827	30,000	25	380,827	
	51	26.00	52,750	47,489	3,165	30,800	14.887	10%	1.80000	0.60000	0.92593	35,416	29,306	26	34,489	998
	52	27.00	55,651	50,048	3,339	32,782	14.55%	10%	1.80000	0.54000	0.85734	32,028	28,704	27	31,137	945
	53	28.00	58,712	52,800	3,523	36,960	14.348	10%	1.80000	0.48600	0.79383	30,468	28,653	28	30,268	731
	54	29.00	61,941	55,704	3,716	40,886	14.094	10%	1.80000	0.43740	0.73503	28,808	29,914	29	15,776	631
	55	30.00	65,348	58,768	3,921	44,076	13.852	100%	1.80000	0.39366	1.68058	163,250		30	136,128	5,445
											Total =	419,784	147,606		385,374	8,630
														Discounted employee contribution =		1,000
														Net employer normal cost =		6,830
														PUC NC/Pay =		13.7%

Post-DROP Valuation Sample Life

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
	Age (x)	Service	Annual salary	3 yr. final average salary	Employee contrib.	3.50% Annual accrued benefit	DROP annuity w/ COLA	DROP LS	a_x	PV ann. DROP benefit	PV DROP benefit	DROP ratio	Retirement rates	$_tp_x$	$_{k}p_{x+t}$	v^{x+t}	PVB ret	PVPS	# of past PUC NC payments	PUC AL retirement	PUC NC retirement
	47		42,581																		
	48		44,525																		
	49		47,398																		
age now	50	25.00	50,000	48,966	3,000	28,000	39,000	-	15.037	421,566	421,566	100.0%	40%	0.60000	1.00000	1.00000	169,427	30,000	25	169,427	
	51	26.00	52,750	47,489	3,165	30,800	38,947	32,114	14.887	457,495	461,589	100.9%	0%	1.00000	1.60000	0.92593	-	29,306	26	-	-
	52	27.00	55,651	50,048	3,339	32,782	39,815	67,196	14.556	499,880	582,591	101.9%	0%	1.00000	1.60000	0.85734	-	28,627	27	-	-
	53	28.00	58,712	52,800	3,523	36,960	20,705	105,460	14.348	538,224	546,059	102.0%	0%	1.00000	1.60000	0.79383	-	27,765	28	-	-
	54	29.00	61,941	55,704	3,716	40,886	21,631	147,332	14.094	569,212	592,948	104.2%	50%	0.50000	1.60000	0.73503	130,750	27,337	29	112,716	4,309
	55	30.00	65,348	58,768	3,921	44,079	22,508	192,456	13.852	608,713	643,126	105.6%	100%	0.00000	1.80000	0.68058	181,312		30	108,427	4,377
																Total =	421,489	143,214		391,569	8,686
																			Discounted employee contribution =		1,000
																			Net employer normal cost =		7,686
																					14.2%
																			PUC NC/Pay =		
																			Change in PUC actuarial liability =		4,355
																			30-year amortization of change in PUC actuarial liability =		401
																			Change in PUC normal cost =		356
																			Contribution increase =		857
																			Increase/Pay =		1.7%

Numbers in box are for illustration and DROP ratio purposes only.

Example #3:

This shows DROP ratios at different combinations of age and service for one of the plans in our survey.

Example 3

Ratio of DROP PV/non-DROP PV (3 year minimum and 4 year maximum DROP period)

DROP Participation Period:			*3 years*	*4 years*	*4 years*	*4 years*	*4 years*	*4 years*	*4 years*	*4 years*	*4 years*	*4 years*	*4 years*	*4 years*
							Service when joined DROP and at exit							
			20	20	21	22	23	24	25	26	27	28	29	30
	Joined	Exited	23	24	25	26	27	28	29	30	31	32	33	34
	40	44	***1.005***	**1.007**	**1.011**	**1.015**	**1.019**	**1.023**	**1.026**	**1.030**	**1.062**	**1.095**	**1.127**	**1.160**
	41	45	***1.009***	**1.012**	**1.016**	**1.021**	**1.024**	**1.028**	**1.032**	**1.035**	**1.068**	**1.100**	**1.133**	**1.166**
	42	46	***1.013***	**1.017**	**1.022**	**1.026**	**1.030**	**1.033**	**1.037**	**1.040**	**1.073**	**1.106**	**1.139**	**1.172**
	43	47	***1.017***	**1.023**	**1.027**	**1.031**	**1.035**	**1.039**	**1.042**	**1.046**	**1.079**	**1.112**	**1.145**	**1.178**
Age	44	48	***1.021***	**1.028**	**1.032**	**1.036**	**1.040**	**1.044**	**1.048**	**1.051**	**1.084**	**1.117**	**1.151**	**1.184**
when joinec	45	49	***1.024***	**1.032**	**1.037**	**1.041**	**1.045**	**1.049**	**1.052**	**1.056**	**1.089**	**1.122**	**1.156**	**1.189**
DROP and	46	50	***1.027***	**1.036**	**1.041**	**1.045**	**1.049**	**1.053**	**1.056**	**1.060**	**1.093**	**1.127**	**1.160**	**1.194**
at exit	47	51	***1.029***	**1.039**	**1.044**	**1.048**	**1.052**	**1.056**	**1.059**	**1.063**	**1.096**	**1.130**	**1.163**	**1.197**
	48	52	***1.030***	**1.042**	**1.046**	**1.050**	**1.054**	**1.058**	**1.062**	**1.065**	**1.099**	**1.132**	**1.166**	**1.200**
	49	53	***1.032***	**1.044**	**1.048**	**1.053**	**1.057**	**1.060**	**1.064**	**1.067**	**1.101**	**1.135**	**1.168**	**1.202**
	50	54	***1.034***	**1.046**	**1.051**	**1.055**	**1.059**	**1.063**	**1.066**	**1.070**	**1.103**	**1.137**	**1.171**	**1.205**
	51	55	***1.036***	**1.049**	**1.053**	**1.057**	**1.061**	**1.065**	**1.069**	**1.072**	**1.106**	**1.140**	**1.174**	**1.208**
	52	56	***1.037***	**1.050**	**1.055**	**1.059**	**1.063**	**1.067**	**1.071**	**1.074**	**1.108**	**1.142**	**1.176**	**1.210**
	53	57	***1.039***	**1.052**	**1.057**	**1.061**	**1.065**	**1.069**	**1.072**	**1.076**	**1.110**	**1.144**	**1.178**	**1.212**
	54	58	***1.040***	**1.054**	**1.059**	**1.063**	**1.067**	**1.071**	**1.074**	**1.078**	**1.112**	**1.146**	**1.180**	**1.214**
	55	59	***1.041***	**1.056**	**1.061**	**1.065**	**1.069**	**1.073**	**1.076**	**1.080**	**1.114**	**1.148**	**1.182**	**1.216**
	56	60	***1.043***	**1.058**	**1.062**	**1.067**	**1.071**	**1.075**	**1.078**	**1.081**	**1.116**	**1.150**	**1.184**	**1.218**

Note: Be sure to adjust for treatment of employee contributions.

Glossary

Actuarial Equivalent DROP: Any type of mixed annuity plus lump-sum option that has the same present value as the regular annuity-only benefit. Mathematically this could be thought of as providing a DROP ratio of 100%. Also see definition of PLOP.

Back DROP: The type of DROP where the election is made at the time of retirement (termination of employment) and accumulation of a DROP lump sum is calculated starting at a prior point in time.

Diet DROP: A forward DROP where retirement occurs shortly after the DROP election and only a small portion of the benefit is paid as a lump sum.

DROP Participation Period: The period of time when a participant is accumulating a DROP lump sum and no longer earning a traditional annuity accrual.

DROP ratio: The ratio of the present value of the total DROP benefit to the non-DROP benefit. Both are determined based on salary and service history at time of termination. Where the DROP ratio is greater than 100%, the DROP benefit is more valuable than what the plan would have provided had the DROP not been elected.

"Forward" DROPs: The type of DROP where the election is made prior to the prospective accumulation of a DROP lump sum.

Modified Cash Refund (MCR) Option: A common normal form of payment in a governmental plan in which the annuity is payable for life with a minimum payout equal to the employee contribution made (both pre- and post-

tax) plus interest at the time of retirement. Should the retiree die before the sum of the annuity payments equals the employee contribution reserve at the time of retirement, the balance is paid in a single sum at time of death.

PLOP: A partial lump-sum option is any one of several options that provide for a reduced annuity in exchange for a partial lump-sum payout (e.g., a refund of employee contributions in exchange for a reduced annuity). Generally the benefit under this option is the actuarial equivalent of the normal form of payment, in which case it would meet the definition of an actuarial equivalent DROP.

Self-Directed DROP: A forward DROP where the DROP account balance is segregated and invested at the direction of the participant.

Sunset Provision: A common legal provision that automatically sets an end to a law (or plan provision) unless extended by future legislation.

Window Benefit: A retirement incentive that only applies if a participant retires within a certain period (window) of time.