

DAMODAR VALLEY CORPORATION

ACTUARIAL VALUATION AS AT 31.03.2006 OF

**PENSION, GRATUITY & LEAVE LIABILITY – EXISTING STAFF
PENSION LIABILITY – EXISTING PENSIONER**

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**THIRTY FIRST DAY OF MAY,
TWO THOUSAND SIX**

DAMODAR VALLEY CORPORATION

ACTUARIAL VALUATION AS AT 31.03.2006 OF PENSION, GRATUITY & LEAVE LIABILITY – EXISTING STAFF PENSION LIABILITY – EXISTING PENSIONER

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DAMODAR VALLEY CORPORATION

ACTUARIAL VALUATION AS AT 31.03.2006 OF PENSION, GRATUITY & LEAVE LIABILITY – EXISTING STAFF PENSION LIABILITY – EXISTING PENSIONER

1. FORENOTE

Damodar Valley Corporation (DVC) wishes to fund the liability of payment of Pension, Gratuity & Leave on exit to Eligible Employees from service or on one's death to one's spouse as well as Pension Liability in respect of Existing Pensioner. The Scheme has not been funded based on Actuarial Basis. The expenditure on Pension, Gratuity and Leave for each year is paid out of Current Income i.e PAY AS YOU GO basis.

The aim of this valuation is to work out :

(i) Past Service Liability as at 31.03.2006 for Eligible Employees for their service upto 31.03.2006.

and

(ii) Liability in respect of Existing Pensioner as at as at 31.03.2006.

2. COVERAGE

This cover Employees who were on the roll on the Effective Date 31.03.2006 and eligible for Pension.

3. BENEFIT

DVC Employees/Pensioners are entitled for retirement benefits as per Central Civil Services (Pension) Rules 1972 as applicable in respect of Central Government Employees. However Leave encashment is payable as per Central Civil Services (Leave) Rules 1972.

The details of Pension, Gratuity and Leave Benefit are given in the Schedule detailed hereunder :

(i)	Pension	-	P1/1
(ii)	Gratuity	-	P1/2
(iii)	Leave	-	P1/3

4. DATA

Data for this Valuation was supplied by way of CD and Email.

4.1 This is first valuation carried out by us.

Accordingly we have not carried out

- (i) Reconciliation of Data, between valuations as to exits from last date
- (ii) Follow the trend of increase in salary over the years

4.2 The data was subjected to usual correlation Tests of

- (a) Age - Salary
- (b) Age - Service
- (c) Salary - Service

Such tests have not shown any inconsistency thereon. Accordingly, the data has been used in valuation without amendments.

5. BASES OF VALUATION

This is the first valuation, consequently we have relied upon Stock-Basis i.e general basis as applicable to establishment with mainly white colour worker of such size. Basis of Actuarial Valuation is detailed in **Schedule – P2**. In successive valuation expected exits on actuarial bases will be worked out and compared with actual exits. This will justify or modify the bases used – when appropriate action will be taken.

6. RATIONALE OF VALUATION

Unit projection method has been used. Under the same each individual employee has been valued as per rationale detailed as hereunder :

- (i) Pension - P3
- (ii) Gratuity - P4
- (iii) Leave - P5

7. VALUATION RESULT

7.1 EXISTING STAFF

7.1.1 PENSION LIABILITY

Number of Employees	-	11158
Salary	-	Rs. 12,17,88,509
Accrued Pension	-	Rs. 3,31,34,350
Accrued Liability	-	Rs. 609,54,68,526
Future Service Contribution as percentage of Salary	-	19.60%

7.1.2 GRATUITY LIABILITY

Number of Employees	-	11158
Salary	-	Rs. 15,10,39,808
Accrued Liability	-	Rs. 128,39,43,623
Future Service Contribution as percentage of Salary	-	2.48%

7.1.3 LEAVE LIABILITY

Number of Employees	-	11158
Salary	-	Rs. 16,08,97,737
Accrued Liability	-	Rs. 67,22,30,595

7.2 VESTED PENSIONER

Number of Employees	-	12464
Pension in Payment	-	Rs. 4,28,42,600
Accrued Liability	-	Rs. 903,44,24,395

**BHUDEV CHATTERJEE
ACTUARY**

*Schedule – P1/1***SCHEME OF BENEFITS - PENSION**

<u>Type of Benefit</u>	<u>Benefit Formula</u>
Retirement on completion of qualifying service of 33 years	50% of Emoluments Minimum Pension - 1913
Retirement before completing qualifying service of 33 years but after completion of qualifying service of 10 years	50% of 10 months average emoluments for 33 years of service reduced pro-rate for lesser year of maximum service Minimum Pension - 1913
Invalid Pension on permanent in capacity before reaching age 60	50% of Average emoluments Minimum Pension - 1913
Family Pension payable on (i) Death in Service – when the member dies after rendering 7 years of continuous service (ii) Death after retirement	30% of Pay Minimum Pension Rs. 1913 (i) In the event of death in service pension is payable from the date following the death for a period of seven years or for a period upto the date on which the deceased Employee would have attained the age of 67 years had he survived whichever is less. (ii) In the event of death after retirement Pension is payable for a period of seven years or for a period upto the date on which the retired deceased Employee would have attained the age of 67 years had he survived, whichever is less.

Schedule – P1/2

Death-cum-Retirement Gratuity

In the event of exit of an employee from **DAMODAR VALLEY CORPORATION**

- (a) On retirement on account of permanent incapacity due to bodily or mental infirmity or on grounds accepted by the Board as and sufficient reason for retirement, or
- (b) On Death in Service
- (c) after he has rendered continuous service for not less than 5 years
 - (i) On his superannuation
or
 - (i) On his retirement or resignation
or
 - (ii) On his termination of service for any reason whatsoever other than dismissal

Death-cum-Retirement Gratuity shall be admissible at the rate of one fourth (1/4th) emoluments drawn by such an employee, for every completed six monthly period of service, subject to a maximum of Rs. 3,50,000/- (Rupees Three lakhs fifty thousand) as Gratuity.

Schedule – P1/3

LEAVE BENEFIT :

- (i) Fresh Leave is credited every year
- (ii) Encashment of Surrendered Leave is allowed
- (iii) Maximum Earned Leave that can be credited to the employees account during his total period of service is 300 days

*Schedule – P2***BASES OF ACTUARIAL VALUATION****BASES FOR VALUATION OF CONTINGENT PENSION LIABILITY**1. STAFF MORTALITYMALE STAFF

L.I.C.I 1994-1996 ULTIMATE TABLE
 AT Age X-3 for Age X if age is
 over 40 otherwise at Age x-4
 for age x

FEMALE STAFF

FEMALE Aged X has been taken as
 MALE Aged X-3

2. CONTINGENT PENSIONER-MORTALITY

MALE STAFF

a(55)

FEMALE STAFF

a(55) at age x-2

3. PROPORTION MARRIED

AGE	MALE	FEMALE
Upto age 25	.30	.50
Between 25 & 30	.60	.75
Over 30	.90	.95

4. RESIGNATION/DISSMISSAL/DISABLEMENT

All Causes Combined
 per 1000 Employees

6 Exits p.a distributed as below
 3 below Age 30 &
 2 between Age 30 and Age 40 &
 1 above Age 40

5. AGE-RETIREMENT

Retirement Age

60
 Retirement over age 60 Ignored

6. VOLUNTARY-RETIREMENT

IGNORED

7. SALARY SCALE

MANAGEMENT STAFF
&
NON-MANAGEMENT STAFF

Basic Salary Scale, for different Grades has been considered. Effect is 5.5% of Salary as annual increases for Management Staff and 3.5% for Non-Management Staff.

8. PENSION INFLATION

4% p.a with half yearly rest after vesting of Pension

9. INTEREST RATE

Current Investment yield is given below

Outstanding Term	Govt. Security	P.S.U
Less than 5 years	6.75%	7.0%
Between 5 & 10 Years	7.00%	7.25%
10 Years & Over	7.25%	7.50%

Based on the current market position it is expected that Interest Rate will not further fall in future

Interest rates used for valuation -

Liability upto 5 years - 6.75%
Between 5 & 10 years - 7.00%
Over 10 years - 7.25%

*Schedule – P3***RATIONALE OF VALUATION OF CONTINGENT PENSION LIABILITY**

Consider one age x now
 with salary s
 Service n

Accrued Pension after t years from now will be

$$PEN(x+t) = \text{Pension Fraction} \times (n+t) \times S \times (1+I)^t$$

When I is the rate of annual increase of salary

Probability that such a pension will be payable

$$p(x+t) = \frac{r(x+t) + w(x+t)}{l(x)}$$

When $l(x)$ = Number of staff age x now
 $r(x+t)$ = Member retires at age $x+t$ on superannuation
 $w(x+t)$ = Member retires at age $x+t$ on other ground

Then probable pension = pension \times probability of payment
 = $PEN(x+t) \times p(x+t)$

Cost of purchase price of the pension = $PEN(x+t) \times p(x+t) \times a(x+t)$

When $a(x+t)$ = Cost of purchase of annuity of Re.1/- p.m. at age $x+t$

When annuity represents present value of month payment of Pension for all years to death from date of retirement.

Discounted value at age x of a pension payable at age $x+t$

$$V(x+t) = PEN(x+t) \times p(x+t) \times a(x+t) / (1+J)^t$$

When j is rate of discounting

Aggregate of all discounted values from $t = 0$ to $60 - x$, will constitute the pension liability of the individual.

Contingent widow Pension is worked out same principle as applicable where probability of payment = $\frac{d(x+t)}{d(x)} ax/y$

Where ax/y represents annuity payment to wife aged y on death of husband aged x .

*Schedule – P4***RATIONALE OF VALUATION OF GRATUITY LIABILITY**

Consider one age x now
 with salary s
 Service n

Accrued Gratuity after t years from now Pension will be

$GRT(x+t) = 15/30 \times (n+t) \times S \times (1+I)^t$, subject to maximum of Rs. 3,50,000/-

When I is the rate of annual Increase of salary.

Probability that such a gratuity will be payable

$$p(x+t) = \frac{r(x+t) + w(x+t) + d(x+t)}{l(x)}$$

When l (x) = Number of staff age x now
 r(x + t) = Member retirees at age x + t on superannuation
 w(x + t) = Member retirees at age x + t on other ground
 d(x + t) = Member dies at age x + t

Then probable Gratuity = Gratuity x probability of payment
 = $GRT(x+t) \times p(x+t)$

Discounted value at age x of a Gratuity
 payable at age x + t

$$VGRT(x+t) = GRT(x+t) \times p(x+t) \times (1+J)^{-t}$$

When j is rate of discounting

Aggregate of all discounted values from t = 0 to 60-x, will constitute the Gratuity liability of the individual.

Sum of Gratuity liabilities of all such individuals will constitute the Gratuity liability of the **DAMODAR VELLEI CORPORATION**.

*Schedule – P5***RATIONALE OF VALUATION OF LEAVE LIABILITY**

Consider one age x now
 with monthly salary S
 Number of days leave accrued N

$$\text{Encashment at Current Days Leave} = \text{LEV}(x) = \frac{N}{30} \times \text{Salary}$$

Encashment of Accrued Leave t years from now will be

$$\text{LEV}(x+t) = \frac{N}{30} \times S \times (1+I)^t$$

When I is the rate of annual Increase of salary.

$$\text{Probability of payment of leave} = p(x+t) = \frac{r(x+t) + w(x+t) + d(x+t)}{l(x)}$$

When l (x) = Number of staff age x now
 r (x+t) = Member superannuation at age x + t on superannuation
 w (x+t) = Member retires at age x+t on other ground
 d (x + t) = Members dying at age x + t

$$\begin{aligned} \text{Then Probable Encashment} &= \text{Encashment} \times \text{probability of payment} \\ &= \text{LEV}(x+t) \times p(x+t) \end{aligned}$$

Discounted value at age x of a Leave Liability payable at age x + t

$$\text{VLEV}(x+t) = \text{LEV}(x+t) \times p(x+t) \times (1+J)^{-t}$$

When j is rate of discounting

Aggregate of all discounted values from t = 0 to 60 - x, will constitute the Leave liability of that individual.

Aggregate of leave liability of all individuals will Constitute Leave Liability of **DAMODAR VALLEY CORPORATION**.