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**REPUBLIC OF THE MARSHALL ISLANDS  
SOCIAL SECURITY SYSTEM**

**ACTUARIAL VALUATION  
AS OF OCTOBER 1, 2013**

*Revised*

**PREPARED BY:**



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## *Table of Contents*

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	<b>Page</b>
<b>I. Foreword</b> .....	1
<b>II. Actuarial Valuation Results</b>	
A. Introduction.....	2
B. Actuarial Certification .....	3
C. Summary of Valuation Results .....	4
D. Unfunded Accrued Liability, Funded Ratio, and Deficiency .....	5
E. Discussion of the Unfunded Accrued Liability .....	7
F. Comments and Suggestions to Manage the Unfunded Accrued Liability.....	8
<b>III. Trust Assets</b>	
A. Statement of Net Assets .....	9
B. Statement of Changes in Net Assets .....	10
C. Trust Asset History .....	11
D. Trust Investment Experience History .....	11
<b>IV. Actuarial Assumptions and Summary of Key Features</b>	
A. Actuarial Assumptions .....	12
B. Summary of Key Features .....	15
<b>V. Age, Service, Benefit and Compensation Data</b>	
A. Summary of Characteristics of Workers and Beneficiaries .....	19
B. Age and Service Summary.....	20
C. Accrued Benefit Detail .....	23
<b>VI. Explanation of the Unfunded Accrued Liability</b> .....	24
<b>VII. Projection of Funded Status</b> .....	26

## *Section I*

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### **Foreword**

This report contains the results of the *revised* eighth actuarial valuation of the Republic of the Marshall Islands Social Security System. The valuation was conducted as of October 1, 2013 and the results contained herein report costs applicable to the plan and fiscal years ending September 30, 2014. The revisions reflect data changes, including exclusions of deceased participants not previously reported and updated accrued benefits for vested terminated participants past age 60.

Section 126 of Title 49 stipulates that the Administration may engage an actuary to examine and advise the Administration. It requires the actuary to perform an actuarial valuation of the Administration no less frequently than every three years.

The purpose of the annual valuation is to:

- Compare the accrued liabilities of the system to system assets in order to determine the current funded status of the system.
- Provide a basis for determining the effect of any future proposed changes to the system.
- Project cash flows to determine System sustainability.

## *Section II*

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### **Actuarial Valuation Results**

#### **A. Introduction**

This section contains the detailed results of the actuarial valuation. These results are classified in subsections B through F as noted below:

- B. Actuarial Certification
- C. Summary of Valuation Results
- D. Unfunded Accrued Liability, Funded Ratio, and Deficiency
- E. Discussion of the Unfunded Accrued Liability
- F. Comments and Suggestions to Manage the Unfunded Accrued Liability

## B. Actuarial Certification

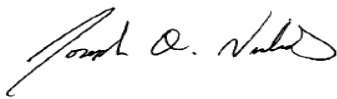
This report presents the results of the actuarial valuation as of October 1, 2013, of the Republic of the Marshall Islands Social Security System. The valuation was performed using participant data and asset information that was supplied by The Republic of the Marshall Islands Social Security Administration. These were not audited, but were checked for reasonableness and consistency with the prior valuation's data. The valuation results presented are dependent on the accuracy of the participant and asset information.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices. The employee data was provided by MISSA and the Plan asset data was obtained from the Deloitte plan audit. This data has been reviewed for reasonableness, but no attempt has been made to audit such information. Employee data is snapshot data as of the valuation date.

The valuation was based on the provisions of the Plan as amended through the beginning of the Plan Year. Each actuarial assumption used in this valuation is reasonably related to the past experience of the Plan and represents reasonable expectations of future experience under the Plan. The Plan trustees with advice and approval of the actuary set the assumptions and methods for the valuation.

Neither the signing actuary nor the firm of Nichols Actuarial Consulting, LLC has a conflict of interest that would impair the objectivity of our work. This report is intended for use by the Plan trustees and the Social Security Retirement Commission and should not be used for any purpose other than as stated herein.

Certified by:



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Joseph A. Nichols, ASA, EA, MAAA, MSPA  
Consulting Actuary

November 2014 (*Revised July 2015*)

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## C. Summary of Valuation Results

The principal results of this valuation are the calculation of the accrued liability, the funded ratio, and the deficiency.

The accrued liability represents the current value of benefits already earned, as of the valuation date including benefits currently in pay status.

The funded ratio is an indication of how well-funded the Administration is at any point in time with respect to benefits already earned. A funded ratio of 100% would indicate that the Administration's liability for benefits already earned was fully funded by current Trust assets. A funded ratio of 25% would indicate that current Trust assets were only great enough to cover 25% of the benefits already earned. The greater the funded ratio, the better funded the Administration is with respect to benefits already earned.

The deficiency is calculated as the accrued liability less the market value of Trust assets and further reduced by the estimated value of future employee contributions in excess of those needed to fund future benefits and system expenses.

An important part of the valuation process is reviewing the assumptions made regarding, among other things, future life expectancy of current and disabled workers, retirees and beneficiaries, investment return, and cost of living adjustments as they apply to the system.

Actuarial assumptions are used to build a mathematical model of the system. Because the system is intended to continue well into the future and indeed past the lifetime of the current workers, these assumptions must be chosen with the very long-term in mind. This is why the assumption regarding the return on system assets does not change with every valuation to reflect the current interest and investment environment. Choosing realistic, long-term assumptions smoothes out the otherwise inherent fluctuations in measurement of system liabilities that would result if assumptions were changed, with every valuation, and allows a level playing field for making comparisons of the system's liabilities from one valuation to the next.

All actuarial assumptions and methods are the same as those utilized in the prior valuation with three exceptions. The mortality table was updated from the UP 1984 table to the RP 2000 table to reflect increasing life expectancies. The salary scale was also decreased from 4.5% to 3% to better reflect future anticipated increases. Finally, the assumption of who is an active worker was changed to include only those with earnings during the last four quarters.

As of October 1, 2013, the total accrued liability stood at \$278,796,000 and the market value of Trust assets was \$72,988,000, resulting in an unfunded accrued liability of \$205,808,000.

When discussing the funded status of a retirement system, a common benchmark is the funded ratio of the system which, as mentioned above, is calculated as the market value of Trust assets divided by accrued liability. The funded ratio as of October 1, 2013 is 26%.

**D. Unfunded Accrued Liability, Funded Ratio, and Deficiency**

The accrued liability represents the value of benefits already earned and which are in pay status as well as benefits earned as of the valuation date by those who are still working and are expected to earn future benefits. One can think of this as the amount needed today to pay for all benefits earned as of today that are either already being paid or may be paid in the future.

This determination of the accrued liability does not include former workers who are no longer making contributions, are not fully insured, and therefore are not entitled to a future benefit. Should these workers re-enter the workforce in the future, their benefits will then be included in the category of workers currently earning benefits.

Accrued Liability For:	Accrued Liability and Market Value of Assets as of October 1,	
	2011	2013
Workers Earning Benefits	\$ 120,384,000	\$ 104,252,000
Retirees, Spouses, Children, and Disabled Workers Receiving Benefits	145,551,000	143,087,000
Fully Insured Inactive Workers Entitled to a Future Benefit*	21,392,000	31,457,000
<b>Total Accrued Liability</b>	<b>\$ 287,327,000</b>	<b>\$ 278,796,000</b>
Market Value of Assets	(64,986,000)	(72,988,000)
<b>Unfunded Accrued Liability</b>	<b>\$ 222,341,000</b>	<b>\$ 205,808,000</b>
<b>Funded Ratio</b>	<b>23%</b>	<b>26%</b>

The unfunded accrued liability is the excess of the accrued liability over the market value of assets. The funded ratio indicates what percentage of the accrued liability is covered by the market value of assets.

The accrued liability decreased from 2011 to 2013 mostly due to adjustments to the data. The decrease would have been greater without assumption changes. Without the changes, the accrued liability would have been \$233,773,000.

\*The increase in inactive liabilities reflects that change in determination of who is an active worker (must have worked at least one of the last four quarters prior to valuation date).

The unfunded accrued liability can also be further reduced by considering the current value of future employee and employer contributions that are in excess of that needed to pay for future benefits earned and future expenses.

Currently we estimate that a combined employee and employer contribution rate of approximately 9% would pay for future benefits earned by new workers who would enter the System in the future and would cover future expenses. This amount has decreased by over 3% of payroll – due mainly to a significant number of new, younger workers. Since the current combined tax rate is 14% of covered earnings, this excess can be used to reduce the unfunded accrued liability as shown below. It is important to note that because the current contribution rate is sufficient to cover future benefits, that the unfunded accrued liability and total deficiency shown below do not exist because of current system provisions, but rather are the result of prior benefits already earned.

	Determination of the Total Deficiency as of October 1,	
	2011	2013
Total Accrued Liability	\$ 287,327,000	\$278,796,000
Market Value of Assets	(64,986,000)	(72,988,000)
Current Value of Excess Employee Contributions from Active Workers	(14,884,000)	(49,950,000)
Total Deficiency*	\$ 207,457,000	\$155,858,000

\*The current value of excess employee contributions from active workers includes an allowance for future system expenses.



## **E. Discussion of the Unfunded Accrued Liability**

The unfunded accrued liability is the excess of the accrued liability over the market value of assets. The funded ratio indicates what percentage of the accrued liability is covered by the market value of assets. The accrued liability is expected to increase from year to year as workers earn additional benefits and get closer to retirement age and in fact the accrued liability shown in this valuation is greater than that in the prior valuation.

When the market value of assets equals or exceeds the accrued liability, there is no unfunded accrued liability and the retirement system is said to be fully funded. Although it is not critical that the Administration be fully funded, it is important that there is a positive trend in increasing the funded ratio from year-to-year. It is important to note that the funded ratio can decrease due to poor performance by the Trust assets and also due to increasing benefits payable to both current and future beneficiaries.

Past valuations have gone into great detail describing the danger of an ever increasing unfunded accrued liability and this report agrees that this is a continuing and serious issue. If the Administration were to cease operations with an unfunded accrued liability, there would not be enough money in the Trust at that time to fully provide benefits already in pay status or promised in the future. Therefore it is important that benefits are not increased until a long-term trend of increasing the funded ratio and decreasing the unfunded accrued liability has been realized.

## **F. Comments and Suggestions to Manage the Unfunded Accrued Liability**

Benefit payments and administrative expenses exceeded the amount of contributions collected during each fiscal year from 2008 and on. Since a larger portion of the contributions are for past due collections, the difference between the current year collections and disbursement are even greater. The trend of deficits shows no end. This puts the Administration in the position of having to dip into the Trust in order to meet its financial commitments. As the amount of benefit payments grows in the future, without further changes, it is quite possible that the Trust will run out of money. In fact, based on current provisions and worker demographics, the Trust will continue to diminish over the next 25 years. This projection is based on no growth in the active workforce. The deficit will come even sooner should the workforce continue to decrease.

The accrued liability is expected to increase from year to year and in fact the accrued liability has increased since the prior valuation. Because the unfunded accrued liability is simply the difference between the accrued liability and Trust assets, the size of the unfunded accrued liability can be limited in three ways; increase the return on invested assets, increase revenue through additional funding, and limit the growth of future benefit payments.

Immediate changes must be made to increase contributions and decrease benefits. The decrease in benefits must include both active workers and those in pay status, or the deficit will continue to grow, until all assets are depleted.

### Section III

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#### Trust Assets

##### A. Statement of Net Assets

<u>Assets and Liabilities as of:</u>	<u>09/30/2013</u>	<u>09/30/2012</u>
ASSETS		
Cash and cash equivalents	\$ 1,767,762	\$ 310,475
Investments at fair value:		
Cash Management	49,943	59,436
Stocks	17,373,802	15,836,554
Mutual Funds	53,280,890	52,129,172
Total Investments	70,704,635	68,025,162
Receivables:		
Contributions	2,019,730	2,063,491
Other receivables	485,992	279,217
Total Receivables	2,505,722	2,342,708
Capital assets, net	55,493	42,149
Total Assets	75,033,612	70,720,494
LIABILITIES		
Accounts payable	157,426	56,822
Other liabilities and accruals	126,052	146,745
Due to affiliate	1,761,952	1,547,381
Total liabilities	2,045,430	1,750,948
Net assets – held in trust for pension benefits	\$ 72,988,182	\$ 68,969,546

**B. Statement of Changes in Plan Net Assets**

<u>Additions and Deductions for Fiscal Years Ended:</u>	<u>09/30/2013</u>	<u>09/30/2012</u>
Additions:		
Contributions		
Private employees	\$ 8,915,779	\$ 8,105,433
Government employees	3,983,184	4,170,888
Penalties and interest	414,913	323,805
Total contributions	<u>13,313,876</u>	<u>12,600,126</u>
Less allowance for doubtful accounts	-	152,745
Net contributions	<u>13,313,876</u>	<u>12,447,381</u>
Investment income:		
Net change in the fair value of investments	7,017,252	7,312,882
Dividends	1,169,089	1,048,719
Interest	6,230	31,742
Total investment income	<u>8,192,571</u>	<u>8,393,343</u>
Less investment expense		
Investment management and custodial fees	148,506	140,864
Total net investment income	<u>8,044,065</u>	<u>8,252,479</u>
Other additions	<u>624,258</u>	<u>335,567</u>
Total additions	<u>21,982,199</u>	<u>21,035,427</u>
Deductions:		
Benefit payments:		
Retirement	10,585,297	9,813,768
Survivors	5,617,160	5,453,080
Disability	799,487	829,921
Lump sum	<u>105,726</u>	<u>155,424</u>
Total benefit payments	17,107,670	16,252,193
Administrative expenses	<u>855,893</u>	<u>799,218</u>
Total deductions	<u>17,963,563</u>	<u>17,051,411</u>
Net increase (decrease)	4,018,636	3,984,016
Plan assets held in trust for pension benefits		
Beginning of year	<u>68,969,546</u>	<u>64,985,530</u>
End of year	<u>\$ 72,988,182</u>	<u>\$ 68,969,546</u>

### C. Trust Asset History

<u>Fiscal Year End</u>	<u>Beginning of Year Market Value of Assets</u>	<u>Prior Year Adjustment</u>	<u>Contributions</u>	<u>Trust Gain or (Loss)</u>	<u>Other Income</u>	<u>Benefit Payments</u>	<u>Administrative Expenses</u>
9/30/1992	\$ 11,411,827		5,203,926	919,006	4,600	3,045,791	370,141
9/30/1993	\$ 14,118,827		5,551,741	1,585,653	7,917	3,650,861	576,256
9/30/1994	\$ 17,027,104		N/A	N/A	5,057	N/A	N/A
9/30/1995	\$ 18,621,286		6,552,290	1,212,257	4,894	4,498,091	686,210
9/30/1996	\$ 21,201,802		N/A	N/A	9,951	N/A	N/A
9/30/1997	\$ 24,018,126	(550,597)*	7,250,596	6,932,697	5,441	6,232,641	776,334
9/30/1998	\$ 30,624,147	192,504	5,941,895	(372,743)	4,422	6,864,677	957,129
9/30/1999	\$ 28,581,697		6,152,415	7,703,934	4,937	7,385,202	970,091
9/30/2000	\$ 34,083,023		6,857,536	7,065,277	65,454	7,657,881	742,942
9/30/2001	\$39,605,013		9,756,368	(5,296,995)	52,002	8,229,021	802,040
9/30/2002	\$35,033,325		9,907,862	(1,428,655)	65,924	8,564,016	685,476
9/30/2003	\$34,263,040	277,812	13,035,585	4,032,258		9,276,506	783,436
9/30/2004	\$41,548,753		10,627,661	6,011,501		9,747,850	859,676
9/30/2005	\$47,580,389		11,921,222	7,869,333		10,673,660	826,840
9/30/2006	\$55,870,444		11,443,526	5,780,773		11,018,951	896,473
9/30/2007	\$61,179,319		12,508,494	7,976,646		11,653,271	982,986
9/30/2008	\$69,028,202		13,471,032	(5,747,499)	1,551,234	12,548,715	1,016,370
9/30/2009	\$63,186,661		12,604,191	3,710,036	1,487,874	13,645,174	972,854
9/30/2010	\$64,882,760		13,118,836	5,978,828	1,432,411	14,551,142	885,294
9/30/2011	\$68,543,988		12,521,129	(98,508)	339,090	15,482,884	837,285
9/30/2012	\$64,985,530		12,447,381	8,252,479	335,567	16,252,193	799,218
9/30/2013	\$68,969,546		13,313,876	8,044,065	624,258	17,107,670	855,893
9/30/2014	\$72,988,182						

\* Transfer out

### D. Trust Investment Experience History

<u>Fiscal Year End</u>	<u>Return</u>		<u>Fiscal Year End</u>	<u>Return</u>
9/30/1992	7.47%		9/30/2004	14.47
9/30/1993	10.73		9/30/2005	16.47
9/30/1994	-0.93	Estimated	9/30/2006	10.39
9/30/1995	6.28		9/30/2007	13.05
9/30/1996	8.09	Estimated	9/30/2008	-8.33
9/30/1997	29.05		9/30/2009	5.79
9/30/1998	-1.25		9/30/2010	8.96
9/30/1999	28.03		9/30/2011	-0.15
9/30/2000	21.21		9/30/2012	13.13
9/30/2001	-13.25		9/30/2013	12.01
9/30/2002	-4.04			
9/30/2003	11.24			

Historical trust investment experience information up to and including the fiscal year that ended 9/30/2002 was taken from prior actuarial valuations prepared by the prior actuary.

#### Average Annual Return

5 Year Average	7.84%
10 Year Average	8.33%
20 Year Average	7.97%

## Section IV

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### Actuarial Assumptions and Summary of Key Features

#### A. Actuarial Assumptions

Actuarial Cost

Method: Individual Entry Age Method, Level Percent of Pay

Investment Income: 7.5% per year

Expenses: 0.75% of Covered Wages

Salary Increase: Salaries are assumed to increase 3% per year into the future

Mortality: RP 2000 Mortality Table.

Disabled

Mortality: Healthy mortality plus five years.

Retirement Age: According to the probabilities in the table if eligible, with a maximum age of 70. Active workers who are older than 62 are assumed to retire at the end of the next fiscal year if they earned 4 quarters of coverage during the fiscal year that just ended.

Age	Probability that the worker will Retire
55	2.5%
56	5.0
57	7.0
58	10.0
59	20.0
60	50.0
61	20.0
62 or older	100.0

Pre-retirement  
Spouse Benefit:

80% of the workers are assumed to be married, and males are assumed to be 3 years older than their spouses.

Surviving male spouses are assumed to remarry 2 years after death of the worker and surviving female spouses are assumed to remarry 6 years after death of the worker.

Representative percentages of those who receive a pre-retirement spouse benefit who remarry are shown in the following table.

Age	Male Spouse Remarry within 2 years		Female Spouse Remarry within 6 years	
	Remarry	Does not Remarry	Remarry	Does not Remarry
20	39.22%	60.78%	76.71%	23.29%
30	32.35%	67.65%	48.92%	51.08%
40	20.70%	79.30%	26.80%	73.20%
50	14.44%	85.56%	9.75%	90.25%
60	7.40%	92.60%	2.52%	97.48%

Surviving spouse benefits continue if the spouse is employed, but the benefits are subject to the earnings test.

Pre-retirement  
Children's Benefit:

Married workers are assumed to have 3 children, and each child is assumed to be age 13 at the time of death of the worker.

Post Retirement  
Survivor's Benefit:

80% of active workers are assumed to be married when they retire. Males are assumed to be 3 years older than their spouses. It is assumed that 10% of male spouses and 60% of female spouses have Old Age Benefits smaller than the survivor's benefit, which is assumed to be twice the amount of the spouse's own benefit.

Disability:

Rates are from the 2003 US Social Security Trustees Report Intermediate Assumptions.

Turnover:

None for citizens of the Marshall Islands.

5% of citizens of countries other than the Marshall Islands are assumed to leave each year, except for that 80% are assumed to leave in their third year of employment. It is also assumed that 80% of workers who are not citizens of the Marshall Islands leave when they retire.

Workers included  
In the Valuation:

Workers who have covered quarters in the last four quarters and who are age 21 or older are assumed to continue working and earn quarters of coverage equal to the average number earned during the previous three years until they become disabled, die, or retire, whichever comes first. Workers who have not earned any quarters of coverage during the last year are assumed to stay out of the work force. Salary used as a basis to project future salaries is the greater of the salary earned during the last three years. If this salary is based on less than four quarters of coverage, it is converted to an annual salary.



## **B. Summary of Key Features**

### Applicable Laws

The Social Security Act of 1990, as amended by Public Laws 1994-104, 1996-27, and 1996-29.

### Workers and Employer's Contributions

Workers, self-employed workers and employers each pay 7% of earnings up to a maximum of \$5,000 of earnings per quarter.

### Coverage

All employees who are citizens or nationals of the Republic of the Marshall Islands and all other employees working in the Republic are covered. U.S. citizens who are exempt from taxation in the Marshall Islands are exempted from coverage.

### Eligibility for and Computation of Benefits is based on the following definitions:

**Quarters of Coverage:** A calendar quarter in which contributions were made for at least \$250 of earnings. Prior to October 1, 1990, a Quarter of Coverage was earned for a calendar year in which contributions were made for at least \$50 of earnings.

**Currently Insured:** Credited with at least 6 quarters of coverage during the previous 40 calendar quarters.

**Fully Insured:** Credited with at least one quarter of coverage for each year since the later of attainment of age 21 or June 30, 1968. A worker who attains retirement age, or becomes disabled after September 30, 1983 must have a minimum of 12 quarters of coverage. Workers who attained retirement age or became disabled prior to October 1, 1983 needed a minimum of 8 quarters of coverage. However, no more than 38 quarters of coverage are required to be Fully Insured.

**Service Insured:** Credited with at least 80 quarters of coverage.

**Maximum Covered Earnings:** Earnings up to a maximum of \$5,000 each quarter.

**Minimum Benefit:** \$128 per month as of October 1, 1994.

### Cost of Living Adjustments

A cost of living adjustment, not to exceed the consumer price index, may be adopted every two years. This adjustment applies to the amount of the Minimum Benefit and is used to calculate Indexed Covered Earnings. Two adjustments have been implemented prior to this valuation.

October 1, 1992	16.1%
October 1, 1994	11.1%

### Wage Index Adjustment

A Wage Index Adjustment may be adopted periodically but may not exceed the government index. The Wage Index Adjustment is used to increase the Basic Benefit bend points and/or the Maximum Covered Earnings. So far, no wage index adjustments have ever been implemented.

### Basic Benefit

A worker's Basic Benefit is calculated as 1/12 of:

1. 2% of Indexed Covered Earnings, plus
2. 14.5% of the first \$11,000 of total Maximum Covered Earnings for which contributions have been made, plus
3. 0.7% of the next \$33,000 of total Maximum Covered Earnings for which contributions have been made.

### Early Retirement Old Age Insurance Benefit

Eligibility: Age 55 and Service Insured

Amount: Greater of the Basic Benefit reduced  $\frac{1}{2}$  % for each month prior to age 60 that benefits commence, and the Minimum Benefit. Benefits paid before attainment of age 62 are reduced by \$1 for every \$3 of earnings in excess of \$1,500 received each quarter.

### Normal Retirement Old Age Insurance Benefit

Eligibility: Age 60 and Fully Insured

Amount: Greater of the Basic Benefit and the Minimum Benefit

### Deferred Old Age Retirement Benefit

Eligibility: Older than age 60 and fully insured

Amount: Greater of the Basic Benefit increased  $\frac{1}{2}$  % for each month past age 60 that benefits commence, and the Minimum Benefit.

### Disability Benefit

Eligibility: Disabled and both Fully and Currently Insured at time of disability

Amount: Unreduced Basic Benefit earned at time of disability. Sum of disability benefit and workers compensation benefit may not exceed 80% of the highest covered compensation earned in the year of disability and the prior five years. The benefit ceases should the worker recover from the disability.

### Survivor Benefits

Eligibility: Worker must have been Fully or Currently Insured at time of death.

Amount:

Spouse: 100% of the Basic Benefit earned at the time of death. Paid until the earlier of the date the spouse remarries, returns to work, or dies. This benefit is reduced by any Old Age Benefit that the spouse may be entitled to base on his or her own earnings history.

Children: 25% of the Basic Benefit for each dependent child under the age of 18 or 22 if a student. The benefit ceases if the child marries or is adopted by a close relative.

Parents: 15% of the Basic Benefit earned at the time of death.

The Minimum total Survivor benefit is \$128 per month.

The sum of all survivors' benefits cannot exceed 100% of the Basic Benefit earned at the time of death.

### Benefits Paid to Employed Retirees

If a person who is receiving an old age insurance benefit accepts covered employment, the benefit shall be recomputed at the end of the calendar year and the recomputed benefit shall be paid beginning with the first month of the subsequent calendar year.

### Earnings Test

Benefits paid before attainment of age 62 are reduced by \$1 for every \$3 of earnings in excess of \$1,500 received each quarter.

### Payment to Non-Citizens Overseas

No more than six months of benefit payments shall be made to any beneficiary who is not a citizen or national of Republic of the Marshall Islands while the beneficiary is outside the Republic of the Marshall Islands. However, benefit payments will be made to citizens and nationals of the Federated States of Micronesia, the Republic of Palau and the United States as if they were citizens or nationals of the Republic of the Marshall Islands if such countries extend the same reciprocal benefits to citizens of the Marshall Island.

### Lump Sum Death Benefit

**Eligibility:** After the death of any covered worker and rights to all survivors benefits have ceased.

**Amount:** Four percent of total Maximum Covered Earnings for which contributions have been paid, less the value of any benefits already paid.

### Lump Sum Benefit (other than death)

**Eligibility:** Worker permanently ceases work due to old age, illness, or disability and has not earned the right to any other benefit.

**Amount:** Four percent of total Maximum Covered Earnings for which contributions have been paid, less the value of any benefits already paid.

## Section V

### Age, Service, Benefit and Compensation Data

#### A. Summary of Characteristics of Workers and Beneficiaries Included in the October 1, 2013 Valuation

Active Workers – Average Age, Average Completed Years of Service, and Average Valuation Compensation

Worker	Number of Workers	Average Age	Average Completed Years of Service	Average Valuation Compensation
Men	6,527	38.2	9.5	\$ 8,252
Women	3,329	37.4	8.3	7,593
Total	9,856	37.9	9.1	8,029

The average annual accrued basic benefit is as of October 1, 2013 and is based on total remuneration for which contributions have been made through September 30, 2013.

Status	Number	Average Age	Average Annual Accrued Basic Benefit
Active	9,856	37.9	\$ 2,732
Inactive and Fully Insured	1,325	49.5	3,991
Retired	2,002	65.9	5,812
Disabled	183	52.9	4,197
Spouse	1,105	58.7	4,335
Child	799		937

Active Status- Currently working (received compensation in at least one of the last four quarters)

Inactive and Fully Insured Status - Not in pay status, not currently earning additional benefits, and entitled to a benefit in the future.

Retired – Currently receiving a monthly benefit

Disabled – Not currently working due to health reasons and below age 55

Spouse – Receiving survivorship benefit due to death of spouse

Child – Receiving benefit due to death of parent

## B. Age and Service Summary

Distribution by Attained Age and Covered Services – Males

Nearest Age	Under 5	5-9	10-14	15-19	20-24	25-29	30 & More	Total
Under 20	55	0	0	0	0	0	0	55
	\$930.49	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$930.49
20-24	524	13	0	0	0	0	0	537
	\$2,611.11	\$8,618.69	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,756.55
25-29	729	226	7	0	0	0	0	962
	\$4,550.12	\$8,677.92	\$10,307.71	\$0.00	\$0.00	\$0.00	\$0.00	\$5,561.74
30-34	444	440	174	4	0	0	0	1,062
	\$4,825.07	\$8,568.61	\$10,910.78	\$14,557.75	\$0.00	\$0.00	\$0.00	\$7,409.81
35-39	271	323	314	97	6	0	0	1,011
	\$4,508.73	\$7,832.78	\$10,976.32	\$14,454.85	\$16,788.83	\$0.00	\$0.00	\$8,606.60
40-44	168	219	230	229	115	8	0	969
	\$5,479.32	\$7,949.37	\$10,166.69	\$12,549.40	\$15,709.94	\$15,326.38	\$0.00	\$10,116.45
45-49	101	128	137	171	216	117	2	872
	\$5,664.85	\$6,849.14	\$7,933.92	\$10,320.36	\$13,171.98	\$15,126.53	\$10,007.00	\$10,247.17
50-54	54	86	78	98	113	198	43	670
	\$6,443.13	\$7,325.05	\$7,787.17	\$9,236.86	\$12,006.08	\$14,673.07	\$16,115.14	\$11,112.54
55-59	35	54	61	58	47	58	30	343
	\$7,471.26	\$7,899.09	\$9,719.84	\$8,740.60	\$11,840.98	\$13,451.00	\$18,019.47	\$10,685.65
60-64	4	8	7	7	3	6	9	44
	\$4,419.25	\$10,162.63	\$9,168.14	\$8,736.14	\$16,259.67	\$16,908.33	\$18,694.00	\$12,335.98
65-69	0	0	0	0	0	0	0	0
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
70 & Older	0	0	0	1	0	1	0	2
	\$0.00	\$0.00	\$0.00	\$6,865.00	\$0.00	\$7,968.00	\$0.00	\$7,416.50
Total	2,385	1,497	1,008	665	500	388	84	6,527
	\$4,285.29	\$8,102.09	\$10,026.75	\$11,397.19	\$13,429.03	\$14,657.88	\$16,926.13	\$8,251.71

**B. Age and Service Summary (continued)**

Distribution by Attained Age and Covered Services – Females

Nearest Age	Under 5	5-9	10-14	15-19	20-24	25-29	30 & More	Total
Under 20	59	2	0	0	0	0	0	61
	\$624.64	\$3,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$702.52
20-24	323	12	0	0	0	0	0	335
	\$2,331.14	\$6,171.33	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,468.70
25-29	388	111	3	0	0	0	0	502
	\$5,145.56	\$8,957.55	\$9,558.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6,014.82
30-34	242	198	88	2	0	0	0	530
	\$4,774.64	\$8,695.23	\$11,884.14	\$15,797.00	\$0.00	\$0.00	\$0.00	\$7,461.35
35-39	169	127	157	53	5	0	0	511
	\$4,208.76	\$8,043.89	\$11,760.20	\$14,018.57	\$15,323.00	\$0.00	\$0.00	\$8,608.23
40-44	128	96	114	97	35	1	0	471
	\$5,392.23	\$8,174.09	\$10,384.25	\$12,491.32	\$16,233.11	\$20,000.00	\$0.00	\$9,466.12
45-49	77	80	66	73	65	42	0	403
	\$5,054.40	\$6,881.03	\$8,577.76	\$9,451.26	\$13,168.62	\$16,138.83	\$0.00	\$9,254.43
50-54	31	42	46	54	52	60	19	304
	\$2,744.32	\$7,378.83	\$6,871.50	\$7,726.22	\$10,517.08	\$14,121.55	\$16,582.58	\$9,334.01
55-59	32	33	31	32	23	19	19	189
	\$6,098.66	\$8,118.88	\$7,066.58	\$7,756.38	\$10,775.78	\$14,274.58	\$18,221.21	\$9,500.59
60-64	4	6	4	3	3	0	2	22
	\$15,135.25	\$8,792.33	\$4,892.00	\$8,069.33	\$3,100.00	\$0.00	\$19,689.50	\$9,352.27
65-69	0	0	0	0	1	0	0	1
	\$0.00	\$0.00	\$0.00	\$0.00	\$7,091.00	\$0.00	\$0.00	\$7,091.00
70 & Older	0	0	0	0	0	0	0	0
	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	1,453	707	509	314	184	122	40	3,329
	\$4,179.77	\$8,180.14	\$10,266.18	\$10,719.13	\$12,564.43	\$14,888.04	\$17,516.28	\$7,592.88

**B. Age and Service Summary (continued)**

Distribution by Attained Age and Covered Services – Everyone

Nearest Age	Under 5	5-9	10-14	15-19	20-24	25-29	30 & More	Total
Under 20	114	2	0	0	0	0	0	116
	\$772.20	\$3,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$810.61
20-24	847	25	0	0	0	0	0	872
	\$2,504.34	\$7,443.96	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$2,645.96
25-29	1,117	337	10	0	0	0	0	1,464
	\$4,756.95	\$8,770.02	\$10,082.80	\$0.00	\$0.00	\$0.00	\$0.00	\$5,717.10
30-34	686	638	262	6	0	0	0	1,592
	\$4,807.28	\$8,607.90	\$11,237.71	\$14,970.83	\$0.00	\$0.00	\$0.00	\$7,426.97
35-39	440	450	471	150	11	0	0	1,522
	\$4,393.51	\$7,892.36	\$11,237.61	\$14,300.69	\$16,122.55	\$0.00	\$0.00	\$8,607.15
40-44	296	315	344	326	150	9	0	1,440
	\$5,441.66	\$8,017.86	\$10,238.79	\$12,532.12	\$15,832.01	\$15,845.67	\$0.00	\$9,903.74
45-49	178	208	203	244	281	159	2	1,275
	\$5,400.78	\$6,861.40	\$8,143.25	\$10,060.34	\$13,171.20	\$15,393.93	\$10,007.00	\$9,933.39
50-54	85	128	124	152	165	258	62	974
	\$5,094.15	\$7,342.70	\$7,447.48	\$8,700.18	\$11,536.82	\$14,544.81	\$16,258.39	\$10,557.43
55-59	67	87	92	90	70	77	49	532
	\$6,815.69	\$7,982.46	\$8,825.80	\$8,390.66	\$11,490.99	\$13,654.22	\$18,097.69	\$10,264.64
60-64	8	14	11	10	6	6	11	66
	\$9,777.25	\$9,575.36	\$7,613.18	\$8,536.10	\$9,679.83	\$16,908.33	\$18,875.00	\$11,341.41
65-69	0	0	0	0	1	0	0	1
	\$0.00	\$0.00	\$0.00	\$0.00	\$7,091.00	\$0.00	\$0.00	\$7,091.00
70 & Older	0	0	0	1	0	1	0	2
	\$0.00	\$0.00	\$0.00	\$6,865.00	\$0.00	\$7,968.00	\$0.00	\$7,416.50
Total	3,838	2,204	1,517	979	684	510	124	9,856
	\$4,245.34	\$8,127.13	\$10,107.09	\$11,179.71	\$13,196.45	\$14,712.94	\$17,116.50	\$8,029.18



**C. Accrued Benefit Detail**

Average Accrued Benefit Distribution by Nearest Age, Sex and Status

Nearest Age	ACTIVE EMPLOYEES			
	Men		Women	
	Number	Avg Acc Ben	Number	Avg Acc Ben
Under 20	55	\$213.58	61	\$166.72
20-24	537	\$681.81	335	\$663.98
25-29	962	\$1,525.28	502	\$1,543.96
30-34	1,062	\$2,348.02	530	\$2,253.17
35-39	1,011	\$2,969.18	511	\$2,964.37
40-44	969	\$3,845.96	471	\$3,362.07
45-49	872	\$4,575.59	403	\$3,909.19
50-54	670	\$5,094.58	304	\$4,523.85
55-59	343	\$4,646.96	189	\$4,078.17
60-64	44	\$4,945.16	22	\$3,105.77
65-69	0	\$0.00	1	\$5,281.00
70 & Older	2	\$4,397.50	0	\$0.00
Total	6,527	\$3,108.77	3,329	\$2,732.12

## Section VI

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### Explanation of the Unfunded Accrued Liability

Although the accrued liability is often discussed, not very many people other than actuaries, really understand the ins and outs of what it is. The accrued liability can be a fairly complicated concept to explain.

However, one can think of the accrued liability as the current value of benefits already earned including benefits that are already in pay status. The unfunded accrued liability is simply the accrued liability less the market value of assets. Both of these numbers change depending on when they are measured and the accrued liability changes depending on the actuarial assumptions and method used to calculate it.

An active worker will earn the right to a future retirement benefit along with other future benefits such as disability and survivor benefits. The dollar amount of each of these benefits depends on the total amount of his earnings on which social security tax has been paid. When the valuation is performed, the worker's current pay is projected into the future (up to the wage base) until his retirement age and then the dollar amount of the various benefits that he may become entitled to in the future is calculated. As part of the valuation process a theoretical annual payment on behalf of this worker is calculated, known as the "normal cost". The normal cost is the theoretical annual payment that, if made each year during the worker's years of employment, would be sufficient to fund all of his future potential benefits. It is important to note that the normal cost is calculated separately for each worker and that it is not necessarily equal to the amount contributed each year by the employee and his employer.

The accrued liability for someone who is still working is calculated as the current value of all benefits that he might receive in the future, less the current value of his future normal costs (not the employee and employer contributions actually collected). But more simply the accrued liability for an active worker can be approximated as the current accumulated value of all of his past normal costs (again, not employee and employer contributions actually collected).

For someone who is no longer working but is entitled to future benefits, the accrued liability is just the current value of all benefits that he might receive in the future. For someone who is currently receiving a benefit, the accrued liability is the current value of the benefits that are currently being paid and will continue into the future.

Having said all of this, perhaps a very simple example will illustrate the concept of the accrued liability for an active worker would be helpful.

Suppose you borrow \$12,000 from a good friend who is not going to charge you any interest and you promise to pay back all \$12,000 at once in 5 years. You plan to put a little bit aside each month and will keep the money in a box, not a bank and your savings will not earn any interest. (This example has been simplified by not assuming any interest to be paid or earned but it works with interest too.) Five years is 60 months, so if you put exactly \$200 into the box each and every month you will have accumulated exactly \$12,000 in 5 years. Think of this \$200 payment as the normal cost as described above.

Now let's say that you don't put \$200 in the box a few times. After 3 years you should have made 36 payments of \$200 and there should be \$7,200 in the box. This \$7,200 represents the "accrued liability" associated with your efforts to save money after 3 years. But when you count the money in the box you find that there is only \$6,800. The amount that is actually in the box represents the "market value of assets" at that point in time. When we subtract the market value of assets from the accrued liability, we arrive at the "unfunded accrued liability", which in this example is \$400 ( $\$7,200 - \$6,800$ ). In other words, you have \$400 less than you would have if you had made each \$200 payment as was scheduled.

To follow the first definition of the accrued liability described above, we can calculate the current value of the future benefits as the value today of what you must pay in the future. This is still \$12,000, what you must pay in two more years. The current value today of what you should deposit in the future is 24 more payments of \$200 each, or \$4,800. We can now calculate the accrued liability as the value of what you need to pay in the future, less the value today of the remaining 24 month payments of \$200 each, which is \$7,200 ( $\$12,000 - \$4,800$ ). In this very simple example, the accrued liability is the same either way it is calculated.

Now the \$400 shortfall may not be a bad thing. Maybe you missed two payments because you had other more pressing expenses and the next month you plan to put \$600 in the box. If you do, your accrued liability will be \$7,400 (one more month will have gone by so it has increased by \$200) but the market value of assets will be \$7,400 and the unfunded accrued liability has gone away.

Some would think it best if you made all of your payments exactly on time so that at any time there was no unfunded accrued liability. However the most important thing to you is that at the end of 5 years there is exactly \$12,000 in the box. A problem comes up if for some reason, there is not enough money in the box to pay off the debt when it comes due. This is the danger of an unfunded accrued liability that does not decrease over time, or even worse, one that increases over time. To expand on our example, you could borrow more money each year (increasing the accrued liability with each loan) until you have borrowed so much that you simply don't earn enough money to put sufficient funds in the box to ever pay it off. This would be like increasing and increasing benefits in a retirement system without a clear-cut plan on how to pay for the increases.

## Section VII

### Projection of Funded Status

An actuarial valuation collects data, and using certain assumptions, determines a liability by projecting life expectancy and salary information into the future. Using the same assumptions as those used in the valuation, and with a few additional assumptions, a cash flow projection can show the sustainability of the System.

Below is a projection of the Systems assets using the same assumptions as those in Section IV. The following assumptions have also been utilized:

- 1) Annual increase in number of active workers: 0%
- 2) Annual increase in new worker's average salary: 3%
- 3) Additional annual contribution from RMI: \$0

Year	Total Workers		Accrued Liability	Assets	Funded Status
	Number	Payroll			
2011	11,899	75,713,337	287,327,000	64,986,000	23%
2013	9,853	82,301,958	278,797,000	72,988,000	26%
2014	9,853	85,069,008	293,221,014	75,663,001	26%
2015	9,853	87,775,766	308,617,965	78,569,097	25%
2016	9,853	90,557,407	324,926,507	81,580,450	25%
2017	9,853	93,328,185	342,144,281	84,635,565	25%
2018	9,853	95,881,080	360,243,292	87,636,954	24%
2019	9,853	98,405,948	378,956,278	90,221,785	24%
2020	9,853	100,590,567	398,141,030	92,161,518	23%
2021	9,853	102,531,679	417,678,894	93,227,920	22%
2022	9,853	104,645,889	437,379,083	93,115,617	21%
2023	9,853	106,851,384	457,379,193	91,875,961	20%
2024	9,853	109,196,216	477,622,788	89,347,399	19%
2025	9,853	111,486,164	498,178,484	85,493,168	17%
2026	9,853	113,678,254	518,958,605	80,095,015	15%
2027	9,853	115,807,743	539,954,718	73,004,863	14%
2028	9,853	117,874,045	561,245,025	64,156,099	11%
2029	9,853	119,987,427	582,796,510	53,355,599	9%
2030	9,853	122,182,556	604,672,632	40,504,784	7%
2031	9,853	124,208,205	626,902,633	25,459,238	4%
2032	9,853	126,215,809	649,536,454	8,068,377	1%

With additional annual contributions of \$2 million from the RMI government, the funded status decreases to 13% by the year 2032. Significant changes to benefits to be paid and contributions to be received must be made to move the System's funded status in the correct direction.