

Approved: 3-11-96  
Date

MINUTES OF THE HOUSE COMMITTEE ON APPROPRIATIONS.

The meeting was called to order by Chairperson Robin Jennison at 1:30 p.m. on March 6, 1996 in Room 514-S of the Capitol.

All members were present except: Representative Kejr, excused

Committee staff present: Alan Conroy, Russell Mills, Susan Wieggers, Legislative Research Department  
Jim Wilson, Revisor of Statutes; Mike Corrigan, Revisor  
Tim Kukula, Appropriations Secretary; Todd Fertig, Administrative Aide

Conferees appearing before the committee: David Slishinsky, Buck Consultants  
Paul Schrader, Buck Consultants

Others attending: See attached list

Chairman Jennison called the meeting to order and assigned several committee bills to subcommittees. **HB 3048** was referred to the subcommittee on State Hospitals and General Government, **HB 2934**, **HB 3044** and **HB 3047** were referred to the subcommittee on SRS, and **SB 402** was referred to the subcommittee on Education.

Discussion was raised on **HB 2612**, a bill concerning reimbursements to the state by prison inmates for the cost of care while in prison. A balloon amendment was distributed to the committee for consideration (Attachment 1).

A motion was made by Representative Gatlin, seconded by Representative Carmody, to amend **HB 2612** adopting the balloon amendment.. The motion carried.

Chairman Jennison recognized Revisor Wilson to explain the amendments that were requested during the hearings earlier in the session.

A motion was made by Representative Carmody, seconded by Representative Kline, to table **HB 2612**. The motion carried.

Chairman Jennison recognized Paul Schrader and David Slishinsky of Buck Consultants to give a KPERS Audit Report to the committee. They distributed a full report to all members and answered questions throughout the presentation (Attachment 2). A more detailed copy of the report is included with the official minutes (Attachment 3).

A handout from the Department of Revenue concerning Motor Fuel Tax Refunds was distributed to the committee (Attachment 4).

The meeting adjourned at 3:20 p.m.

The next meeting is scheduled for March 7, 1996.



HOUSE BILL No. 2612

By Representatives Beggs

1-5

Proposed amendments to HB 2612 for  
Consideration by House Appropriations

Attachment  
1

House Appropriations

3-6-96

9 AN ACT providing for reimbursement of the state for costs of care of  
10 persons in the custody of the secretary of corrections.

11  
12 *Be it enacted by the Legislature of the State of Kansas:*

13 Section 1. This act shall be known and may be cited as the state  
14 corrections reimbursement act.

15 Sec. 2. As used in this act:

16 (a) "Assets" means property, tangible or intangible, real or personal,  
17 belonging to or due an inmate or former inmate, including income or  
18 payments to such prisoner from social security, workers compensation,  
19 veteran's compensation, pension benefits, previously earned salary or  
20 wages, bonuses, annuities, retirement benefits or any other source what-  
21 soever. Assets does not include:

- 22 (1) The homestead of the inmate, up to \$50,000 in value;
- 23 (2) money received by the inmate from the state as settlement of a  
24 claim against the department by the inmate;
- 25 (3) money judgment received by the inmate from the state as the  
26 result of a civil action in which an officer or employee of the department  
27 was a named defendant and found to be liable; or
- 28 (4) money saved by the inmate from wages and bonuses paid the  
29 inmate while the inmate was in the custody of the secretary.

30 (b) "Cost of care" means the average per capita cost to the depart-  
31 ment of corrections for transportation, room, board, clothing, security,  
32 medical and other normal living expenses of inmates, as determined by  
33 the secretary, less amounts paid by an inmate pursuant to K.S.A. 75-5211,  
34 75-5268 or 75-5275, and amendments thereto, for food, lodging or trans-  
35 portation or pursuant to K.S.A. 1995 Supp. 75-52,139 and amendments  
36 thereto for services provided to the inmate.

37 (c) "Department" means the department of corrections.

38 (d) "Inmate" means any person committed to the custody of the sec-  
39 retary.

40 (e) "Secretary" means the secretary of corrections.

41 Sec. 3. (a) On or before August 1, 1996, the secretary shall adopt a  
42 form to be used by the department to obtain information from each in-  
43 mate regarding the inmate's assets. The department shall submit the form

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1 to each inmate in the secretary's custody at the time the form is developed  
2 and to each inmate sentenced to the custody of the secretary thereafter.  
3 The department may resubmit the form to an inmate at any time for the  
4 purpose of obtaining current information regarding the inmate's assets.

5 (b) Each inmate shall complete the form provided for by this section,  
6 or shall cause the form to be completed, and shall affirm under oath that  
7 the information provided is complete and accurate, to the best of the  
8 inmate's knowledge.

(b) The attorney general shall enter into written contracts with one or more attorneys to secure reimbursement for the cost of care of persons incarcerated under the custody of the secretary. The payment under such contracts shall be on a contingent fee basis. The attorney general shall adopt policies prescribing standards and guidelines governing the filing, processing and payment of contingency fee contracts under this section.

9 Sec. 4. (a) The secretary of corrections shall forward to the attorney  
10 general a report on each inmate containing the inmate's completed form  
11 provided for by section 3, together with all other information available on  
12 the assets of the inmate, and an estimate of the total cost of care for the  
13 inmate.

14 [(b)] The attorney general shall investigate or cause to be investigated  
15 each report furnished under subsection (a). If upon completing the in-  
16 vestigation the attorney general has good cause to believe that the inmate  
17 has sufficient assets to recover not less than 10% of the estimated cost of  
18 care of the inmate or 10% of the estimated cost of care of the inmate for  
19 two years, whichever is less, the attorney general shall seek to secure  
20 reimbursement for the expense to the state for the cost of care of the  
21 inmate.

[(c)]

contract with one or more attorneys pursuant to subsection (b) to

22 [(c)] Not less than 60 days before release of an inmate, the secretary  
23 shall notify the attorney general of the date of release. The secretary shall  
24 forward to the attorney general the most recent information that the  
25 secretary has regarding the inmate's assets and a statement of the total  
26 cost of care for the inmate, less any amounts previously recovered from  
27 the inmate pursuant to this act.

[(d)]

28 Sec. 5. Each inmate shall fully cooperate with the state by providing  
29 complete financial information for the purposes of this act. The failure of  
30 an inmate to fully cooperate may subject the inmate to disciplinary action  
31 in accordance with rules and regulations of the secretary and may be  
32 considered by the Kansas parole board for purposes of determining  
33 whether to parole an inmate and by the secretary for purposes of deter-  
34 mining good time credits.

35 Sec. 6. (a) At any time while an inmate is in the custody of the sec-  
36 retary or upon the release of an inmate from the custody of the secretary  
37 of corrections, [the attorney general may file] a complaint in the district  
38 court, stating that the defendant is or has been an inmate and that there  
39 is good cause to believe that the defendant has assets, and praying that  
40 the assets be used to reimburse the state for the cost of care of the  
41 defendant. The complaint shall be filed in the county where the inmate  
42 is in custody or, if a former inmate, where the former inmate was sen-  
43 tenced or where the former inmate resides.

[may be filed under the state corrections reimbursement act

1 (b) Upon the filing of the complaint under this section, the court shall  
2 issue an order to show cause why the prayer of the complainant should  
3 not be granted. The complaint and order shall be served upon the defen-  
4 dant personally at least 30 days before the date of hearing on the com-  
5 plaint and order.

6 (c) At the time of the hearing on the complaint and order, if it appears  
7 that the defendant has any assets which ought to be subjected to the claim  
8 of the state under this act, the court shall issue an order requiring any  
9 person, corporation or other legal entity possessed or having custody of  
10 those assets to appropriate and apply the assets or a portion thereof to-  
11 ward reimbursing the state as provided for under this act.

12 (d) At the hearing on the complaint and order and before entering  
13 any order on behalf of the state against the defendant, the court shall  
14 take into consideration any legal obligation of the defendant to support a  
15 spouse, minor children or other dependents and any moral obligation to  
16 support dependents to whom the defendant is providing or has in fact  
17 provided support.

18 (e) If the person, corporation or other legal entity neglects or refuses  
19 to comply with an order under subsection (c), the court shall order the  
20 person, corporation or other legal entity to appear before the court at  
21 such time as the court directs and to show cause why the person, cor-  
22 poration or other legal entity should not be considered in contempt of  
23 court.

24 (f) If, in the opinion of the court, the assets of the defendant are  
25 sufficient to pay the cost of the proceedings under this act, the assets shall  
26 be liable for those costs upon order of the court.

27 (g) The state may recover the cost of care of an inmate for the entire  
28 period or periods the defendant is or was an inmate.

29 Sec. 7. (a) Except as provided in subsection (c), in seeking to secure  
30 reimbursement under this act, the attorney general may use any remedy,  
31 interim order or enforcement procedure allowed by law or court rule,  
32 including an *ex parte* restraining order to restrain the inmate or any other  
33 person or legal entity in possession or having custody of the estate of the  
34 inmate from disposing of certain property pending a hearing on an order  
35 to show cause why the particular property should not be applied to re-  
36 imburse the state as provided for under this act.

37 (b) To protect and maintain assets pending resolution of an action  
38 under this act, the court, upon request, may appoint a receiver.

39 (c) The attorney general shall not enforce any judgment obtained  
40 under this act by means of execution against the homestead of the former  
41 inmate.

42 Sec. 8. The attorney general shall enforce the provisions of this act  
43 except that the attorney general may request the county or district attor-

1-3  
or any contracting attorney under subsection  
(b) of section (4)

7-1

1 ney of the county where the inmate was sentenced or the prosecuting  
2 attorney of the county where any asset of a former inmate is located to  
3 make an investigation or assist in legal proceedings under this act.

4 Sec. 9. The sentencing judge, the sheriff of the county and the sec-  
5 retary shall furnish to the attorney general ~~or prosecuting attorney~~ all  
6 information and assistance possible to enable the attorney general ~~or~~  
7 county or district attorney to secure reimbursement for the state under  
8 this act.

9 Sec. 10. Amounts recovered pursuant to this act to reimburse ex-  
10 penses incurred by the state for the cost of care of an inmate ~~shall be~~  
11 remitted to the state treasurer who shall deposit the entire amount in the  
12 state treasury and credit it to the state general fund.

13 Sec. 11. If a person has been ordered to pay reimbursement under  
14 this act and has diligently paid such reimbursement for at least 10 years,  
15 the governor may excuse the person from being required to make further  
16 payments pursuant to this act.

17 Sec. 12. This act shall take effect and be in force from and after its  
18 publication in the statute book.

or any contracting attorney under subsection (b)  
of section (4)

to the

for such attorney

less any contingent fee to an attorney contracting  
to perform services under subsection (b) of section  
(4)

**Actuarial Audit  
of the  
Kansas Public Employees Retirement System**

**Buck Consultants, Inc.**

*Attachment*

*2*

*House Appropriations*

*3-6-96*

## **Scope of Study**

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2-2

**Independent opinion of reasonableness and consistency of:**

- **Actuarial Assumptions**
- **Actuarial Methods**
- **Triennial Experience Analysis**
- **Actuarial Valuation Results (particularly 1993-1994)**

**And,**

- **Adequacy of Statutory Contributions**



## **Areas Covered**

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- **Membership Data**
- **Actuarial Assumptions**
- **Actuarial Methods**
- **Actuarial Valuation Results**
- **Findings and Recommendations**

2-3

## **Period of Change**

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**1993**

- **Significant changes in benefits for active and retired members, actuarial assumptions and methods**

**1994**

- **Additional COLA granted and asset valuation method changed**

**1995**

- **Additional changes in actuarial assumptions**

2-4

## **Actuarial Process**

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- **"Snapshot" of value of expected payments compared to accumulated assets and future funding sources**
  
- **Advance Funding**
  
- **Key elements of process:**
  - **Employee data**
  - **Benefits promised**
  - **Actuarial assumptions**
  - **Actuarial methods**
  - **Asset valuation**

2-5

## **Actuarial Process**

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- **Determinations:**
  - **Can obligations be met?**
  - **Is experience favorable or unfavorable?**
  - **Are funding policies met?**
  - **Trends**
  - **Projections**

2-6

**Data**

2-7

**KPERS (Local, State/School and TIAA)**

<b>Membership Count</b>						
<b>Members</b>	<b>December 31, 1992</b>			<b>December 31, 1993</b>		
	<b>Segal</b>	<b>Buck</b>	<b>Difference</b>	<b>M&amp;R</b>	<b>Buck</b>	<b>Difference</b>
<b>Actives</b>	<b>113,769</b>	<b>119,838</b>	<b>6,069</b>	<b>117,934</b>	<b>122,926</b>	<b>4,992</b>
<b>Inactives</b>	<b>13,808</b>	<b>10,650</b>	<b>(3,158)</b>	<b>12,049</b>	<b>13,279</b>	<b>1,230</b>
<b>Retirees</b>	<b>36,389</b>	<b>36,843</b>	<b>454</b>	<b>40,867</b>	<b>40,873</b>	<b>6</b>
<b>Beneficiaries</b>	<b>2,864</b>	<b>2,404</b>	<b>(460)</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>TOTAL</b>	<b>166,830</b>	<b>169,735</b>	<b>2,905</b>	<b>170,850</b>	<b>177,078</b>	<b>6,228</b>

\* Included in retiree number.

**Data**

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2-8

<b>Members</b>	<b>Membership Count</b>		
	<b>December 31, 1993</b>	<b>December 31, 1994</b>	<b>% Change</b>
<b>Actives</b>	<b>123,296</b>	<b>131,387</b>	<b>6.6%</b>
<b>Inactives</b>	<b>12,311</b>	<b>16,091</b>	<b>30.7%</b>
<b>Retirees &amp; Beneficiaries</b>	<b>43,165</b>	<b>44,285</b>	<b>2.6%</b>
<b>TOTAL</b>	<b>178,772</b>	<b>191,763</b>	<b>7.3%</b>

# Data

2-9

Data Element	Number of Unpopulated Fields		Data Changed
	December 31, 1992	December 31, 1993	
Most current annual compensation	3,949	0	n/a
Previous annual compensation	4,279	127	2,358
Date of membership	642	675	757
Date of birth	488	525	264
Service amounts	8	3	R
Contributions with interest	188	107	R
Sex code	492	523	215
R = Reasonable compared to last year.			

# Actuarial Assumptions

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2-10

## Economic

	<b>Greenwich Survey Average State Funds</b>	<b>KPERS</b>
<b>Investment Return</b>	<b>8.0%</b>	<b>8.0%</b>
<b>Salary Increases</b>	<b>5.6</b>	<b>5.5</b>
<b>"Spread"</b>	<b>2.4</b>	<b>2.5</b>



## **Actuarial Assumptions/Experience Analysis**

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11-2

### **Increase in Total Payroll for Amortizing Unfunded**

- **4% assumption based on inflation**
- **Very sensitive to declining work force**

### **Rates of Retirement**

- **No retirement rates for reduced retirement**
- **Average retirement age assumption is comparatively high**

## **Actuarial Assumptions/Experience Analysis**

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2-12

### **Withdrawal**

- Age at which benefits commence not studied
- Contribution refund pattern not studied

### **Mortality (Life Expectancy)**

- Experience was unfavorable
- No additional margin for school employees
- No separate mortality table for disabled employees

## **Actuarial Cost Method**

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- **Determines and allocates estimated cost to specific periods**
- **Projected Unit Credit Cost Method adopted in 1993**
- **PUC not as conservative as old method (Entry Age Cost Method with Frozen Initial Liability)**
- **Will produce increasing costs if group ages**

2-13

# Actuarial Cost Method

2-14

## Society of Actuaries 1995 Study

Actuarial Cost Method	Types of Employees Covered				
	General Employees	Police/Fire	Teachers/School	Total	Percent
Entry Age	59	44	28	131	72%
Aggregate	3	4	2	9	5%
Frozen Initial Liability	7	4	6	17	9%
Projected Unit Credit	9	3	6	18	10%
Pay-As-You-Go	2	1	1	4	2%
Other	3	0	0	3	2%
<b>Total</b>	<b>83</b>	<b>56</b>	<b>43</b>	<b>182</b>	<b>100%</b>

State of Wisconsin Study: 14% of Plans used PUC

## **Asset Valuation Method**

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- **Changed in 1994 to market value based**
- **3-Year smoothing is lower than average**
- **Initializing at market value inconsistent with smoothing**
- **No limits (boundaries)**

2-15

## Asset Valuation Method

2-16

### Society of Actuaries 1995 Study

Asset Valuation Method-Equities	Types of Employees Covered				
	General Employees	Police/Fire	Teachers/School	Total	Percent
Market Value	10	9	5	24	14%
Smoothed Value (3 years or less)	16	8	6	30	17%
Smoothed Value (more than 3 years)	38	30	21	89	50%
Book Value	16	6	10	32	18%
Other	1	1	0	2	1%
<b>Total</b>	<b>81</b>	<b>54</b>	<b>42</b>	<b>177</b>	<b>100%</b>

## Asset Valuation Method

2-17

### Society of Actuaries 1995 Study

Asset Valuation Method-Fixed Income	Types of Employees Covered				
	General Employees	Police/Fire	Teachers/School	Total	Percent
Market Value	6	6	2	14	8%
Smoothed Value (3 years or less)	13	6	5	24	13%
Smoothed Value (more than 3 years)	35	29	14	78	43%
Book Value	28	14	22	64	35%
Other	1	1	0	2	1%
<b>Total</b>	<b>83</b>	<b>56</b>	<b>43</b>	<b>182</b>	<b>100%</b>

## Actuarial Reports

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8-2

### Issues

- **Disclosure**
- **Reconciliation**
- **Reasonableness of Results**
- **Implications/Forecasts**



## Reasonableness of 1993 vs. 1994 Results

2-19

Changes in Unfunded Liability	Amount (millions)	
	M&R	Buck
Unfunded at June 30, 1993	\$ 968	\$ 968
• Increase due to amortization method and contribution/timing	*	26
Expected Unfunded at June 30, 1994	\$ 968	\$ 994
• Investment gain	(102)	(97)
• Asset method change	(134)	(159)
• 1994 COLA	75	75
• Methodology changes	228	228
• Data and salary adjustments	150	150
• Decrement and salary loss	320*	314
Actual Unfunded at June 30, 1994	\$ 1,505	\$ 1,505

\* Per M&R, increase due to amortization method and contribution/timing of \$55M was included in decrement and salary loss of \$320M.

## Conclusions

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- **Large Loss Not Reconciled**
- **Identified data and methodology issues part of explanation**
- **Parallel valuations required to determine why**

022  
2-20

## **Findings and Recommendations**

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- **Data**
- **Actuarial Assumptions/Methods**
- **Adequacy of Contributions/Funded Status**
- **1993 vs. 1994 Actuarial Valuations Results**
- **Actuarial Valuation Report Contents**

2-21

## Data

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2-22

**Finding: Quality Appears to be Improving**

### Recommendations:

- **Greater reconciliation efforts needed**
- **Inactive/Active member coding and data supplied should be improved**

## Actuarial Assumptions/Methods

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**Findings:** Reasonable and individually in-line with common practices

However, in combination little margins for conservatism. System is highly leveraged.

### Recommendations:

**Monitor and evaluate the following:**

- Retirement rates
- Postretirement mortality
- Membership payroll increases
- Average age of members
- Asset valuation boundaries

2-23

## Adequacy of Contributions/Funded Status

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h2-2

**Findings:**

- **Employer contributions are not currently adequate, and will increase due to delayed funding (5.2% of pay to 6.1% of pay)**

- **Unfunded obligations will double by 2015, if all assumptions are met**

- **Comparisons with average system**

**Funded Ratio (market value) 83% vs. 91%**

**Funding Period 38 years vs. 28 years**

**Asset Valuation 3 year smoothing vs. 5 year smoothing**

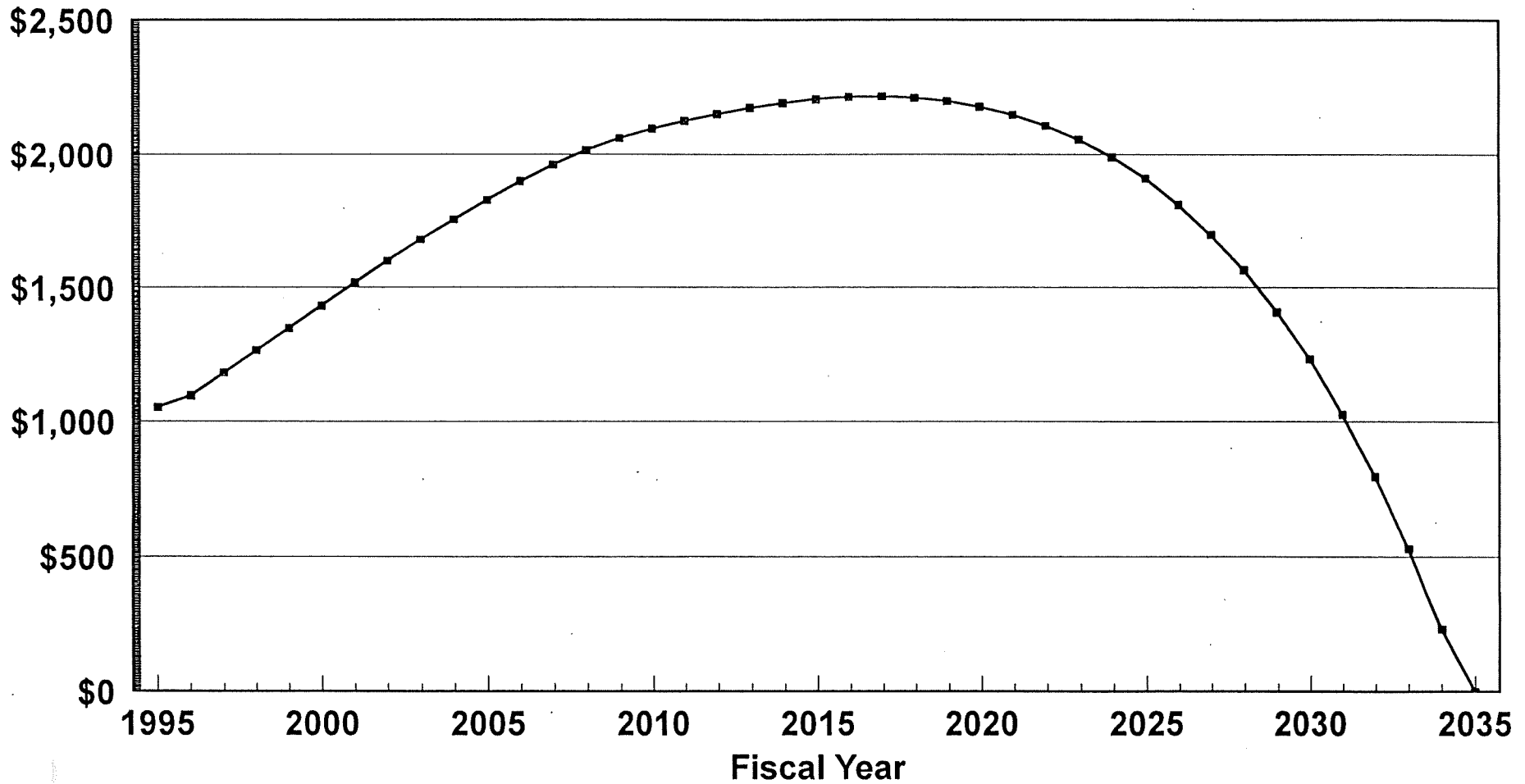
**Funding Method Projected Unit Credit vs. Entry Age  
Normal, Aggregate or Other**

2-25

**KPERS**  
**Projection of Unfunded Accrued Liability**  
**Increasing Employer Contribution Rate of .20% up to 6.07%**  
**State/School**

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Unfunded (BOY) - in Millions



## Recommendations

- **The long-term actuarially required contribution should be determined and disclosed annually**
- **Future benefit increases (including ad hoc ones) are not advisable until actuarially required contribution is met**
- **Long term open-group forecast advisable to:**
  - **determine sensitivity of system to both adverse and positive experience**
  - **refine the funding policies**
  - **understand likelihood long-term financial soundness**

2-26



## 1993 vs. 1994 Actuarial Valuation Results

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2-27

**Finding:**       **\$320M not reconciled**  
                  **\$335M explained**

### **Recommendations:**

- **Independent actuarial valuations for 1993 and 1994 required to explain differences**
- **Independent actuarial valuation of M&R results may be more productive (in combination with open-group forecast)**

## Actuarial Valuation Report Contents

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2-28

**Finding:** Latest (1995) report shows substantial improved disclosure and explanation

### **Recommendations:**

#### **Expand reports to include:**

- **More detail on the reasons for changes in the unfunded obligations and normal costs**
- **Disclosure of the long-term effect on employer contribution requirements due to current short fall**
- **A forecast of the unfunded obligations and the funded ratio (Assets at market and/or actuarial value compared to the system liabilities on a Pension Benefit Obligation basis)**
- **A history of key actuarial measures (e.g., actuarially required contribution compared to actuarial contributions, funded ratio, market value of assets compared to actuarial value, etc.)**
- **Required actuarial disclosure information and exhibits**

**Actuarial Audit Report  
of the  
Kansas Public Employees Retirement System**

**Prepared under Contract  
for the  
Kansas Legislative Coordinating Council  
and  
Presented to the Joint Committee on Pensions,  
Investments, and Benefits**

**Buck Consultants, Inc.  
1675 Broadway  
Denver, Colorado 80202**

**February 29, 1996**

*Attachment*  
*3*  
BUCK  
CONSULTANTS

*3-6-96*

*House Appropriations*

# KPERS Actuarial Audit Report

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## Section I. Introduction

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### Background

An actuarial review of the Kansas Public Employees Retirement System (KPERS) was authorized under Section 32 of Chapter 267 of the 1995 Session Laws of Kansas. Buck Consultants was selected by the Legislative Coordinating Council (LCC) of the Kansas Legislature to provide this independent review of recent KPERS actuarial valuations and experience analysis. As an independent reviewing actuary, we have been asked to express an opinion regarding the reasonableness and accuracy of the actuarial assumptions, actuarial cost methods, valuation results, statutory contribution rate, and triennial experience analysis. This report documents the results of our review.

KPERS is an umbrella organization whose mission is to effectively administer the pension programs for three statewide public employee pension groups. All three pension systems are defined benefit retirement plans where participating employers and employees share the cost of providing benefits. The three pension systems are:

- Kansas Public Employees Retirement System (KPERS)- covering State and School employees, Local employees, and TIAA members.
- Kansas Police and Firemen's Retirement System.
- Kansas Retirement System for Judges.

The current actuary for KPERS is Milliman & Robertson. They were selected as actuary in 1994, replacing The Segal Company. They have completed their annual actuarial valuation for the fiscal years ending in 1994 and 1995, and an analysis of plan experience during the three year period ending December 31, 1994. Buck requested and received copies of the actuarial reports prepared by The Segal Company and Milliman & Robertson covering the five year period from 1991 through 1995, as well as the reports on plan experience for the three year period ending December 31, 1991 and December 31, 1994.

Many changes have occurred during this five year period. The most significant changes can be summarized as follows:

- Revisions were made to the actuarial assumptions in 1993 reflecting the results of the triennial experience analysis for the period ending December 31, 1991, including lower withdrawal rates and a change in the retirement age assumption.
- Significant benefit increases were granted during the 1993 Legislative session, including a very substantial cost-of-living increase to benefits of retired members.
- The actuarial cost method used for KPERS was changed in 1993 from the Frozen Initial Liability Method to the Projected Unit Credit Method.
- The period for amortizing unfunded liabilities was increased to 40 years beginning July 1, 1993.
- Another cost of living increase was granted to benefits paid to retired members in 1994.
- The asset valuation method used to determine unfunded liabilities was changed in 1994 from book value to a three year smoothing of market value.
- Revisions were made to the actuarial assumptions in 1995 reflecting the results of the triennial experience analysis for the period ending December 31, 1994, including changes to the salary scale, withdrawal rates, and disability rates.
- The 1994 actuarial valuation performed by Milliman & Robertson resulted in significant data, methodology, and procedural changes and a significant and unexplained increase in the actuarial contribution rate.

This report is intended to document our independent analysis of the work performed and the conclusion reached during the period under review, and provide the LCC with recommendations and conclusions regarding the future funding requirements of KPERS.

### **Actuarial Process**

The KPERS actuary prepares an annual actuarial valuation to determine the funded status of the system at the valuation date and the employer contributions which are necessary, along with investment return and employee contributions, to fund the promised pension payments. The valuation is a "snapshot" in time which measures the current value of expected future pension payments and balances this "liability" with the value of current assets and future funding needs. The funding methodology involves advance funding, or prefunding, so that assets are accumulated to pay for future benefits for current employees. The reasons for this advance funding include:

- Increasing the security of promised (and legislated) benefits by accumulating assets in an orderly manner.

- Providing for the equitable treatment of different generations of tax payers by assigning reasonable retirement system costs to each year.
- Providing a method that appropriately recognizes costs over the working lifetime of both current and prospective members of KPERS. The infusion of new members replacing members who terminate, retire, and die makes funding a dynamic process.

Each year's valuation involves the determination of the liabilities for benefits promised to KPERS members, the calculation of the amount of assets currently available in the trust fund to pay for those benefits, and the determination of the recommended employer contributions for budgeting purposes. Membership demographic data is merged with a pension model incorporating the KPERS benefit structure and anticipated future experience. Typically, a funding policy is established by the governing body with the goal of achieving reasonably level contributions and attaining an asset accumulation which provides adequate benefit security. The key elements of the valuation process which implement the funding policy are as follows:

- Membership data - demographic information is collected as of the valuation date and expected future pension payments are determined for each member of the system.
- Benefit levels - structure of promised benefits defined under state statute which are payable upon retirement, withdrawal, disability, or death.
- Actuarial assumptions - these represent the actuary's best guess of future experience under KPERS and form the basis for estimating future benefits and determining plan liabilities.
- Asset valuation method - the methodology used to assign a value to the current assets on hand; the value can be market value, book, or some averaged value. The primary purpose of an asset valuation method is to smooth out volatile market value fluctuations so that the goal of level contributions is supported.
- Funding method - the procedure used to allocate the costs of the promised benefits, to specific years. Various methods aim to smooth costs or benefits, or fund for benefits as they accrue.

The ultimate cost of a pension program over time equals the benefits paid and expenses incurred while administering the program. The source of revenue used to pay for this cost is equal to the contribution from employers and employees to fund the program, plus investment return earned on contributions made through pre-funding the benefit payments.

## Section II. Review of Membership Data

As part of Buck's actuarial review of the Kansas Public Employees Retirement System, a thorough data analysis was performed on the member information used for the actuarial valuations completed as of June 30, 1993 and June 30, 1994. KPERS supplied Buck with the same active, inactive, pensioner and beneficiary data that was used for the June 30, 1993 actuarial valuation and the June 30, 1994 actuarial valuation by The Segal Company and Milliman & Robertson (M&R), respectively.

Our objectives in this process were to:

- Reconcile, by category, the numbers of people included in the information we received from KPERS -- to the number of members included in the 1993 and 1994 valuations
- Compare 1993 valuation data to previous data noting any major differences
- Check for completeness of data
- Check for necessary data elements

This type of analysis may help explain the reasons for different actuarial valuation results between 1993 and 1994. The results of our analysis follows.

### Reconciliation of Number of Members by Category

Data collected for the June 30, 1993 valuation was based on a census date of December 31, 1992, and December 31, 1993 for the June 30, 1994 valuation. The reconciliation of membership data was done by category within each system. Tabulated results are shown below followed by a discussion of our findings:

#### KPERS (Local, State/School and TIAA)

Members	Membership Count					
	December 31, 1992			December 31, 1993		
	Segal	Buck	Difference	M&R	Buck	Difference
Actives	113,769	119,838	6,069	117,934	122,926	4,992
Inactives	13,808	10,650	(3,158)	12,049	13,279	1,230
Retirees	36,389	36,843	454	40,867	40,873	6
Beneficiaries	2,864	2,404	(460)	*	*	*
<b>TOTAL</b>	<b>166,830</b>	<b>169,735</b>	<b>2,905</b>	<b>170,850</b>	<b>177,078</b>	<b>6,228</b>

\* Included in retiree number.



**Kansas Police & Firemen's Retirement System**

Members	Membership Count					
	December 31, 1992			December 31, 1993		
	Segal	Buck	Difference	M&R	Buck	Difference
Actives	5,353	5,334	(19)	5,138	5,321	183
Inactives	8	140	132	250	220	(30)
Retirees	1,458	1,416	(42)	2,193	2,178	(15)
Beneficiaries	486	586	100	*	*	*
<b>TOTAL</b>	<b>7,305</b>	<b>7,476</b>	<b>171</b>	<b>7,581</b>	<b>7,719</b>	<b>138</b>

\* Included in retiree number.

**Kansas Retirement System for Judges**

Members	Membership Count					
	December 31, 1992			December 31, 1993		
	Segal	Buck	Difference	M&R	Buck	Difference
Actives	153	163	10	224	229	5
Inactives	7	7	0	12	11	(1)
Retirees	61	70	9	105	109	4
Beneficiaries	27	28	1	*	*	*
<b>TOTAL</b>	<b>248</b>	<b>268</b>	<b>20</b>	<b>341</b>	<b>349</b>	<b>8</b>

\* Included in retiree number.

**Total of Retirement Systems**

Members	Membership Count					
	December 31, 1992			December 31, 1993		
	Segal	Buck	Difference	M&R	Buck	Difference
Actives	119,275	125,335	6,060	123,296	128,476	5,180
Inactives	13,823	10,797	(3,026)	12,311	13,510	1,199
Retirees	37,908	38,329	421	43,165	43,160	(5)
Beneficiaries	3,377	3,018	(359)	*	*	*
<b>TOTAL</b>	<b>174,383</b>	<b>177,479</b>	<b>3,096</b>	<b>178,772</b>	<b>185,146</b>	<b>6,374</b>

\* Included in retiree number.

**Active Members:** Our findings indicate the final active number counts were considerably higher than both Segal and M&R for the 1993 and the 1994 valuations. According to correspondence between Segal and KPERS, it appears that Segal assumed inactive status for all those missing current compensation. This could account for a portion of the differences between Buck's and Segal's active data counts. In addition, Segal may have utilized data from prior valuations to match employees with an uncertain status. As part of our review, we also matched data between the 1993 and 1994 census dates. Results of this matching will be discussed later on in this section of the report.

**Inactive Members:** Active and inactive records are supplied on the same magnetic tape for a particular year's valuation. It is up to the actuary to separate the two categories. Buck's inactive counts were lower than Segal's for the 1993 valuation, which partially explains why Buck's active counts were so much higher. Buck used the same procedures to attain counts for the inactives for both the 1993 and 1994 valuation data. Segal's complete process is unknown, except for the information given in the previous paragraph; however, we understand that Buck was given the same criteria to follow as M&R for developing inactive counts. Buck's inactive counts were much closer to the 1994 valuation inactive counts but still approximately 10% higher.

**Retired Members and Beneficiaries:** M&R did not show numbers of retirees and beneficiaries separately in the 1994 actuarial report. However, in total, the number counts are within five people as shown in the tables on the previous page.

Our reconciliation indicates a difference in total membership at December 31, 1993 of about 3.6% more members than were included by M&R in the 1994 valuation report. Almost all of this difference was in active and inactive member counts. In discussing this difference with M&R, it was found that the information they had received from KPERS reflected terminations between December 31, 1993 and the time the magnetic tape was created (March, 1994). The members who terminated in early 1994 were treated as inactive or excluded, depending on whether they were eligible for future benefits. Given that the census date is December 31, 1993, they should have been considered as active members. This problem was discovered by M&R after the 1994 report was issued and was corrected for the 1995 report. This explains the unusually high increase in the active and inactive members considered in the 1995 valuation by M&R as follows:

Members	Membership Count		
	December 31, 1993	December 31, 1994	% Change
Actives	123,296	131,387	6.6%
Inactives	12,311	16,091	30.7%
Retirees & Beneficiaries	43,165	44,285	2.6%
<b>TOTAL</b>	<b>178,772</b>	<b>191,763</b>	<b>7.3%</b>

#### Comparison of 1993 and 1994 Membership Data

We chose to compare the 1993 and 1994 membership data due to the considerable differences, many of which were data related, between the 1993 valuation prepared by The Segal Company and the 1994 valuation prepared by Milliman & Robertson.

We found the integrity of the 1994 valuation data to be considerably better than that of the 1993 valuation data. The tables on page 8 show the number of records (considering all systems) whose data changed from the 1993 to 1994 valuation. The active and inactive data reveal many records changing information from 1993 to 1994 while the retiree and beneficiary data proved considerably more consistent from one year to the next. Of course, this is to be expected since they are in receipt of their benefits and information should be more stable for these groups.

In the tables below, an "R" was coded for types of fields where the changes which took place appear reasonable. In most cases where changes took place, the differences represented the change from unpopulated to populated. For the 1993 valuation data, Segal would have had to request a lot of additional information to complete the unpopulated fields. Buck is unsure if any additional data was requested of KPERS on missing data items or if assumptions were made in order to complete the unpopulated fields. As discussed previously, this appears to have happened to the active/inactive data where Segal assumed inactive status for all records with current compensation was missing.

**Completeness of Data**

**Active Members:** The 1993 valuation data appeared to be missing important data information. In comparison, the 1994 valuation data seemed much more complete with fewer data items unpopulated. Many records on the 1993 valuation data were missing compensation. The treatment of these members as inactive and the assumed level of compensation could significantly impact the liabilities between 1993 and 1994. The following table considering all systems gives a breakdown of unpopulated fields.

Data Element	Number of Unpopulated Fields		Data Changed
	December 31, 1992	December 31, 1993	
Most current annual compensation	3,949	0	n/a
Previous annual compensation	4,279	127	2,358
Date of membership	642	675	757
Date of birth	488	525	264
Service amounts	8	3	R
Contributions with interest	188	107	R
Sex code	492	523	215

R = Reasonable compared to last year.

**Inactive Members:** There is no information in either report on how deferred vested benefit amounts are calculated for this group. In order to determine the liability for future benefits payable to vested inactive members, the actuary must determine the benefit amount from the service and compensation history given since no benefit information is included in the data. Buck has analyzed the data for the inactive members by looking at the field "Last Reported Annual Compensation". These and other data elements for all systems are listed below with the number of unpopulated records in the corresponding year's column as was done for the active category.

Data Element	Number of Unpopulated Fields		Data Changed
	December 31, 1992	December 31, 1993	
Last reported annual compensation	2,693	7	6,921
Date of membership	222	187	0
Date of birth	72	101	0
Service amounts	9	0	43
Contributions with interest	187	22	0
Sex code	71	101	0

**Retired Members and Beneficiaries:** With the exception of monthly benefit amounts for both retirees and beneficiaries, there were quite a few missing data elements on the 1993 and 1994 valuation data. As noted in the following section, the 1993 COLA amounts calculated by KPERS were incorporated into the monthly benefit amounts on the 1994 valuation data. On the following table, an asterisk (\*) indicates items that were tallied only when applicable for the retiree records. For example, if a retiree's record indicated by option code that joint annuitant information should be present, the unpopulated joint annuitant data fields were tallied. The following table considers all systems.

Data Elements	Number of Unpopulated Fields				Data Changed	
	December 31, 1992		December 31, 1993		Retirees	Benefic.
	Retirees	Benefic.	Retirees	Benefic.		
Date of birth	0	n/a	0	n/a	1	n/a
Service amounts	236	397	10	23	R	R
Contributions with interest	844	407	865	453	R	R
Sex code	1	n/a	5	n/a	0	n/a
Date of retirement	0	6	1	2	5	3
Retirement type	1,415	69	1,247	66	2	0
Retirement option	331	25	288	26	0	0
Monthly benefit amount	0	n/a	0	n/a	R	n/a
Joint annuitant date of birth	572*	72	532*	82	1	1
Joint annuitant sex code	618*	38	579*	44	1	0
Joint annuitant monthly benefit	440*	0	399*	0	R	R

### Necessary Data Elements

All necessary data elements were present on the data tapes in order to calculate liabilities for active, inactive, and retired members and beneficiaries with the exception of unpopulated fields described in the preceding section.

For the audit process, Buck received the entire retiree and beneficiary data file as kept by KPERS. M&R, however, requested only the specific data items necessary for valuation purposes. It was discovered, through discussions with KPERS' data processing department, that a data field titled "Municipal Systems Contributions" had not been requested by M&R for the 1994 or 1995 valuations. This field is necessary to correctly calculate liabilities for refunds (when retired members die but have not yet received benefits equal to the total value of their paid contributions). This data item totaled \$5.1M for all systems on the 1994 valuation data. The lack of this information would not have a substantial impact on liabilities, it should be supplied to M&R in the future.

The December 31, 1992 data used for the June 30, 1993 valuation did not have the 1993 COLA incorporated into the monthly benefit amounts. The COLA was effective in June of 1993, meaning Segal calculated or estimated the COLA amounts before calculating liabilities. Since the 1993 COLA was based on service, the calculation required substantial data integrity. M&R received data as of December 31, 1993, which would have included the calculated 1993 COLA amounts in the monthly benefits. Service amount fields on the 1994 (December 31, 1993 data) valuation data were more populated than the 1993 (December 31, 1992 data) valuation data. (See tables above.) The service amounts on the retiree data for retirees and beneficiaries who were present on both the 1993 and 1994 valuations appeared consistent and averaged to the same amount of service.

We can conclude from our analysis that although the integrity of the data supplied to the actuary has improved, efforts to improve data quality should continue. This should include a validation of membership counts and completion of unpopulated fields through discussions between the actuary and KPERS before final actuarial calculations are performed. This includes identifying and verifying all necessary data elements.

A source of particular concern is the information maintained for inactive members. We recommend KPERS improve the information maintained for inactive members. Buck suggests using codes to identify inactive members who have or have not received refunds, and vested members who have elected to leave their contributions with KPERS therefore remaining eligible for a deferred pension. Ideally, the amount of the future benefit and the commencement date would be passed to the actuary. At a minimum, up to date information regarding salary history and service should be included to facilitate an accurate calculation of future benefits.

## Section III. Actuarial Assumptions

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### Background on Actuarial Assumptions

The actuarial assumptions form the basis of any actuarial valuation or cost study. Since it is not possible to know in advance how each member's career will evolve in terms of salary growth, future service and cause of termination, the actuary must develop assumptions designed to predict future patterns. These assumptions enable the actuary to value the amount of benefits earned and to reasonably predict when these benefits will be paid. Similarly, the actuary must make an assumption about future investment earnings of the trust fund. In developing the assumptions, the actuary examines the past experience and considers future expectations to make his or her best estimate of the anticipated experience under the plan.

Traditionally actuarial assumptions have been considered either "explicit" or "implicit". Under the explicit approach each individual assumption represents the actuary's best estimate of experience with respect to that assumption. Under the implicit approach the assumptions in the aggregate represent the actuary's best estimate of future experience, but each individual assumption does not necessarily represent the actuary's best estimate. In the past, the implicit approach to assumptions was often used and was acceptable under ERISA and the Internal Revenue Code. However, since 1988, the minimum funding standards under those two laws were changed to, in effect, require the explicit approach to selecting assumptions. Although KPERS is not subject to the ERISA minimum funding rules, standard actuarial practice today tends to be based on the explicit approach to selecting assumptions. The KPERS actuaries have been following the explicit approach.

There are two general types of actuarial assumptions:

- - Economic assumptions - these include the valuation interest rate (expected return on plan assets), assumed rates of salary increase, inflation, cost-of-living increases (if applicable), and increase in total payroll.
- - Demographic assumptions - these include the assumed rates of mortality (both before and after retirement), disability, retirement, and withdrawal before and after eligibility for a vested benefit.

For purposes of our review, we will focus on the KPERS assumptions and their reasonableness considering the last triennial experience analysis performed for the period ending December 31, 1994.

**Economic Assumptions**

The key economic assumptions are the valuation interest rate (expected return on plan assets and forms the basis for discounting future benefit payments), the salary scale (or assumed rates of salary increase), the increase in total payroll (since unfunded liabilities are amortized over an increasing payroll), and inflation. Since inflation impacts both salary increases and asset return, it is important to equally reflect the underlying inflation rate in both the valuation interest rate and salary scale assumptions.

**Valuation Interest Rate:** The valuation interest rate should represent the long-term rate of return expected on the actuarial value of assets, considering the real rate of return on the plan's assets, the underlying inflation rate, expenses, and future contributions. The period considered for funding represents a long time horizon. In reviewing this assumption, the KPERS actuary relied upon a three-year history of returns and discussions with the KPERS investment consultants. They concluded an 8% assumption was appropriate in conjunction with other economic assumptions.

We would suggest a more rigorous approach to choosing or validating the valuation rate. A long-term asset return assumption should consider the fund's asset allocation policy, expected long-term real rates of return unique to each asset class, and the underlying inflation rate. Given the KPERS investment policy and target asset allocation, the development of the valuation interest rate can be summarized as follows:

Investment Category	Expected Real Rate of Return	Target Asset Allocation	Expected Rate of Return
Cash	.5%	5%	.025%
Fixed Income			
• Domestic	3%	25.7%	.771
• - International	3.5%	10.9%	.382
Equities			
• - Domestic	6%	28.4%	1.704
• - International	7%	15%	1.050
Real Estate	5%	10%	.500
Alternative Investments	8%	5%	.400
Expected Real Return			4.832%
Inflation			4.000
Nominal Return			8.832%
Expenses			(.400)
Total Expected Return, Net of Expenses			8.432%



Given this analysis, it is our opinion that the current 8% valuation interest rate is reasonable, and in fact offers a slight degree of conservatism.

**Inflation:** Recent inflation rates have been lower than historical averages. The inflation rate under the CPI-U index over the ten-year period ending December 31, 1994 was as follows:

Year	CPI-U Index
1985	3.6%
1986	1.9
1987	3.6
1988	4.1
1989	4.8
1990	5.4
1991	4.2
1992	3.0
1993	3.0
1994	2.6
Average Rate:	
Last 5 years	3.6%
Last 10 years	3.6%

In our opinion, a long-term inflation rate of 4% is reasonable.

**Salary Scale:** The salary scale, or assumed annual rates of salary increase, is the other key economic assumption. An analysis of the appropriateness of the salary scale needs to consider two points. First, how do the rate of actual salary increases compare with those expected according to the actuarial assumptions. Second, are the two economic assumptions (interest rate and salary scale) internally consistent with regard to the underlying inflation assumption.

The salary scale used for KPERS consists of two components. The first component is the rate of inflation, which is 4%. This is the same inflation assumption as is inherent in the development of the valuation rate, so the two economic assumptions are internally consistent. The other component of the salary scale varies by age and measures a combination of productivity and merit (the latter including both individual merit increases and promotions). The productivity and merit component averages 1.5% for a KPERS member from age 30 to age 60. The total overall salary scale is thus 5.5% for a career employee.

The most recent experience study showed that actual salary increases were higher at earlier ages and lower at higher ages. New salary scales were created to match the patterns in the more recent experience by age. Given the current economic climate, it would not be surprising if current salary increases are lower than those expected by the salary scale assumption. However, this assumption is a long-term assumption and past history has shown that years of little or no increase in salaries are followed by years of greater than expected increases to make up for the lean years. Note, however, that recent experience with the private sector seems to indicate a real decrease in salary increases may be occurring. Therefore, while we agree that the current assumptions are reasonable, we feel they should be monitored closely.

As noted above, the salary scales, like the demographic assumptions, exhibit age-related characteristics. Another approach for setting this assumption would be to consider a service-related salary scale since many contractual salary increases are a function of length of service in a position. The KPERS actuary did not examine salary by service. For future experience studies, we recommend salary increases be examined by service as well as age.

Another consideration in examining the package of economic assumptions is to look at the spread between the valuation interest rate and the salary scale. The valuation interest rate is 8% and the salary scale averages 5.5%. The differential or spread is therefore 2.5%. This spread is within the normal range and shows there is a reasonable relationship between the interest rate and salary scale assumptions.

For comparison purposes, we have also compared KPERS' economic assumptions to those in the most recent Buck survey of economic pension actuarial assumptions, prepared in January, 1996. The average valuation interest rate in that survey was 8.08%, with 32% of the plans surveyed using a rate of 8%, more than any other interest rate. The salary scale assumptions were surveyed based on analysis of the equivalent salary increase rate from age 40 to normal retirement age. The average salary increase rate on that basis was 5.22%; a comparable analysis for KPERS would produce an equivalent salary increase rate of about 5%. We thus see that both economic assumptions for KPERS are similar to the average in the latest Buck survey. The average spread between interest rate and salary scale based on the survey was 2.86%, compared to KPERS' spread of 3.0% on a comparable basis.

Greenwich Associates annual survey of public and private retirement plan practices also confirmed that KPERS practices in this area are in line with common practices.

	Greenwich Survey Average State Funds	KPERS
Investment Return	8.0%	8.0%
Salary Increases	5.6	5.5
"Spread"	2.4	2.5

The Wilshire report on state retirement system funding practices and the State of Wisconsin study also confirmed that the average investment return assumption for state and major public pension systems was 8.1%. In both these surveys, salary increase assumptions surveyed included inflation only or estimated salary increases from entry age.

***Increase in Total Payroll:*** As part of determining the actuarial contribution rate, the unfunded accrued liability is amortized over a 40-year period from July 1, 1993 as a level percent of pay. Since pay is expected to increase, an assumption is made for the rate at which total payroll increases. The amortization payment will remain level as a percentage of total payroll provided:

- the active membership group remains at a constant or stationary level, and
- the underlying long-term inflation rate of 4% is realized.

This procedure for amortizing unfunded accrued liabilities is common for large public plans. However, this methodology increases the risk of future funding shortfalls since adequate funding is dependent on a stationary or growing active membership group. If active membership decreases, contributions will need to be increased in order to meet the amortization period.

Although we believe a 4% increase assumption in total payroll is reasonable based on past experience and the underlying inflation rate, it does not consider expected future reductions in the State workforce. Recent legislation does not allow replacement of one-quarter of State employees who retire. Given this, it will be difficult for KPERS to maintain the stationary active group necessary to avoid increases in future employer contributions under the current funding policy.

It should be noted that a recent Wilshire survey of public retirement systems found the average remaining amortization period to be 28 years. This compares with the current remaining amortization period for KPERS of 38 years, ten years longer than the average. The survey also indicated that 33% of the systems surveyed had amortization periods over 30 years.

### **Demographic Assumptions**

The demographic assumptions are the assumed rates of retirement, withdrawal (with and without a vested benefit), disability and mortality (death before and after retirement). These decrements define the member status changes which effect the payment of benefits. Since KPERS is a large retirement system, the demographic assumptions are based on the system's own experience. To this end, the KPERS actuary prepares periodic experience studies to review the current actuarial assumptions and revises them as necessary.

The demographic assumptions were last revised effective as of June 30, 1995, based on an experience study which covered the period from January 1, 1992 through December 31, 1994. Our study of the current assumptions involved a review of the three-year experience study of KPERS and the reasonableness of the recommendations given the historical experience. We examined these experience studies as well as the outline of procedures used to produce the results. We found most of the assumptions to be appropriate and to explicitly reflect the actuary's best estimate of future experience under KPERS. However, we have specific concerns regarding the retirement rate assumption. We generally agree with the methodology and approach used to analyze experience, but believe the analysis should have compared the results with the previous 3-year study of the period January 1, 1989 to December 31, 1991, and should have shown comparisons of the proposed assumptions with survey information of other public systems. Specific comments on the assumptions follow.

**Rates of Retirement:** These rates form the basis of determining the expected future benefits paid upon early, normal, or late retirement. Unreduced benefits are available under KPERS at age 65, age 62 with at least ten years of service, or after any age if age plus years of service equals or exceeds 85. Reduced benefits are available before eligibility for unreduced benefits, provided the member has attained age 55 and has at least ten years of service. It is our experience that more employees take advantage of unreduced benefits, and therefore, the incidence of retirement after attaining eligibility for unreduced benefits is higher than for reduced benefits. Also, some members will not wait for unreduced benefits and will take advantage of a reduced benefit, particularly if the benefits are subsidized as are KPERS.

Significant retirement benefit enhancements passed during the 1993 legislative session undoubtedly caused distortions in retirement experience during the examination period. As a result, the KPERS actuary recommended no change be made to retirement rates until more reliable data could be examined.

We are in agreement with the use of the retirement rates for predicting the utilization of early retirement options for unreduced benefits under the Rule of 85.

In our opinion, given the changing retirement benefit structure, the KPERS actuary (either Segal in 1993 or M&R in 1995) should have recommended changes in the retirement assumptions for reduced benefits considering the "best guess" of expected experience. This would include a review of the retirement assumptions used by other public systems with similar benefit structures and realistic future expectations. We believe retirement rates beginning at first eligibility for reduced benefits is more appropriate than an average retirement age for valuing the effect of early retirement subsidies. We also expect that some members will choose to work beyond normal retirement age, resulting in the application of retirement rates during a late retirement period.

Note that the Greenwich Associates survey indicated an average retirement age assumption of age 60.4 for State plans compared to over age 63 under KPERS.

***Rates of Withdrawal (Before and After Eligibility for Vested Benefits):*** A member who terminates employment with at least ten years of service may choose to receive a refund of contributions with interest or a deferred vested pension. Members terminating with less than ten years of service receive a refund of member contributions with interest. For calculating withdrawal liability after ten years of service, the valuation assumes members will elect either the refund or the deferred vested pension, whichever has the greater value at termination.

The analysis of withdrawal experience indicated a close correlation between actual and expected withdrawals for male members and recommended no change. The analysis for female members indicated a lower withdrawal experience than assumed and recommended lowering the female withdrawal to match male members. In our opinion, the proposed rates of withdrawal are reasonable.

The withdrawal liability is also dependent on the age at which vested terminated members elect to begin receiving pension payments. This can occur at age 62 without reduction, or as early as age 55 reduced for early retirement. The experience analysis did not study incidence of electing deferred vested pensions before normal retirement age. We recommend this be considered during the next analysis.

Also, the practice of valuing the greater of the deferred vested pension or refund value is conservative. We suspect many terminating members, especially younger members, are not aware of the relative differences in value and therefore elect the contribution refund. We recommend this be studied and assumptions developed which better match the election pattern.

**Rates of Disability:** Disability income benefits are provided under the KPERS Death & Disability Benefits program to members who have been totally disabled for 180 continuous days. These members continue to receive disability benefits provided the member is under age 65 when first disabled. A disabled member can then retire at age 65 or after five years of disability, if later, but not after age 70, and receive a retirement benefit. Service is granted during the period of disability for determining the retirement benefit.

The experience analysis studied the incidence of members becoming disabled during the triennial period and recommended an increase to the disability rates. In our opinion, the recommended change in the disability rate assumption is reasonable.

**Rates of Mortality:** The most important decremental assumption is mortality because this assumption is a predictor of when pension payments stop. The mortality assumption applies to members both before and after retirement. Most often, gender distinct rates are used for non-disabled members since studies continually show that females live longer than males, although that gap has been shrinking according to recent mortality studies.

The KPERS valuations use separate mortality assumptions for School members than State and Local members. The 1983 Group Annuity Mortality (GAM) Table is used for both groups, although a margin is used for School members resulting in a longer life expectancy (90% of the 1983 GAM rate). Also, additional death benefits are payable for a service-connected accidental death. In order to value this benefit, a separate assumption is made for these service related deaths. A 5% portion of all active deaths are assumed to be service related. Although this assumption was not included in the analysis, we believe it is reasonable.

The analysis separated the experience for males and females, school and non-school, and active and retired member groups. Although graphical illustrations of the results were made, a better indicator of determining how well experience matched the assumption is comparing actual with expected deaths. The results indicated that overall, there were fewer deaths during the triennial period than assumed. The only exception was for active members of the non-school group where actual deaths were higher.

In our opinion, the experience indicates an increase to the margin for School members should have been considered (i.e., improved mortality or longer life expectancies) . Continuing the current mortality rates for non-school members is reasonable. Given recent mortality studies, we expect improvements in mortality to continue. We recommend the mortality experience be monitored closely and the mortality assumption be improved when warranted using updated mortality tables.

With a separate valuation of disability benefits, an assumption is made for the mortality of a disabled member which is different than for non-disabled members. This is reasonable since totally disabled members are expected to have a shorter life expectancy. The mortality for disabled members is assumed to be the same as a member age 65. There is very little experience available to determine the validity of this assumption. However, the analysis indicates there were more deaths of disabled members than were expected. In our opinion, a separate disabled life mortality table should be considered. The current assumption does not provide enough of a mortality load for members becoming disabled close to retirement age when the incidence of disability is highest.

## Section IV. Actuarial Methods

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### Actuarial Cost Methods

As discussed earlier, the ultimate cost of any retirement program is equal to the benefits paid plus the administrative costs of operating the plan. This cost is provided from contributions made to the plan plus the investment return on accumulated contributions which are not immediately needed to pay benefits or administrative costs. The level and timing of the contributions needed to fund the ultimate cost are determined by the actuarial assumptions, plan provisions, member characteristics, investment experience, and the actuarial cost method. Actuarial cost methods are calculation processes which determine and allocate the cost of a retirement plan to specific periods of time. As such, it has an influence on the level and timing of the ultimate contributions.

Different actuarial cost methods can provide for faster funding earlier in a plan's existence, more level funding over time, or more flexibility in funding. The choice of an actuarial cost method will determine the pattern or pace of the funding and therefore should be linked to long term financing objectives of the fund and benefit security considerations.

The desired pattern of funding which is influenced by the actuarial cost method will depend on the importance of the following factors to the financing of the plan:

- - Budgetary limitations
- - Stability of contribution rate
- Flexibility of funding
- Pace of funding
- Benefit security
- - Intergenerational equity

These factors and their relative importance to maintaining the actuarial integrity of the plan are significant elements to be considered when selecting an actuarial cost method.

Changes in participant characteristics, plan experience, and investment return over time can lead to a funded status which is either more or less favorable than expected under the actuarial method used. This difference, applied differently by each cost method, adjusts the level of funding required in any one year. This adjustment can distort the true cost of benefits accruing under the plan.



The cost of accruing benefits under most methods is referred to as the normal cost. This cost is expressed as a percentage of pay when benefits and contributions are based on compensation. The pattern of this cost varies by cost method. This cost can be expressed as a level percentage of pay over a Member's full career, or can be expressed as the value of benefits accruing during the current year as a percentage of pay. The later approach leads to an increasing normal cost pattern throughout a member's career since the initial value of accruing benefits is small and increases as a member reaches retirement age.

At any point in time (i.e., valuation date), the actuarial cost method may determine the accrued liability of benefits which, under the cost method, should be funded by past contributions and investment return. An unfunded actuarial liability will exist if the accrued liabilities exceed the value of assets on hand on the valuation date. Although actuarial cost methods may differ in how this unfunded liability is treated, an additional cost results since future funding of this amount is not considered in the cost of accruing benefits (normal cost). This additional cost may be determined by amortizing the unfunded obligation over a period of years and adding it to the normal cost to arrive at the total cost, or it may be expressed as a percentage of future salaries and included in the normal cost determination.

The actuarial cost methods used by the KPERS pension groups are as follows:

- ***Kansas Public Employees Retirement System (KPERS)*** - Projected Unit Credit Cost Method replaced the Entry Age Cost Method with Frozen Initial Liability (FIL) in 1993. This cost method determines the normal cost as the value of benefits accruing during the year with salary projection, and determines an additional cost by amortizing the unfunded actuarial liability over a 40-year period as a percentage of increasing payroll. Actuarial gains and losses adjust the unfunded liability each year.
- ***Kansas Police & Firemen's Retirement System*** - The Aggregate Actuarial Cost Method with Supplemental Liability is used. This cost method projects the value of benefits using future service and salary increase assumptions and determines a normal cost as a percentage of salary to pay the projected benefit value not funded to date. The Supplemental Liability is amortized over a 40-year period as a percentage of increasing payroll and is added to the cost. Actuarial gains and losses adjust the normal cost each year.

- ***Kansas Retirement System for Judges*** - The Entry Age Cost Method with Frozen Initial Liability is used. This method is similar to the method used for Police & Fire except the unfunded actuarial liability is frozen and is only adjusted for changes in plan provisions and actuarial assumptions. The frozen unfunded liability is amortized over a 40-year period as a percentage of increasing payroll. Actuarial gains and losses adjust the normal cost each year.

All of the actuarial cost methods employed by the KPERS actuary will systematically fund the prospective pension benefits on an actuarially sound basis given all of the actuarial assumptions are realized. We have reviewed the application of the cost methods and the amortization methodology, and in our opinion, the procedures employed are reasonable. However, we should point out that the Projected Unit Credit Cost Method is not as conservative as the FIL Method it replaced.

Under the Projected Unit Credit Cost method, the normal cost represents the value of benefits accruing during the current year assuming projected salary to retirement. The normal cost, represented as a percentage of pay, can be expected to increase for an individual member as that member ages and reaches retirement age. The total normal cost of KPERS can remain level as a percentage of pay if:

- all the actuarial assumptions are realized, and
- the average age of the active membership does not increase.

The total normal cost of KPERS as a percentage of pay can be expected to increase if the average age of the membership increases. Although recent experience suggests a relatively level average age, only time will tell if the average age and, consequently, the total normal cost rate remains level.

It is also important to note that to date, few public retirement systems have adopted the Projected Unit Credit Cost Method. A recent study of Public Employee Retirement Systems commissioned by the Society of Actuaries was published in 1995. Of the 182 public plans surveyed, the number of plans using the various actuarial cost methods were as follows:

Actuarial Cost Method	Types of Employees Covered				
	General Employees	Police/Fire	Teachers/School	Total	Percent
Entry Age	59	44	28	131	72%
Aggregate	3	4	2	9	5%
Frozen Initial Liability	7	4	6	17	9%
Projected Unit Credit	9	3	6	18	10%
Pay-As-You-Go	2	1	1	4	2%
Other	3	0	0	3	2%
<b>Total</b>	<b>83</b>	<b>56</b>	<b>43</b>	<b>182</b>	<b>100%</b>

The State of Wisconsin survey confirmed that 14% of the plans used the Projected Unit Credit Cost Method.

It should be noted that the Projected Unit Credit Cost Method is the most common cost method utilized in the private sector, due in large part to its required use for accounting disclosure.

#### Asset Valuation Methods

A primary funding policy goal is to have stable contributions. Large market value fluctuations make this goal difficult to achieve. Thus most actuaries use an asset valuation method which smoothes out these fluctuations in support of achieving level contributions. A good asset valuation method places values on a plan's assets which are related to current market value but which will also produce a smooth pattern of costs. This is a question of balancing fit (measured against market value) and smoothness.

Neither book or market value of these assets is generally felt to be appropriate in determining the actuarial contribution rate for an on-going pension plan. Book value produces smooth predictable employer contributions, but it ignores sizeable appreciation and is not a good measure of the fund's true value (i.e., a poor fit to market value). On the other hand, market value is a realistic current measure of the fund, but on a long-term basis one day's market value may not be a very meaningful figure for a pension fund. Furthermore, sharp short-term swings in market value can result in large fluctuations in the employer contributions required to fund the plan (i.e., not very smooth).

The goal of the actuarial asset valuation method is thus to smooth or reduce investment fluctuations. This is particularly important during periods of volatile capital markets in which abrupt changes in asset values, when factored into the funding valuation, produce sudden unnecessary changes in contribution levels. In this case, "unnecessary" implies that the change in asset values is not necessarily a true revaluing of the assets involved but rather a fluctuation reflecting a current economic climate or a short term reaction to specific news.

Desirable characteristics of an actuarial asset valuation method include the following:

- The method should be simple to operate. It should be readily calculable from financial statements.
- The method should be easy to explain to all interested parties.
- The theoretical underpinnings should be solid. The value produced should account for market and book values.
- The method should smooth effect of market fluctuations.
- Investment decisions should not be affected by the actuarial asset valuation method, and vice versa.
- The value produced should be realistic; the price tag placed on assets should be sensible and should not cause other variables to be adjusted to account for unrealistic asset values.

Asset valuation methods need to be reviewed periodically to determine whether they continue to be consistent with changing conditions. An overall asset valuation policy might include many different methods for different security types, as appropriate.

Investment strategy and portfolio structure could influence the choice of an asset valuation method. For instance, if bonds are actively traded, the same method used for valuing equities could be used for this asset class. However, if bonds are generally purchased with the intent of holding them until maturity, amortized cost would seem more appropriate.

The desire for predictability and stability in contributions leads plan sponsors to use an asset valuation method which smoothes out values. If variances are not as important, faster write-ups or write-downs toward actual market value would more accurately measure current conditions since market value is considered the true current price of assets.

Accounting requirements may influence the selection of an asset valuation method. Recent accounting standards issued by GASB mandates the use of a method of valuing assets which considers market value for reporting purposes.

The assets considered for actuarial valuation purposes under KPERS was changed in 1994 from the cost value of assets to an approach based on market value which recognizes unexpected changes over a three-year period. At the effective date of the change (June 30, 1994), valuation assets were initialized at market value and future deviations in market versus an expected value (assuming the valuation rate of 8% return is achieved) are smoothed over a three-year period.

The new KPERS actuary, Milliman & Robertson, expressed concern over the continual use of book value for actuarial valuation purposes for the following reasons:

- Book value was not an accurate measure of current value
- Appreciation/depreciation was not realized until a security is sold
- Valuation of book value might affect investment decisions (i.e., hold bonds to maturity instead of recognizing appreciation/depreciation upon earlier sale)
- Does not represent total investment return

When choosing an asset valuation method, it is important to recognize the long-term investment policy and asset allocation targets. Given the asset classes included in the target asset allocation policy (see page 13), we would expect fluctuations between book value to warrant the use of a smoothed approach which considers market value. The smoothed approach should recognize a portion of the appreciation/depreciation which is fully recognized in market value over a finite period, usually reflective of a market cycle (typically a three to five year period). The selection of the smoothing period impacts the degree of smoothness vs. fit previously discussed. The choice of a three-year period emphasizes the degree of fit over smoothness more than a longer smoothing period (i.e., five years) would recognize. A longer smoothing period is more common (see survey information on page 26).

Additional considerations for the asset valuation method are:

- In changing from book value to a smoothed value based on market value, a decision should be made on how to recognize the immediate difference between book and market, and

- If there are prolonged bear or bull markets during the smoothing period, the actuarial asset value may unnecessarily deviate from the current value of assets.

The new asset method was initialized at market value. Given that market value exceeded book value at June 30, 1994, the initial value immediately recognized this difference as an actuarial gain and reduced the unfunded liability. This immediate recognition eliminated the conservatism of using book value, which is somewhat in conflict with a smoothed approach. A retroactive application of the proposed asset valuation method at June 30, 1994 would have been a reasonable alternative.

The deviation which could exist during extended bear or bull markets gives us more reason for concern. Since the smoothing period is relatively short, we would recommend the calculation of the smoothed value be constrained to a corridor around market value. Due to IRS regulations in the private sector, a corridor of 80% to 120% of market value is required. In our opinion the use of the same corridor will ensure that the actuarial value of assets does not deviate more than 20% higher or lower than market value and will guard against a significant deviation between the current market value and actuarial value of assets.

The use of book value for actuarial purposes was very common for public employers in the past, but recent survey's indicate market value smoothing methods have become very popular for public plans. This is true even for plans with high allocations in fixed income investments. The recent survey of Public Employee Retirement Systems commissioned by the Society of Actuaries found the number of plans using various asset valuation methods separated by equities and fixed income in use as follows:

Asset Valuation Method-Equities	Types of Employees Covered				
	General Employees	Police/Fire	Teachers/School	Total	Percent
Market Value	10	9	5	24	14%
Smoothed Value (3 years or less)	16	8	6	30	17%
Smoothed Value (more than 3 years)	38	30	21	89	50%
Book Value	16	6	10	32	18%
Other	1	1	0	2	1%
<b>Total</b>	<b>81</b>	<b>54</b>	<b>42</b>	<b>177</b>	<b>100%</b>

Asset Valuation Method-Fixed Income	Types of Employees Covered				
	General Employees	Police/Fire	Teachers/School	Total	Percent
Market Value	6	6	2	14	8%
Smoothed Value (3 years or less)	13	6	5	24	13%
Smoothed Value (more than 3 years)	35	29	14	78	43%
Book Value	28	14	22	64	35%
Other	1	1	0	2	1%
<b>Total</b>	<b>83</b>	<b>56</b>	<b>43</b>	<b>182</b>	<b>100%</b>

## Section V. Actuarial Valuation Results Review

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This section of our review discusses the following aspects of the actuarial valuation results:

- Content of the actuarial reports with regard to disclosure of actuarial assumptions, plan provisions, data considered, actuarial methods, valuation procedures, assets, and other information that another actuary, unfamiliar with the situation, would require to appraise the finding.
- Adequacy of the information provided in the actuaries' reports with regard to analysis of gains and/or losses and the effect of changes in plan provisions, actuarial assumptions, and actuarial methods.
- Compliance with the disclosure requirements of Governmental Accounting Standards Board.
- Reasonableness of the results of the valuations performed during our review period of 1993 through 1995.

### Content of the Actuarial Reports

The American Academy of Actuaries has stated, "The form and content of any actuarial communication should meet the needs of the particular circumstances, taking into account the knowledge and understanding of the users and the actuary's relationship to the users." Therefore, the form and content of an actuarial report may vary considerably from one actuary or plan to another.

However, the Academy has issued the Actuarial Standard of Practice No. 4 which deals with measuring pension obligations and communicating the results. They list specific elements to be included, either directly or by reference to prior communication, in pension actuarial communications. Some of the elements would not be pertinent in all communications, but since an actuarial valuation report is the most complete picture of the actuarial status of the plan, all the elements listed should be covered in the report, even if only briefly.



The following is a list of the specific:

- The name of the person or firm retaining the actuary and the purposes that the communication is intended to serve.
- An outline of the benefits being discussed or valued and of any significant benefits not included in the actuarial determinations.
- A statement as to the effective date of the calculations, the date as of which the participant and financial information were compiled, and the sources and adequacy of such information.
- A summary of the participant information, separated into significant categories such as active, retired, and terminated-vested. Actuaries are encouraged to include a detailed display of the characteristics of each category and a reconciliation with prior reported data.
- A summary of asset information and derivation of the actuarial value of assets. Actuaries are encouraged to include an asset summary by category of investment and a reconciliation with prior reported assets showing total contributions, benefits, investment return, and any other reconciliation items.
- A description of the actuarial assumptions and cost method and the asset valuation method. Changes in assumptions and methods from those used in previous communications should be stated and their effects noted. If the actuary expects that the long-term trend of costs resulting from the continued use of present assumptions and methods would result in a significantly increased or decreased cost basis, this should also be communicated.
- A statement of the findings, conclusions, or recommendations necessary to satisfy the purpose of the communication and a summary of the actuarial determinations upon which these are based. The communication should include applicable actuarial information regarding financial reporting. Actuaries are encouraged to include derivation of the items underlying these actuarial determinations.
- A disclosure of any facts which, if not disclosed, might reasonably be expected to lead to an incomplete understanding of the communication.

We have reviewed the actuarial valuation reports prepared by The Segal Company (Segal) from 1991 through 1993 and prepared by Milliman & Robertson, Inc. (M&R) in 1994 and 1995. All of the reports contain the majority of the specific information required by the Academy. Our analysis will focus on the major elements, especially those areas in which we have found deficiencies, and on other elements commonly found in pension actuarial reports.

***The 1991 through 1993 Actuarial Valuation Reports:*** The results of these valuations were presented in three separate reports. There were separate reports for the Kansas Police and Firemen's Retirement System, the Kansas Retirement System for Judges and the Kansas Public Retirement System, which included the State/School, Local and TIAA members.

While the use of three reports can simplify the presentation of results, the differences in format and the lack of summaries showing results for the entire System made comparisons difficult. A "summary" report which would present major results for all groups in the same format would have been helpful.

The summary of plan provisions in each of the reports was very good, providing enough details without becoming too cumbersome. The following two changes would have improved the summary:

- Separate the description of the benefits provided by the KPERs Death and Disability Program and the Retirement System. It was not immediately clear which of the disability and death benefits were provided and valued under the retirement plan.
- Specify the normal form of payment.

There were significant plan provision changes effective with the 1993 valuation but no details were provided. In addition to the summary of plan provisions included in the report, a comparative summary of plan changes briefly describing the old and new plan provisions should have been included.

The reports included a very brief description of the actuarial assumptions. Withdrawal for all causes were outlined at sample ages. Separate rates for death, disability, and withdrawal should have been shown at the sample ages. Other assumptions made which were necessary should have been listed, including percent married, age differences between members and spouses, and commencement age for deferred pensions. Details of any assumptions made with regards to missing data or other valuation procedures should also be included.

The most serious deficiency in the reports was the lack of comparisons with the prior year's results and an analysis of the major causes of the changes in the results. Historical comparisons of key measures were not provided. Almost all the comparisons in the reports dealt with the data, not plan costs.

All three reports included a results section, which disclosed the benefit enhancements and some of the other non-demographic changes which would impact plan costs. But no indication of the financial impact of these changes was given. If these plan changes and their impact were detailed in another document, they should have been included here by reference.

***The 1994 and 1995 Actuarial Valuation Reports:*** These actuarial valuations were prepared by M&R and the results presented in reports which included separate summaries for the individual systems, as well as all systems combined. Given the complexity of the System, the summaries required for the groups and Plans and the use of three different cost methods, such an approach could produce a confusing, unwieldy report. However, the report was well organized and it was relatively easy to find information.

The summary of plan provisions included the disclaimer, "In the interest of simplicity, certain generalizations have been made." Plan provision summaries need not include all plan details, but the reports omitted some items which should have been included, specifically:

- Description of vesting provisions.
- Description of the TIAA and Correctional employees. If the Correctional employees were not valued with the same provisions as other KPERS members, the major differences should be mentioned.
- Definition of "Tier I", "Tier II", and "Transfer" members. Those classifications were used in the summary without explanation.
- Identification of disability and death benefits paid from the KPERS Death and Disability Program. From the summary given, there was no indication that these benefits were not included in the retirement plan liabilities or always excluded from the assets. Ideally, the benefits paid from the Death and Disability Program would not be described in this summary or it should be clear these benefits were not considered in the valuation results. Overall, the relationship of the Death and Disability Program with the retirement benefits is unclear.
- Specification of the normal form of annuity.

Although the 1994 report mentions the July, 1994 benefit increase (COLA) to retirees, the specifics of the increase should have been detailed.

The summary of actuarial assumptions and methods in these reports were more complete than in the previous reports. A table of mortality rates at sample ages and explanation of the margin used for School members should be included. Also, a description of valuation procedures indicating assumptions made for missing data and commencement ages for deferred pensions should be added.

Comparisons between the current and prior year's data and results were given throughout the report when appropriate. A breakdown of the assets by investment type was included on the basis of book value in 1994 and market value in 1995. Overall, the cost summaries were complete.

The report also contained an excellent section entitled "Board Summary" which provided a concise overview and an experience analysis for the year of all systems combined. The overview contained a very informative summary of contribution rates, showing the prior and current year actuarial rates and the recommended rates, which include the statutory limitations. A weighted average was computed and differences shown. This one summary capsulized not only the increase in costs from the previous year but also the increasing deficit of the statutorily limited rates to the true actuarial cost rates. The overview could have been improved by commentary on this increasing deficiency and projections which would indicate when the actuarial rate and statutory rate reached equilibrium.

Again, historical comparison of key actuarial and other measures were omitted which made funding progress difficult to assess.

**Adequacy of the information provided in the actuaries' reports with regard to analysis of gains and/or losses.**

The determination of the net actuarial experience gain or loss for a plan year is important as a measure both in magnitude and direction of the accuracy of the set of actuarial assumptions. Based upon the results of the prior valuation, the unfunded liability and actuarial contribution rate brought forward from the previous year to the current year assuming all actuarial assumptions were exactly realized. If actual experience is more favorable than assumed, a net gain will result (unfunded liability and actuarial rate will be less than expected); and conversely, if actual experience is less favorable than assumed, a net loss will result (those items will be more than expected).

The effect of changes in plan provisions, actuarial assumptions and actuarial methods are not components of experience but are frequently included in the analysis so as to show the flow of final results from one year to the next. Our comments assume such items are to be included in a gain/loss analysis.

The analysis is often detailed by source with changes by component elements shown. The elements examined and format of the analysis can vary considerably depending upon the plan, cost method and degree of detail required by the Board and Retirement System staff. An extensive breakdown of the total gain or loss computed requires a high standard for data. The gain/loss elements most commonly analyzed are the following:

- investment return
- salary increases
- new entrants
- decrements (in total or separately for each decrement - withdrawal, death, disability and retirement)
- changes in actuarial assumptions or method
- changes in plan provisions

Depending upon the needs of the user and the significance of the impact on the results, other items such as data changes, may be analyzed as well.

The actuarial valuation reports prepared by Segal from 1991 through 1993 did not contain a gain/loss analysis. In the "Results of Actuarial Valuation" sections of the reports, comparisons of the funding ratios and percentage of payroll represented by the unfunded actuarial liability for the prior and current year are given but a numerical breakdown of the reasons for the changes in values is not included. The Segal report for the Police and Firemen's Retirement System noted that there were changes in the characteristics of the members, including an increase in average age of the active members. The KPERS report indicates a 9.2% net investment yield rate for the fiscal year ending June 30, 1993. But in all cases, the impact on the results was not given. No other comments or analysis of the gains or losses due to actuarial assumptions were made.

Since the valuations for the three systems were done and presented in three separate reports, and the Judges System had only 248 participants, a gain/loss analysis for that Plan would generally not be done. And since the assumption changes were in some cases driven by the revisions to the plan provisions, it would be appropriate to combine those two elements of the gain/loss review. The absence of a new entrant analysis is not unusual in a plan such as this because employees who must complete a year of service before membership begins are not given credited service for that period and, therefore, the impact on the accrued liability is minimal. Since most of the members are valued using this cost method, a new entrant analysis might not be of significant value. However, the complete lack of analysis, especially of the impact of the investment return and salary increases, is

surprising. Those two items frequently have a large impact on changes in the financial condition of a plan from one year to the next and should be examined.

The M&R reports included a gain/loss analysis in three exhibits in the Board Summary section. These exhibits analyzed changes in assets, unfunded actuarial liabilities and the weighted average of the actuarial contribution rate. As part of the change in unfunded liability expected, the amortization methodology creates an increase in the unfunded liability. Also, the time lag associated with not contributing at the actuarial rate creates an expected increase in unfunded liabilities. These items were included in the 1995 report, but were missing in the 1994 report.

#### **Compliance with the disclosure requirements of Governmental Accounting Standards Board**

The Segal Company reports did not contain the information required by Governmental Accounting Standards Board Statement No. 5. Since the required Pension Benefit Obligation results were given in the System annual financial report, we assume it was provided separately.

The Milliman & Robertson report contains the information required by GASB No.5 and appears to be complete.

Effective for periods after June 15, 1996, public defined benefit retirement plans will be required to measure pension expense according to a new standard by computing an actuarially required contribution (ARC). The ARC will require amortization of unfunded liabilities over a maximum of 40 years initially, and a maximum of 30 years in ten years. While the standard is reasonably flexible with regard to actuarial methods and assumptions (and the current KPERS methods, assumptions and procedures generally comply), the net effect to KPERS will be a more detailed disclosure and comparison of the ARC to the actual contributions. Public employers participating in single employer plans will be required to expense the ARC, but employers participating in cost-sharing multiple employer plans will be able to continue to expense the statutorily required contributions.

#### **Reasonableness of the Actuarial Valuation Results for 1993-1995**

As outlined in the introduction, many changes in the plan provisions, actuarial assumptions, and actuarial methods occurred during the five-year period we reviewed. The most significant changes occurred in 1993 as a result of the 1993 Legislation, and again in 1994 when M&R replaced Segal and several data adjustments and methodology changes significantly increased the actuarial contribution rate.

The changes made by M&R and the impact on valuation results were reviewed by Segal. In most cases, Segal agreed the results of the changes were reasonable. The increase in the unfunded liability attributable to salary and decrement losses at June 30, 1994 amounted to \$320M, of which \$55M was due to the amortization method and contribution/timing differences. Segal indicated they believed a loss of that magnitude was possible given the changes in the plan that had occurred. They suggested there were a number of retirements between 1993 and 1994 due to members taking advantage of the plan improvements. Our independent reconciliation of the changes in unfunded liability between 1993 and 1994 with comparison to M&R follows:

Changes in Unfunded Liability	Amount (millions)	
	M&R	Buck
Unfunded at June 30, 1993	\$ 968	\$ 968
• Increase due to amortization method and contribution/timing	*	26
Expected Unfunded at June 30, 1994	\$ 968	\$ 994
• Investment gain	(102)	(97)
• Asset method change	(134)	(159)
• 1994 COLA	75	75
• Methodology changes	228	228
• Data and salary adjustments	150	150
• Decrement and salary loss	320*	314
Actual Unfunded at June 30, 1994	\$ 1,505	\$ 1,505

\* Per M&R, increase due to amortization method and contribution/timing of \$55M was included in decrement and salary loss of \$320M.

The methodology changes shown above include:

- revised liabilities for the actual 1993 COLA (Segal estimates were low),
- M&R included the value for a return of employee contributions if death occurs after termination but before commencement of vested pension, Segal did not,
- change in methodology for determining value of pre-retirement spouses benefit upon death while an active employee, and

- revision to the inactive member liability. Segal had valued the benefits payable at age 65, then loaded 25% for expected earlier commencement. M&R valued the benefits deferred to age 62 which produced a higher liability. We estimate this change in methodology would have increased the Segal liabilities by 10%.

The changes in data and salary adjustments were results of an assumption Segal made regarding active records with unpopulated salary fields. Segal assumed the members were inactive. M&R pursued the missing information with KPERS and found these members to be active, resulting in an increase in the liability.

Although we agree the system experienced losses during this period due to members retiring and taking advantage of the plan improvements, we do not believe there was a sufficient increase in the number of retirees or benefit levels above the COLA increases to justify the magnitude of the loss indicated.

A possible source for this loss could be due to methodology changes since, in our opinion, the actuarial accrued liabilities for active members increased more than would be anticipated, given general increases in membership and compensation. In discussing this issue with M&R, a change was made in the methodology used for projecting the actuarial calculations from the census date to the valuation date. We agree with M&R's revision to this methodology. Pinpointing the source of all changes would require a parallel valuation to compare results using the same membership data.

#### **Funded Status**

The funded status of the system was reduced as a result of the recent benefit changes. A recent Wilshire study showed the average statewide retirement system funded ratio, based on market value of assets and disclosed Pension Benefit Obligations under GASB No. 5, was 91%. A Wisconsin survey of funded ratios, based on both market and actuarial asset values, showed an average funded ratio of 85%. The funded ratios of KPERS are less than these averages, with a funded ratio based on market value of 83% in 1995, up from 77% in 1994. It is likely that the robust investment results in 1995 resulted in an overall improvement in the average funded ratios. These comparisons do indicate KPERS is less well funded than the average public system.



## Section VI. Findings and Recommendations

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1. The data provided by KPERS to the actuary appear to be substantially improved between 1993 and 1994. However, a significant number of active and/or inactive members appear not to be included in the calculations and some data elements continue to be missing.

### *Recommendations:*

- a. Greater effort should be made by KPERS and the actuary to reconcile and agree on membership counts and other relevant data prior to completing the actuarial valuation.
  - b. All necessary data elements should be identified, supplied and verified.
  - c. Inactive/active member identification coding should be improved.
  - d. Future benefits payable to vested inactive members who do not withdraw their contributions should be calculated by KPERS and provided on the data submitted annually to the actuary along with commencement dates.
- 
2. The actuarial assumptions and methods used in the most current actuarial valuation are in our opinion reasonable and generally in line with common practices.

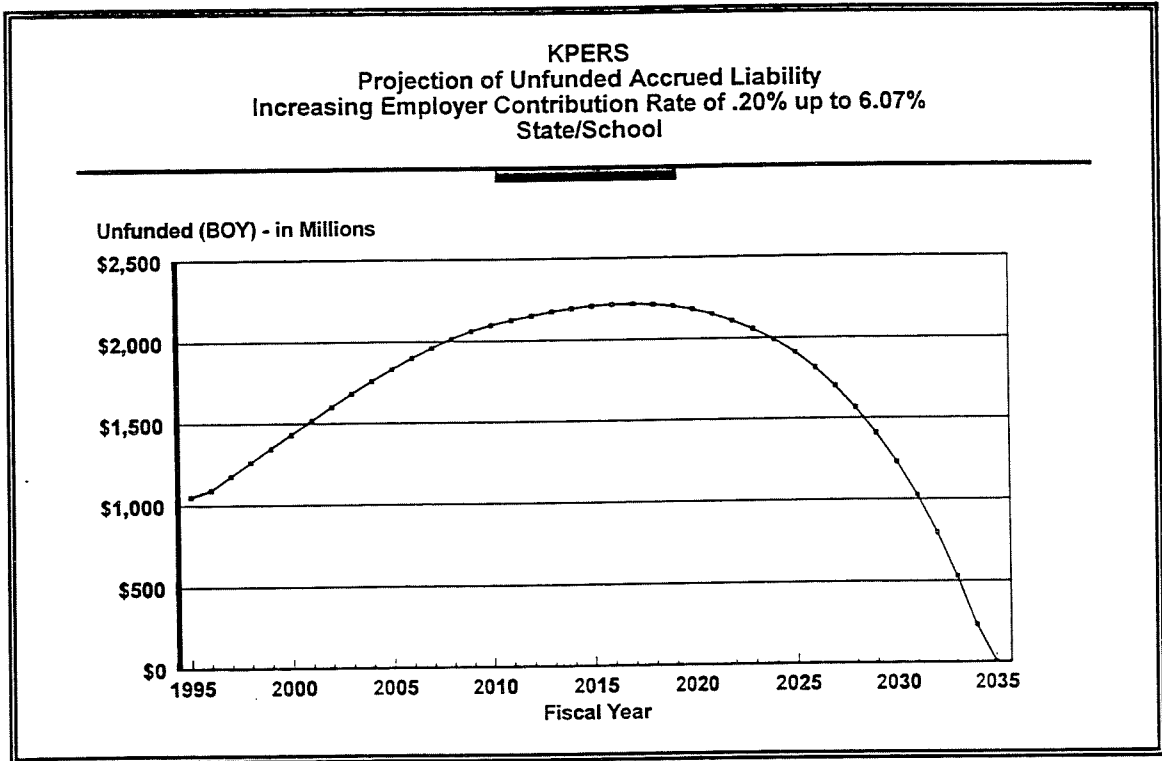
However, the combination of the use of the projected unit credit actuarial cost method, a 40-year amortization period for payment of the unfunded obligations of KPERS, the current funded status of the system, an assumption of a 4% per year increase in the membership payroll, and the failure to meet the actuarially required contributions all contribute to a likelihood for increasing contribution requirements even if all assumptions are otherwise met. In total, the assumptions and methods have little margin for conservatism and, as a result, the system is highly leveraged.

### *Recommendations:*

Buck recommends that the following assumptions/methods be closely monitored and evaluated:

- a. Retirement rates
- b. Postretirement mortality
- c. Membership payroll increases (the 4% per year increase assumption)
- d. The average age of the members
- e. Boundaries for the asset valuation method

3. The combination of contributing less than the actuarially required contribution on a Projected Unit Credit actuarial cost determination and amortizing the unfunded obligations over an increasing payroll will delay payment of the actuarially required contribution until 2009 as determined by KPERS using software provided by M&R. Employer contributions will increase from the current actuarially determined amounts of 5.23% of pay to 6.07% of pay because of the delayed contributions - even if all assumptions are met. Under these projections, the unfunded obligations are expected to grow dramatically to over two (2) times the current level, peaking by 2015, if assumptions are all realized.



***Recommendations:***

- a. Future actuarial valuations should clearly disclose the current actuarially required contribution as well as the long-term effect of making contributions less than the actuarially required contribution.
- b. Future benefit increases are not advisable without additional funding (e.g., the continuation of ad hoc benefit increases for retirees will exacerbate the shortfall of contributions required and will become increasingly more expensive as the retiree population increases).

- c. A long-term actuarial forecast of KPERS using an open group model should be considered under alternative assumptions to determine the most likely cost and funded status of the system. In particular, the sensitivity of KPERS of various alternative scenarios (e.g., lower membership, earlier retirement, mortality improvement, positive and negative investment performance compared to the expectation, etc.).

An open group model projects valuation results into the future, over a 10, 20, or 30 year period, and replaces expected terminations and retirements with new members. The current actuarial valuation process is a closed group model and does not anticipate the effect of adding new members. The understanding of the expected effect of new member replacements under a declining membership group (as anticipated due to recent legislation affecting State employees) is crucial to the determination of the long-term financial soundness of KPERS.

4. The differences between the June 30, 1993 actuarial valuation prepared by The Segal Company and the June 30, 1994 actuarial valuation prepared by Milliman & Robertson have only partially been reconciled. Approximately \$320M of unreconciled loss (5.8% of the accrued liability) is unusually high. This is after Segal and M&R have estimated methodology and data clarifications to account for \$335M of additional liability. While the number of members retiring due to the 1993 legislation undoubtedly contributed to the loss, it is unlikely that this accounts for a loss of that magnitude. An investigation of actuarial reports for years prior to 1993 and in 1995 do not reveal a loss of that magnitude. It is probable that additional data corrections, methodology changes, or calculation errors are responsible.

***Recommendations:***

- a. An independent actuarial valuation of both 1993 and 1994 results would be required to reconcile the differences and determine if the difference was due to data, methodology or calculation error.
- b. A more productive exercise may be to request an independent actuarial valuation of the 1994 (or 1995) Milliman & Robertson results to confirm their methodology and conclusions, since Milliman & Robertson is now advising KPERS as to the amount of the determination of the current actuarially required contribution.

5. The current (1995) actuarial valuation report has improved the disclosure of the funded status of KPERS. However, additional disclosure and analysis are needed in our opinion.

***Recommendations:***

The annual actuarial report should be expanded to include:

- a. More detail on the reasons for changes in the unfunded obligations and normal costs. For example, the effect of gains or losses due to mortality, retirement experience, salary increases, etc. should be identified.
- b. Since the employer contributions is significantly less than the actuarially required contribution, disclosure should be made at each valuation of the long-term effect of the short fall on ultimate employer contribution requirements.
- c. A forecast of the unfunded obligations and the funded ratio (Assets at market and/or actuarial value compared to the system liabilities on a Pension Benefit Obligation basis).
- d. A history of key actuarial measures (e.g., actuarially required contribution compared to actuarial contributions, Funded Ratio, market value of assets compared to actuarial value, etc.).
- e. Required actuarial disclosure information and exhibits.

Administrative Services Bureau  
Susan K. Duffy, Executive Manager  
Kansas Department of Revenue  
915 SW Harrison St.  
Topeka, KS 66612-1588



(913) 296-2331  
FAX (913) 296-8932

Administrative Services

**TO:** Representative Fred Gatlin  
House Appropriations Committee

**FROM:** Susan Duffy *[Signature]*  
Department of Revenue

**RE:** Motor Fuel Tax Refund Information

**DATE:** March 5, 1996

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As I discussed with you earlier today, you may want to consider the following information regarding motor fuel refunds. It would be difficult to eliminate the motor fuel refund process for the following reasons:

1. The statistics for FY 95 indicate that 67% of the refunds issued for gasoline were agriculture, i.e., farmers still using gas powered tractors. Ag is only 9% of the diesel fuel refunds (down from 21% in FY 94) which means farmers are using the dyed diesel fuel.
2. Apparently over the road dyed diesel is not readily available to refrigerated trucking companies.
3. Cities, counties, USD's and townships probably do not use the dyed diesel because they do not have 2-tank storage. It is very expensive to install and meet the KDHE requirements. Further, their off road usage is probably not high enough to warrant the cost and liability.

We have included the stats from FY 1995 to give you a better idea of the business types requesting refunds. If you require additional information, please call me.

3-6-96

House Appropriations

Attachment  
4

MF Refunds.FY95

CUMULATIVE FISCAL YEAR BY COLLECTION MONTH TOTALS				
RVMFSTAR	Coll. Mo. July through	June		
GASOLINE				
		GALLONS	CARD	PERCENT
CODE	OCCUPATIONAL NAME	REGULAR	COUNT	TOTAL
1000	AGRI	8,864,594	8129	67.4%
2000	AVIATION	63,772	43	0.5%
3000	IMPLEMENT DEMONS	0	0	0.0%
4000	CITIES	246,749	80	1.9%
5000	CONTRACTORS ROAD	13,552	10	0.1%
6000	CONTRACTORS OTHER	142,919	55	1.1%
7000	COUNTIES	274,264	37	2.1%
8000	CUST WORK EXCL	974,466	773	7.4%
9000	CUST WORK	132,561	127	1.0%
10000	DEHY	17,986	21	0.1%
11000	GARGAGE WASH	0	0	0.0%
12000	GROUNDS MAIN	170,162	83	1.3%
13000	GRAIN ELEVATOR	0	0	0.0%
14000	IRRIGATION	66,474	10	0.5%
15000	MFG	653,748	83	5.0%
16000	MINING	87,049	24	0.7%
* 17000	MISC	1,248,086	296	9.5%
18000	MOTOR BOATS	39,324	13	0.3%
19000	OIL PROD	114,055	41	0.9%
21000	PAINT	0	0	0.0%
22000	PIPE LINE CONSTR	1,437	1	0.0%
23000	QUARRYING	5,868	4	0.0%
24000	RAILROADS	13,621	4	0.1%
25000	SAND BLASTING	2,047	2	0.0%
26000	SAND PIT	4,140	3	0.0%
27000	SAW MILL	1,200	2	0.0%
28000	STOVE & LIGHTS	0	0	0.0%
29000	TOWNSHIPS	2,298	1	0.0%
30000	WELDING	2,720	5	0.0%
31000	WOOD SAWING	0	0	0.0%
32000	WATER WELLS	5,802	2	0.0%
33000	PIPE LINES REF OILS	1,203	2	0.0%
90000	UNCLASSIFIED	0	0	0.0%
	TOTAL	13,150,097	9851	100.0%

\* MISC includes about: *refrig units for trucks* 50%  
*trash haulers* 20%  
*all others (golf courses, etc)* 30%

MF Refunds.FY95

CUMULATIVE FISCAL YEAR BY COLLECTION MONTH TOTALS				
RVMFSTAR	Coll. Mo. July through	June		
DIESEL		GALLONS	CARD	
CODE	OCCUPATIONAL NAME	DIESEL	COUNT	
1000	AGRI	1,429,149	976	9.2%
2000	AVIATION	52,367	8	0.3%
3000	IMPLEMENT DEMONS	75,058	20	0.5%
4000	CITIES	945,202	89	6.1%
5000	CONTRACTORS ROAD	1,705,533	42	11.0%
6000	CONTRACTORS OTHER	581,750	55	3.8%
7000	COUNTIES	1,354,872	148	8.8%
8000	CUST WORK EXCL	544,623	159	3.5%
9000	CUST WORK	20,681	15	0.1%
10000	DEHY	112,266	16	0.7%
11000	GARGAGE WASH	0	0	0.0%
12000	GROUNDS MAIN	223,905	38	1.4%
13000	GRAIN ELEVATOR	0	0	0.0%
14000	IRRIGATION	22,713	7	0.1%
15000	MFG	162,010	45	1.0%
16000	MINING	708,849	62	4.6%
17000	MISC	7,143,731	623	46.1%
18000	MOTOR BOATS	9,374	5	0.1%
19000	OIL PROD	163,481	57	1.1%
21000	PAINT	0	0	0.0%
22000	PIPE LINE CONSTR	0	0	0.0%
23000	QUARRYING	95,297	4	0.6%
24000	RAILROADS	2,910	2	0.0%
25000	SAND BLASTING	4,983	2	0.0%
26000	SAND PIT	64,189	13	0.4%
27000	SAW MILL	0	0	0.0%
28000	STOVE & LIGHTS	0	0	0.0%
29000	TOWNSHIPS	0	0	0.0%
30000	WELDING	0	0	0.0%
31000	WOOD SAWING	0	0	0.0%
32000	WATER WELLS	40,958	3	0.3%
33000	PIPE LINES REF OILS	18,146	4	0.1%
90000	UNCLASSIFIED	1,458	1	0.0%
	TOTAL	15,483,505	2394	100.0%

## MF Refunds.FY95

CUMULATIVE FISCAL YEAR BY COLLECTION MONTH TOTALS				
RVMFSTAR	Coll. Mo. July through	June		
GASOHOL				
		GALLONS	CARD	
CODE	OCCUPATIONAL NAME	GASOHOL	COUNT	
1000	AGRI	55,548	57	84.9%
2000	AVIATION	0	0	0.0%
3000	IMPLEMENT DEMONS	0	0	0.0%
4000	CITIES	0	0	0.0%
5000	CONTRACTORS ROAD	0	0	0.0%
6000	CONTRACTORS OTHER	0	0	0.0%
7000	COUNTIES	0	0	0.0%
8000	CUST WORK EXCL	5,421	7	8.3%
9000	CUST WORK	0	0	0.0%
10000	DEHY	0	0	0.0%
11000	GARGAGE WASH	0	0	0.0%
12000	GROUNDS MAIN	0	0	0.0%
13000	GRAIN ELEVATOR	0	0	0.0%
14000	IRRIGATION	0	0	0.0%
15000	MFG	0	0	0.0%
16000	MINING	0	0	0.0%
17000	MISC	4,486	3	6.9%
18000	MOTOR BOATS	0	0	0.0%
19000	OIL PROD	0	0	0.0%
21000	PAINT	0	0	0.0%
22000	PIPE LINE CONSTR	0	0	0.0%
23000	QUARRYING	0	0	0.0%
24000	RAILROADS	0	0	0.0%
25000	SAND BLASTING	0	0	0.0%
26000	SAND PIT	0	0	0.0%
27000	SAW MILL	0	0	0.0%
28000	STOVE & LIGHTS	0	0	0.0%
29000	TOWNSHIPS	0	0	0.0%
30000	WELDING	0	0	0.0%
31000	WOOD SAWING	0	0	0.0%
32000	WATER WELLS	0	0	0.0%
33000	PIPE LINES REF OILS	0	0	0.0%
90000	UNCLASSIFIED	0	0	0.0%
	TOTAL	65,455	67	100.0%