



Date of Notice: Friday, September 8, 2017

PUBLIC NOTICE

A PUBLIC MEETING OF THE GOVERNING BOARD OF THE CALIFORNIA EARTHQUAKE AUTHORITY

NOTICE IS HEREBY GIVEN that the Governing Board of the California Earthquake Authority (“CEA”) will meet in West Sacramento, California. Pursuant to California Insurance Code §10089.7, subdivision (j), the Bagley-Keene Open Meeting Act applies generally to meetings of the Board, and the meeting is open to the public—public participation, comments, and questions will be welcome for each agenda item. All items are appropriate for action if the Governing Board wishes to take action. Agenda items may be taken out of order.

LOCATION: CalSTRS Headquarters Building
Boardroom – Lobby, E-124
100 Waterfront Place
West Sacramento, California

DATE: Wednesday, September 20, 2017

TIME: 12:00 p.m.

AGENDA:

1. Call to order and member roll call:
 - Governor
 - Treasurer
 - Insurance Commissioner
 - Speaker of the Assembly
 - Chair of the Senate Rules Committee

Establishment of a quorum

This CEA Governing Board meeting will be broadcast live on the Internet. Please wait until the official start time of the meeting before clicking on either icon:



[Audio](#)



[Video \(with audio\)](#)

If you are unable to log into the meeting please call the CEA directly at (916) 661-5001 for further assistance.

2. The Board will meet in closed session to discuss personnel matters and litigation matters, as permitted by California Government Code section 11126, subdivisions (a) and (e), respectively.
3. Consideration and approval of the minutes of the June 7, 2017, CEA Governing Board meeting.
4. Executive Report by Chief Executive Officer Glenn Pomeroy, which will include an update for the Board on legislative activities of interest to the CEA.
5. Chief Financial Officer Tim Richison will present to the Board the CEA financial report.
6. Mr. Richison will propose for Board approval mid-year revisions to the 2017 CEA budget, which will take into account a budget-augmentation approved during this Board meeting.
7. Mr. Pomeroy will request Board approval to permit CEA to contract to hire certain staff positions.
8. Chief Mitigation Officer Janiele Maffei will update the Board on CEA-mitigation-program projects, including the California Residential Mitigation Program incentive program (CRMP Earthquake Brace + Bolt), CEA's financial-incentive and mitigation program (CEA Brace + Bolt), and ongoing mitigation-related research projects.
9. Ms. Maffei will update the Board on the CEA Research Program.
10. Ms. Maffei will present, and seek Board approval of, contracting with the Southern California Earthquake Center ("SCEC") for a research project proposed by SCEC that would support and expand CEA's continued use of UCERF 3 and future, related seismic-science reports.
11. Ms. Maffei will ask that the Board approve CEA's establishing a nonprofit charitable foundation, whose functions would include receiving contributions and disbursing accumulated funds for clearly defined grant programs and other appropriate mitigation-related purposes.
12. Chief Insurance and Technology Officer Todd Coombes will report to the Board on CEA insurance and information-technology initiatives and seek Board approval to expand CEA's contract with existing contractor Aartrijk to support strategic consulting on CEA's insurance-marketing efforts.
13. Chief Communications Officer Chris Nance will seek Board approval to amend CEA's existing agreement with Randle Communications, which has been instrumental in planning and arranging CEA's community- and agent-outreach activities, in order to increase expenditures.
14. Mr. Nance will seek Board approval to modify CEA's existing agreement with Runyon Saltzman, CEA's principal advertising agency, in order to increase 2017–18 expenditures.
15. Enterprise & Strategic Risk Advisor Laurie Johnson will update the Board on CEA enterprise-risk-management-program planning and progress.
16. Chief Operations Officer Kellie Schneider will present to the Board the periodic CEA-operations metrics report, and propose Board adoption of a successor plan to the current (2015–17) CEA Strategic Plan.
17. Public comment on matters that do not appear on this agenda and requests by the public that those matters be placed on a future agenda.
18. Adjournment.

For further information about this notice or its contents:

General Information:

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To view this notice on the CEA website or to learn more about the CEA, please visit www.EarthquakeAuthority.com

Persons with disabilities may request special accommodations at this or any future Governing Board meeting or may request the accommodation necessary to receive agendas or materials the CEA prepares for its Board meetings. Please contact Carlos Martinez by telephone, toll free, at (877) 797-4300 or by email at cmartinez@calquake.com. We would appreciate hearing from you at least five days before the meeting date to best allow us to meet your needs.

NOTE: You might have received this notice because your name, or that of your organization, appears on a public-notice list maintained by the California Earthquake Authority. If in the future you do not wish to receive public notices pertaining to the California Earthquake Authority, please send your request by email to cmartinez@calquake.com.



Draft Meeting Minutes are not available.

Please see CEA Governing Board Meeting
[Approved Minutes.](#)

Governing Board Memorandum

September 20, 2017

Agenda Item 4: Executive Report by Chief Executive Officer Glenn Pomeroy

Recommended Action: No action required—information only

Chief Executive Officer Glenn Pomeroy will present his Executive Report to the Board, which will include an update on legislative activities of interest to the CEA.



FINANCIAL REPORT

June 30, 2017

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Note: See Fact Sheets for Policies In Force, Written Premiums, and Exposures.

Financial Statements & Budgets

California Earthquake Authority
Balance Sheet
as of June 30, 2017

Assets

Cash and investments:	
Cash and cash equivalents	\$ 347,248,163
Restricted cash and equivalents	129,224,487
Restricted investments	355,972,867
Investments	5,532,350,649
	<hr/>
Total cash and investments	6,364,796,166
Premiums receivable, net of allowance for doubtful accounts of \$9,328,134	47,262,195
Capital contributions receivable	-
Risk capital surcharge receivable	-
Interest receivable	20,790,885
Securities receivable	-
Restricted securities receivable	-
Prepaid reinsurance premium	20,951,459
Transformer reinsurance premium deposit	-
Prepaid transformer maintenance premium	7,818,490
Equipment, net	300,853
Other assets	42,458
	<hr/>
Total assets	<u>\$ 6,461,962,506</u>

Liabilities and Net Position

Unearned premiums	\$ 330,167,766
Accounts payable and accrued expenses	5,637,435
Deferred grant revenue	2,329,789
Accrued reinsurance premium expense	-
Loss and loss adjustment expense reserves	25,729
Securities payable	-
Revenue bond payable	310,000,000
Revenue bond interest payable	3,868,750
	<hr/>
Total liabilities	652,029,469
Net position:	
Restricted, expendable	163,867,659
Unrestricted, participating insurer contributed capital	777,384,796
Unrestricted, State of California contributed capital	247,326,803
Unrestricted, all other remaining	4,621,353,779
	<hr/>
Total net position	5,809,933,037
	<hr/>
Total liabilities and net position	<u>\$ 6,461,962,506</u>

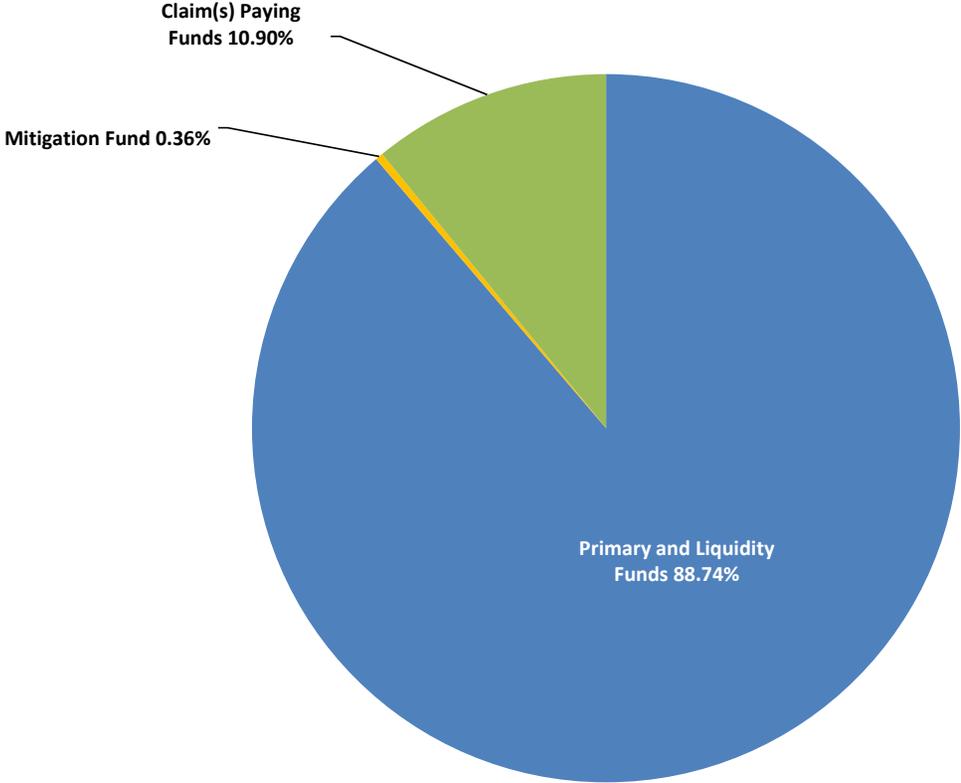
California Earthquake Authority
Statement of Revenues, Expenses and Changes in Net Position
as of June 30, 2017

Underwriting income:	
Premiums written	\$ 325,302,347
Less premiums ceded - reinsurance	(145,525,023)
Less risk capital surcharge	<u> -</u>
Net premiums written	<u>179,777,324</u>
Change in unearned premiums	<u>(12,702,402)</u>
Net premiums earned	<u>167,074,922</u>
Expenses:	
Losses and loss adjustment expenses	(148,409)
Participating Insurer commissions	32,531,234
Participating Insurer operating costs	10,563,585
Reinsurance broker commissions	1,400,000
Pro forma premium taxes equivalent	7,649,417
Other underwriting expenses	<u>17,200,570</u>
Total expenses	<u>69,196,397</u>
Underwriting profit	97,878,525
Net investment income	41,169,770
Other income	207,549
Grant revenue	825,353
Financing expenses, net	(1,614,443)
Earthquake Loss Mitigation Fund expenses	(3,893,293)
Participating Insurer Contributed Capital	-
State of California premium tax contribution equivalent	<u>7,649,417</u>
Increase in net position	142,222,878
Net position, beginning of year	<u>5,667,710,159</u>
Net position, end of year to date	<u><u>\$ 5,809,933,037</u></u>

Investments

**California Earthquake Authority
Investment Distribution at Market Value
as of June 30, 2017**

Market Value	\$6,246,842,516
Primary and Liquidity Funds	88.74%
Mitigation Fund	0.36%
Claim(s) Paying Funds	10.90%
Total:	100.00%



Debt

**California Earthquake Authority
Schedule of Outstanding Debt**

DEBT	ISSUANCE AMOUNT	INTEREST RATE	NET PROCEEDS	OUTSTANDING PRINCIPAL	AS OF DATE	MOODY'S RATING*	FITCH RATING**
Series 2014 Revenue Bonds 3 year bond CUSIP 13017HAD8	\$ 60,000,000	1.824%	\$ 59,498,463	\$ 60,000,000	30-Jun-2017	A3 Outlook Stable	A Outlook Stable
Series 2014 Revenue Bonds 5 year bond CUSIP 13017HAE6	\$ 250,000,000	2.805%	\$ 247,910,261	\$ 250,000,000	30-Jun-2017	A3 Outlook Stable	A Outlook Stable

DEBT-SERVICE SCHEDULE

The table below shows the annual-debt-service requirements for the Series 2014 Bonds.

Debt	Payment Date	Outstanding Principal	Principal	Interest	Debt Service	Annual Debt Service
Series 2014 Revenue Bonds 3 year bond	1-Jan-17	\$60,000,000	\$0	\$547,200	\$547,200	
	1-Jul-17	\$0	\$60,000,000	\$547,200	\$60,547,200	
	2017					\$61,094,400
Series 2014 Revenue Bonds 5 year bond	1-Jan-17	\$250,000,000	\$0	\$3,506,250	\$3,506,250	
	1-Jul-17	\$210,000,000	\$40,000,000	\$3,506,250	\$43,506,250	
	2017					\$47,012,500
	1-Jan-18	\$210,000,000	\$0	\$2,945,250	\$2,945,250	
	1-Jul-18	\$105,000,000	\$105,000,000	\$2,945,250	\$107,945,250	
	2018					\$110,890,500
	1-Jan-19	\$105,000,000	\$0	\$1,472,625	\$1,472,625	
	1-Jul-19	\$0	\$105,000,000	\$1,472,625	\$106,472,625	
	2019					\$107,945,250

*Moody's rating since May 2015.

**Fitch rating affirmed April 2017.

Claim-Paying Capacity

**California Earthquake Authority
Available Capital Report
as of June 30, 2017**

Cash & Investments (includes capital contributions and premiums)	\$	6,364,796,166
Earthquake Loss Mitigation Fund Cash and Investments	\$	(24,801,361)
Interest & Securities Receivable	\$	20,790,885
Premium Receivable	\$	47,262,195
Risk Capital Surcharge & Capital Contributions Receivable	\$	-
Other Assets	\$	42,458
Revenue Bonds	\$	(680,712,845)
Debt Service (Interest, Principal & Debt Service (Min. Bal.))	\$	(104,053,450)
Unearned Premium Collected	\$	(241,261,179)
Accrued Reinsurance Premium Expense	\$	-
Accounts and Securities Payable, and Accrued Expenses	\$	(5,637,435)
Loss Reserves	\$	(25,729)
CEA Available Capital	<u>\$</u>	<u>5,376,399,704</u>

**California Earthquake Authority
Claim-Paying Capacity
as of June 30, 2017**



Total Capacity \$15,188M

Note: Not drawn to scale

Risk-Transfer Programs

**California Earthquake Authority
Current Risk-Transfer Program Summary
as of June 30, 2017**

Traditional Reinsurance Contracts	Contract Period	Reinsurance Limit	12-Month Rate-on-Line	12-Month Premium
2017 January Program Contract 1	January 1, 2017 - December 31, 2017	614,317,300	4.40%	27,029,961
2017 January Program Contract 2	January 1, 2017 - December 31, 2017	290,405,830	3.20%	9,292,987
2017 January Program Contract 3	January 1, 2017 - December 31, 2017	15,000,000	6.25%	937,500
2017 January Program Contract 4	January 1, 2017 - December 31, 2017	25,000,000	5.60%	1,400,000
2016-2017 January Program Contract 1	January 1, 2016 - December 31, 2017	472,799,040	4.40%	20,803,158
2016-2017 January Program Contract 2	January 1, 2016 - December 31, 2017	99,999,970	5.70%	5,699,998
2016-2017 January Program Contract 3	January 1, 2016 - December 31, 2017	49,999,995	5.00%	2,500,000
2016-2017 January Program Contract 4	January 1, 2016 - December 31, 2017	50,000,000	2.60%	1,300,000
2017-2018 January Program Contract 1	January 1, 2017 - December 31, 2018	472,170,373	4.50%	21,247,667
2017-2018 January Program Contract 2	January 1, 2017 - December 31, 2018	240,999,850	3.30%	7,952,995
2017-2018 January Program Contract 3	January 1, 2017 - December 31, 2018	135,000,000	6.35%	8,572,500
2017-2018 January Program Contract 4	January 1, 2017 - December 31, 2018	5,000,000	5.70%	285,000
2017-2018 April Program Contract 1	April 1, 2017 - March 31, 2018	738,633,400	3.00%	22,159,002
2017-2019 April Program Contract 1	April 1, 2017 - March 31, 2019	186,780,000	3.10%	5,790,180
2016-2018 April Program Contract 1	April 1, 2016 - March 31, 2018	259,876,500	3.10%	8,056,172
2016-2019 April Program Contract 1	April 1, 2016 - March 31, 2019	124,999,920	3.25%	4,062,497
2015-2017 August Program Contract 2	August 1, 2015 - July 31, 2017	200,000,000	4.50%	9,000,000
2016-2019 August Program Contract 1	August 1, 2016 - July 31, 2019	200,000,000	4.15%	8,300,000
2015-2020 August Program Contract 1	August 1, 2015 - July 31, 2020	139,000,000	4.23%	5,879,700
2016-2017 December Program Contract 1	December 1, 2016 - November 30, 2017	80,000,000	5.75%	4,600,000
2017 January Program Contract 5	January 1, 2017 - December 31, 2017	72,000,000	5.30%	3,816,000
2016-2017 May Program Contract 1	May 1, 2016 - November 30, 2017	100,000,000	3.55%	3,550,000
2016-2018 June Program Contract 1	June 1, 2016 - May 31, 2018	49,999,980	5.40%	2,699,999
2015-2017 August Program Contract 1	August 1, 2015 - July 31, 2017	93,750,000	5.60%	5,250,000
2016-2017 August Program Contract 1	August 1, 2016 - July 31, 2017	93,750,000	5.50%	5,156,250
2015-2017 December Program Contract 1	December 1, 2015 - November 30, 2017	124,999,980	5.50%	6,874,999
2015-2017 December Program Contract 1	December 1, 2016 - November 30, 2017	99,988,000	5.50%	5,499,340
2016-2018 December Program Contract 1	December 1, 2016 - November 30, 2018	74,998,000	5.60%	4,199,888
2015-2017 December Program Contract 2	December 1, 2015 - November 30, 2017	49,999,950	5.60%	2,799,997
2015-2018 August Program Contract 1	August 1, 2015 - July 31, 2018	93,750,000	5.80%	5,437,500
2016-2019 August Program Contract 2	August 1, 2016 - July 31, 2019	93,750,000	5.80%	5,437,500
Total Traditional Reinsurance		5,346,968,088		

Transformer Reinsurance Contracts	Contract Period	Reinsurance Limit	12-Month Rate-on-Line	12-Month Premium
2014 - 2017 Transformer Reinsurance Contract 1	December 1, 2014 - November 30, 2017	200,000,000	5.05%	10,126,970
2014 - 2017 Transformer Reinsurance Contract 2	December 1, 2014 - November 30, 2017	200,000,000	3.54%	7,220,177
2015 - 2018 Transformer Reinsurance Contract 1	September 16, 2015 - September 15, 2018	250,000,000	5.05%	12,712,517
2016 - 2019 Transformer Reinsurance Contract 1	December 1, 2016 - November 30, 2019	500,000,000	4.04%	20,287,517
2017 - 2020 Transformer Reinsurance Contract 2	May 16, 2017 - May 15, 2020	425,000,000	3.54%	17,406,285
2017 - 2020 Transformer Reinsurance Contract 1	May 16, 2017 - May 15, 2020	500,000,000	6.06%	33,094,316
Total Transformer Reinsurance		2,075,000,000		

Total Risk-Transfer Program	\$ 7,421,968,088
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**California Earthquake Authority
Total Risk-Transfer Program Premiums
as of June 30, 2017**

Traditional Reinsurance Contracts	Contract Period	12-Month Rate-on-Line	Year-to-Date Premiums
2017 January Program Contract 1	January 1, 2017 - December 31, 2017	4.40%	27,029,961
2017 January Program Contract 2	January 1, 2017 - December 31, 2017	3.20%	9,292,987
2017 January Program Contract 3	January 1, 2017 - December 31, 2017	6.25%	937,500
2017 January Program Contract 4	January 1, 2017 - December 31, 2017	5.60%	1,400,000
2016-2017 January Program Contract 1	January 1, 2016 - December 31, 2017	4.40%	20,803,158
2016-2017 January Program Contract 2	January 1, 2016 - December 31, 2017	5.70%	5,699,998
2016-2017 January Program Contract 3	January 1, 2016 - December 31, 2017	5.00%	2,500,000
2016-2017 January Program Contract 4	January 1, 2016 - December 31, 2017	2.60%	1,300,000
2017-2018 January Program Contract 1	January 1, 2017 - December 31, 2018	4.50%	21,247,667
2017-2018 January Program Contract 2	January 1, 2017 - December 31, 2018	3.30%	7,952,995
2017-2018 January Program Contract 3	January 1, 2017 - December 31, 2018	6.35%	8,572,500
2017-2018 January Program Contract 4	January 1, 2017 - December 31, 2018	5.70%	285,000
2016-2017 April Program Contract 1	April 1, 2016 - March 31, 2018	3.00%	5,677,733
2017-2018 April Program Contract 1	April 1, 2017 - March 31, 2018	3.00%	14,772,668
2017-2019 April Program Contract 1	April 1, 2017 - March 31, 2019	3.10%	3,860,120
2016-2018 April Program Contract 1	April 1, 2016 - March 31, 2018	3.10%	8,056,172
2016-2019 April Program Contract 1	April 1, 2016 - March 31, 2019	3.25%	4,062,497
2015-2017 August Program Contract 2	August 1, 2015 - July 31, 2017	4.50%	5,250,000
2016-2019 August Program Contract 1	August 1, 2016 - July 31, 2019	4.15%	8,300,000
2015-2020 August Program Contract 1	August 1, 2015 - July 31, 2020	4.23%	5,879,700
2016-2017 December Program Contract 1	December 1, 2016 - November 30, 2017	5.75%	4,600,000
2017 January Program Contract 5	January 1, 2017 - December 31, 2017	5.30%	3,816,000
2016-2017 May Program Contract 1	May 1, 2016 - November 30, 2017	3.55%	3,254,167
2016-2018 June Program Contract 1	June 1, 2016 - May 31, 2018	5.40%	2,699,999
2015-2017 August Program Contract 1	August 1, 2015 - July 31, 2017	5.60%	3,062,500
2016-2017 August Program Contract 1	August 1, 2016 - July 31, 2017	5.50%	3,007,813
2015-2017 December Program Contract 1	December 1, 2015 - November 30, 2017	5.50%	6,302,082
2015-2017 December Program Contract 1	December 1, 2016 - November 30, 2017	5.50%	5,041,062
2016-2018 December Program Contract 1	December 1, 2016 - November 30, 2018	5.60%	4,199,888
2015-2017 December Program Contract 2	December 1, 2015 - November 30, 2017	5.60%	2,566,664
2015-2018 August Program Contract 1	August 1, 2015 - July 31, 2018	5.80%	5,437,500
2016-2019 August Program Contract 2	August 1, 2016 - July 31, 2019	5.80%	5,437,500
Total Traditional Reinsurance Premium			212,305,831
Transformer Reinsurance Contracts	Contract Period	12-Month Rate-on-Line	2017 Premium
2014 - 2017 Transformer Reinsurance Contract 1	December 1, 2014 - November 30, 2017	5.05%	7,609,589
2014 - 2017 Transformer Reinsurance Contract 2	December 1, 2014 - November 30, 2017	3.535%	5,326,712
2015 - 2018 Transformer Reinsurance Contract 1	September 16, 2015 - September 15, 2018	5.05%	12,732,742
2016 - 2019 Transformer Reinsurance Contract 1	December 1, 2016 - November 30, 2019	4.04%	20,287,517
2017 - 2020 Transformer Reinsurance Contract 2	May 16, 2017 - May 15, 2020	3.54%	15,023,750
2017 - 2020 Transformer Reinsurance Contract 1	May 16, 2017 - May 15, 2020	6.06%	30,300,000
Total Transformer Reinsurance Premium			45,956,560
Total Risk-Transfer Program Premium			258,262,391

*Note: Additional risk transfer program contract expected in 2017

Governing Board Memorandum

September 20, 2017

Agenda Item 6: 2017 CEA Budget: Insurance Services Mid-Year Revision and Mitigation Mid-Year Revision

Recommended Action: Approve 2017 CEA Insurance Services Mid-Year Budget Revision. No action required on 2017 Mitigation budget.

Background:

CEA staff prepared and submitted to the Governing Board (which approved) annual budgets for Insurance Services and Mitigation based on all anticipated expenses for the 2017 CEA fiscal year¹ at the December 2016 Board meeting.

Analysis:

2017 Insurance Services Budget

Staff has prepared an attachment to assist the Board in analyzing the 2017 mid-year budget for Insurance Services.

- **Attachment A: 2017 Insurance Services Budget Mid-Year Revision**

Attachment A shows the originally approved 2017 insurance services budget; actual expenditures through June 30, 2017; proposed revisions to certain budget categories for the remainder of 2017, based on anticipated expenditures; and a proposed augmentation to the 2017 budget.

Budget-category-level revisions are proposed, based on anticipated expenditures for the remainder of 2017, which in the aggregate would cause a reduction of \$ 9,841,346 in total 2017 budget expenditures. In order to maintain CEA's 1-in-400 year financial-strength level (as approved by the Board at its December 2016 meeting), staff has had to increase the amount of risk-transfer CEA purchases, the added premium for which results in an increase in the Risk-Transfer budget of \$65,852,318. Reductions in non-risk-transfer budget categories totaling \$9,841,346 partially offset the budget shortfall caused by those additional risk-transfer premium payments, resulting in a net budget increase requested of \$56,010,972 for the remainder of 2017.

After analyzing CEA written-premium collections as of June 30, 2017, the 2017 annual-written-premium estimate is revised downward from \$675,000,000 to \$645,000,000. Comparing the revised mid-year 2017 budget to the revised written-premium estimate, the amount by which the CEA's "Statutory Expense Cap" exceeds the 2017 annual aggregate budget is down from \$6,375,942 to \$5,415,023 (a reduction of \$ 960,919). Following is a comparison of the original

¹ The CEA fiscal year is the calendar year.

(December 2016) Statutory Expense Cap calculation and the newly revised Statutory Expense Cap calculation.

ORIGINAL	
Summary of Proposed 2017 CEA Statutory Expenses/Expense Cap [projected statutory expense compared to projected statutory cap presented to Governing Board at December 2016 meeting]	
The projected statutory-expense portion of the proposed 2017 budget is \$34,124,058, which is less than the projected 6% cap of \$40,500,000:	
Projected 2017 written premium:	\$675,000,000
Statutory operating-expense cap 2017 (percentage)	6%
Statutory operating-expense cap 2017 (dollars)	\$40,500,000
Approved 2017 operating expense budget	\$34,124,058
Amount by which 6% cap exceeds proposed budget	\$6,375,942
REVISED	
Summary of Proposed 2017 CEA Statutory Expenses/Expense Cap [projected statutory expense compared to projected statutory cap presented to Governing Board at December 2016 meeting]	
The projected statutory-expense portion of the proposed 2017 budget is \$34,124,058, which is less than the projected 6% cap of \$40,500,000:	
Revised Projected 2017 written premium:	\$645,000,000
Statutory operating-expense cap 2017 (percentage)	6%
Statutory operating-expense cap 2017 (dollars)	\$38,700,000
Revised Proposed 2017 operating expense budget	\$33,284,977
Amount by which 6% cap exceeds proposed budget	\$5,415,023

2017 Mitigation Services Budget

Attachment B is offered to support analysis of the 2017 mid-year Mitigation Services Budget.

- **Attachment B: 2017 Mitigation Budget Mid-Year Revision**

Attachment B shows the Board-approved 2017 mitigation budget; actual expenditures through June 30, 2017; and proposed revisions to certain budget categories for the remainder of 2017, based on anticipated expenditures.

For the remainder of 2017, staff proposes reducing total budget expenditures by \$ 473,263, for a total Mitigation Services Budget expenditure of \$ 2,637,245.

Recommendation:

Staff recommends these Board actions:

- Approve the proposed 2017 Insurance Services mid-year revised budget, including a proposed budget augmentation of \$ 56,010,972 to meet Risk-Transfer responsibilities; and
- Direct staff to operate CEA business operations within the total, approved, revised budgets for Insurance Services and Mitigation Services.

CALIFORNIA EARTHQUAKE AUTHORITY
Insurance Services
Budgeted and Actual Expenditures
as of June 30, 2017

	(a)	(b)	(b2)	(c)	(d) (d=a+b+b2+c)	(e)	(f) (f=d-e)	(g) (g=e/d)
	Approved 2017 Budget 1/1/2017	Adjustments ^A	Adjustments 2 ^A	Augmentations	2017 Budget after Augmentations and Adjustments	Actual Expenditures	Augmented & Adjusted Approved Budget (d) vs. Actual Expenditures (e)	Percentage used of Augmented & Adjusted 2017 Budget
Human Resources:								
Compensation and Benefits	\$ 25,359,916	\$ (158,500)		\$ -	\$ 25,201,416	\$ 10,879,453	\$ 14,321,963	43.17%
Travel	707,298	(244,232)		-	463,066	133,925	329,141	28.92%
Other	766,310	(332,838)		-	433,472	138,469	295,003	31.94%
Board Meeting	22,100	(13,004)		-	9,096	1,596	7,500	17.55%
Administration & Office	1,351,140	(44,179)		-	1,306,961	806,790	500,171	61.73%
EDP Hardware	470,950	-		-	470,950	102,130	368,820	21.69%
EDP Software	1,099,915	-		-	1,099,915	284,640	815,275	25.88%
Information Technology	1,775,205	-		-	1,775,205	1,171,699	603,506	66.00%
Telecommunications	268,324	(3,278)		-	265,046	153,565	111,481	57.94%
Rent/Lease	1,693,900	(2,050)		-	1,691,850	558,895	1,132,955	33.03%
Compliance	60,000	(50,000)		-	10,000	-	10,000	0.00%
Government Affairs	146,000	-		-	146,000	60,769	85,231	41.62%
Insurance	175,000	-		-	175,000	90	174,910	0.05%
Internal Audit	100,000	(75,000)		-	25,000	-	25,000	0.00%
Intervener Fees	-	-		-	-	-	-	0.00%
Other	78,000	(1,000)		-	77,000	8,860	68,140	11.51%
Regulatory Expenses	50,000	(10,000)		-	40,000	-	40,000	0.00%
Risk Management	-	95,000		-	95,000	20,746	74,254	21.84%
Total Statutory Expenditures	\$ 34,124,058	\$ (839,081)	\$ -	\$ -	\$ 33,284,977	\$ 14,321,627	\$ 18,963,350	43.03%
Audit Services	116,000	-		-	116,000	74,500	41,500	64.22%
Capital Market	7,583,695	(112,922)		-	7,470,773	4,199,823	3,270,950	56.22%
Claims	124,000	(14,000)		-	110,000	1,147	108,853	1.04%
Loans	-	-		-	-	-	-	0.00%
Grants	12,000,000	(83,547)		-	11,916,453	133,340	11,783,113	1.12%
Investment Services	3,234,043	129,740		-	3,363,783	1,624,959	1,738,824	48.31%
Legal Services	3,567,500	(2,047,082)		-	1,520,418	498,660	1,021,758	32.80%
Loss-Modeling	1,123,500	-		-	1,123,500	284,940	838,560	25.36%
Marketing Services ¹	14,925,725	(229,454)		360,000	15,056,271	1,508,998	13,547,273	10.02%
Producer Compensation	67,500,000	(3,000,000)		-	64,500,000	32,522,122	31,977,878	50.42%
Participating Insurer Operating Costs	28,306,360	(2,175,000)		-	26,131,360	10,526,843	15,604,517	40.28%
Seismic Related Research	200,000	(180,000)		-	20,000	-	20,000	0.00%
Engineering Related Research	1,620,000	(1,290,000)		-	330,000	(18,686)	348,686	0.00%
Risk Transfer ²	246,947,682	-	9,841,346	56,010,972	312,800,000	146,925,023	165,874,977	46.97%
Total Non-Statutory Expenditures	\$ 387,248,505	\$ (9,002,265)	\$ 9,841,346	\$ 56,370,972	\$ 444,458,558	\$ 198,281,669	\$ 246,176,889	44.61%
Total Budget Expenditures	\$ 421,372,563	\$ (9,841,346)	\$ 9,841,346	\$ 56,370,972	\$ 477,743,535	\$ 212,603,296	\$ 265,140,239	44.50%

¹Augmentation to fund user experience and user interface website design from March 15, 2017 Governing Board Meeting Agenda Item 9.

²Proposed augmentation for additional risk transfer needs.

^AAdjustments to meet insurance services end of year projections.

CALIFORNIA EARTHQUAKE AUTHORITY
Mitigation
Budgeted Expenditures and Actual Expenditures
as of June 30, 2017

	(a)	(b)	(c)	(d) (d=a+b+c)	(e)	(f) (f=d-e)	(g) (g=e/d)
	Approved 2017 Budget 1/1/2017	Adjustments^A	Augmentations	2017 Budget after Augmentations and Adjustments	Actual Expenditures	Augmented & Adjusted Approved Budget (d) vs. Actual Expenditures (e)	Percentage used of Augmented & Adjusted 2017 Budget
Human Resources:							
Compensation and Benefits	\$ 1,602,015	\$ (235,263)	\$ -	\$ 1,366,752	\$ 610,833	\$ 755,919	44.69%
Travel	79,900	(34,900)	-	45,000	19,156	25,844	42.57%
Other	34,595	(17,800)	-	16,795	9,455	7,340	56.30%
Administration & Office	73,798	(100)	-	73,698	9,944	63,754	13.49%
EDP Software	100	(100)	-	-	-	-	0.00%
Information Technology	1,200	-	-	1,200	472	728	39.33%
Telecommunications	23,000	-	-	23,000	10,190	12,810	44.30%
Rent/Lease	140,700	(49,700)	-	91,000	44,977	46,023	49.43%
Total Operating Expenditures	\$ 1,955,308	\$ (337,863)	\$ -	\$ 1,617,445	\$ 705,027	\$ 912,418	43.59%
Investment Services	11,200	(400)	-	10,800	4,500	6,300	41.67%
Legal Services	10,000	(5,000)	-	5,000	-	5,000	0.00%
Marketing	384,000	(230,000)	-	154,000	-	154,000	0.00%
Seismic - Related	-	-	-	-	-	-	0.00%
Engineering - Related	750,000	100,000	-	850,000	83,517	766,483	9.83%
Total Other Expenditures	\$ 1,155,200	\$ (135,400)	\$ -	\$ 1,019,800	\$ 88,017	\$ 931,783	8.63%
Total Expenditures	\$ 3,110,508	\$ (473,263)	\$ -	\$ 2,637,245	\$ 793,044	\$ 1,844,201	30.07%

^AAdjustments to meet mitigation end of year projections.

CEA Governing Board Memorandum

September 20, 2017

Agenda Item 7: Approval for CEA process to contract to hire employees for upper-management and unique, high-skill positions

Recommended Action: Approve recommended process and accept CEO Glenn Pomeroy's recommendation to direct-hire four contract employees

Background:

When the CEA opened for business in 1996, the CEA law provided a 25-person limit on how many CEA employees could be hired "subject to civil service positions." Because 25 staff members were not sufficient to carry out the CEA's Governing Board-directed, publicly adopted mission, CEA hired many staff through employment agencies in order to fill critical skilled-work needs.

Since 2013, when the CEA law was amended to eliminate the 25-person cap on CEA employees who could be hired subject to civil service provisions, CEA's workforce of civil service employees has grown further. But a significant majority of the CEA workforce are still employed through employment agencies, including both upper-level management and some non-management, high-skill positions.

The CEA law broadly authorizes the CEA Governing Board to fill positions outside of civil service. Because of the complex nature of the CEA's insurance and related business activities and its position in a competitive retail insurance marketplace and as a major, world-leading participant in the multi-billion-dollar global risk-transfer marketplace, both upper-management and executive positions within CEA require candidates who have unique knowledge, skills, and abilities associated with the high-level work they are hired to perform.

In fact, as CEA's insurance capacity increases (it is now well over \$15 Billion and growing quickly) and its additional activities become more complex (as an example, EQ loss-mitigation programs providing millions of dollars in grants and national research support in seismic science and engineering), the level of business risks to the organization become greater: a strong bench of upper-level staff available to fill CEA's numerous critical roles is both available to the CEA, and the only workable way, to mitigate these significant risks associated with the CEA's continued successful operation.

In order to spur growth as the leading earthquake-insurance enterprise in the country and one of the largest in the world, CEA must recruit and retain qualified, skilled professionals—

leaders, managers, and uniquely skilled staff who have insurance-industry experience in leadership roles, as well as private-sector technical and business acumen.

Analysis:

The CEA has been afforded a unique statutory authority that guides how CEA's Governing Board is authorized to staff CEA's operations.

- California Insurance Code sections 10089.5–10089.54 authorizes the Board to conduct CEA business operations in several different ways, including by contracting with officers and employees to administer the Authority.
- While a number of CEA employees are and will remain subject to civil service provisions, Insurance Code section 10089.7 provides the Governing Board a plenary authority and power to “employ or contract with that staff and those professionals the board deems necessary for its efficient administration.”
- And in the CEA law, in very broad terms, the Governing Board is empowered “without limitation” to perform “all acts that relate to the function and purpose of the authority, whether or not specifically designated in” the CEA law.

To sum up, key to the CEA's successful operations over more than two decades has been the flexibility the Board has employed to attract and retain talent at high levels who bring important, needed professional skillsets. But often—both at the upper-management levels and with certain non-management staff whose unique and needed skillsets the CEA requires—the use of that staffing technique comes at a considerable price, when the staff members recruited and retained come to CEA through professional employment agencies or consulting firms, whose business model adds expense to the hire. Asserting the Governing Board's clear statutory authority to hire the talent directly will be highly favorable to CEA's prospects, near- and long-term, both in terms of retention of the talent as permanent, non-temporary employees and the ability to compensate those employees at a reasonable wage, free of agency mark-up.

The four positions being proposed are:

- Director of Insurance Education & Sales Support
- Mitigation Director
- Reinsurance and Risk Transfer Director
- Chief Information Security Officer

Recommendation

Based on the analysis provided and the authority cited above, staff recommends that the Governing Board recognize, and delegate to the chief executive officer, its flexible hiring authority to permit the hire of (1) certain specialized, management-level staff and (2) non-management-level staff who possess a specialized skillset that cannot be obtained through civil service, as at-will employees.

Governing Board Memorandum

September 20, 2017

Agenda Item 8: CEA-supported mitigation-related projects and activities

Recommended Action: No action required—information only

The CEA Mitigation Department manages multiple projects, focusing on expanding mitigation resources for homeowners and technical professionals statewide, as well as developing and collecting data to broaden those mitigation efforts.

1. Guidelines Development

ATC 110, the earthquake-guidelines-development project, will create additional statewide retrofit standards that can be used to reduce earthquake damage in single-family dwellings.

In addition to creating a uniform seismic-retrofit-design methodology for homeowners, contractors, and engineers, the new guidelines will help the CEA and others (1) establish and expand incentive programs to encourage seismic retrofits, such as that of the California Residential Mitigation Program, and (2) enhance the CEA's ability to develop and provide suitable mitigation discounts for CEA-insured homeowners.

The CEA is providing the funding, and CEA's Chief Mitigation Officer Janiele Maffei and FEMA's Mike Mahoney are jointly managing the project.

2. FEMA P-50/P-50-1 Training, Simplified Seismic Assessment Certification, and QuakeGrade™

FEMA P-50/P-50-1 Training:

CEA contributed funds to develop FEMA P-50 and FEMA P-50-1. While the tool has been available for use by inspection professionals, so far it has not been widely distributed or used.

CEA took the initiative and brought the FEMA P-50 evaluation tool—and related training—to California inspection professionals in 2015, for the following reasons:

- To help homeowners interested in retrofits learn associated risks and vulnerabilities.
- To provide home-buyers information at time of sale regarding potential seismic risks in light of structure vulnerabilities.

- To provide additional inspection resources in support of CEA’s Hazard Reduction Discount program.

As of May 2017, 240 inspectors had completed the CEA-supported FEMA P-50 training. In collaboration with the California Real Estate Inspection Association (CREIA) and the American Society of Home Inspectors (ASHI), outreach for the training targeted home inspectors, since the tool would naturally extend the services they already provide.

Simplified Seismic Assessment Certification

With CEA’s assistance, CREIA is currently working with the Applied Technology Council (ATC) to develop a training curriculum to support CREIA’s implementation of a Simplified Seismic Assessor (SSA) certification. It is anticipated the program and certification process will be in place by year-end 2017.

Mobile Application – QuakeGrade™

CEA launched a web-based application, based on FEMA P50, for use by inspection professionals at the 2017 CREIA annual conference in May. The application is called QuakeGrade™, and it may be used on Macs/PCs and laptops running Safari, Chrome, or Internet Explorer browsers, and on mobile devices running iOS or Android operating systems.

QuakeGrade™ uses data the inspector inputs as they conduct a simplified seismic-assessment, noting certain structural and geological conditions of the house. From these data points, the application calculates a seismic-vulnerability score. A report is generated that describes the inspected house’s seismic vulnerabilities and identifies potential retrofit options that could mitigate the vulnerabilities and improve the vulnerability score.

There is potential for the application to incorporate the CEA Hazard Reduction Discount (HRD) form. CEA staff is working with CEA Technology and Insurance Operations to identify any needed modifications to QuakeGrade™, as well as any corresponding changes to the HRD form.

3. CRMP Earthquake Brace + Bolt Program:

Background:

Homeowners in the CRMP’s *Earthquake Brace + Bolt* (EBB) program ZIP Codes are eligible for an incentive payment of up to \$3,000 to help pay costs associated with seismically retrofitting their houses. EBB is operated by the California Residential Mitigation Program, a joint powers authority whose members are the CEA and the California Governor’s Office of Emergency Services.

The initial CRMP EBB pilot program ran in 2013 and 2014 in four ZIP Codes; eight retrofits were completed.

In 2015, CRMP EBB was available in 28 ZIP Codes, in seven cities: Oakland, San Francisco, San Leandro, Los Angeles, Pasadena, Santa Monica, and Napa; 526 retrofits were completed.

For the 2016 CRMP EBB program, funds provided by CEA from its Loss Mitigation Fund allowed for 600 retrofits. In addition, the 2015–2016 State budget included an appropriation of \$3,000,000 to the California Department of Insurance, with direction that the Department grant that money to the CEA, which would then contribute the funds to CRMP EBB—that process was completed and the funds were provided.

Additional information and analysis:

EBB will close out its 2016 program by the end of 2017. As of September 11, 2017, the following 2016-program retrofits have been completed or, some cases, remain in progress:

- 1. Completed 1,551
- 2. Permits received 5

All funds appropriated to the CDI, and then granted to the CEA for mitigation-grant purposes in the 2016 program, have been expended.

Napa Earthquake Brace + Bolt (CRMP):

CRMP’s Napa Earthquake Brace + Bolt program (Napa EBB) launched in February 2017.

Napa EBB is funded by the FEMA Hazard Mitigation Grant Program (HMGP) and by a partial CRMP EBB funding match provided with CEA support. Napa EBB will provide retrofit grants for 100 houses.

As of September 11, 2017:

Completed retrofits	82
Permits received (retrofit not completed)	3
Extensions (program is considering)	7

CRMP expects that the Napa program will reach its goal of 100 retrofits.

2017 CRMP EBB:

The 2016–2017 State budget included an appropriation of \$3,000,000 to the California Department of Insurance, with legislative direction that those funds be granted to CEA, which would contribute them to the CRMP EBB program. With the infusion of state-sourced funds, the goal for 2017 CRMP EBB is 2,000 retrofits.

Homeowner registration for the 2017 CRMP EBB program was open from January 25 through February 27 (2017), in 33 cities and more than 140 ZIP Codes. A total of 5,760 California homeowners registered for the 2017 program. A random selection was conducted in March 2017, accepting 4,000 qualified homeowners into the program. In June 2017, 1,700 homeowners on the waiting list were brought into the program.

As of September 11, 2017:

Completed retrofits	541
Permits received (retrofit not completed)	657
Extensions (program is considering)	437

Retrofits to date (all programs)

2014	9
2015	535
2016	1630
2017	2,000 (in progress)

2018 CRMP EBB:

At the May CRMP governing board meeting, additional cities were approved for the 2018 EBB program: Glendale, Monrovia, San Fernando, Sierra Madre, Colton, La Verne, Montecito, Santa Paula, Fillmore and Los Gatos. In addition, five more ZIP Codes will be included in Los Angeles (91607, 90025, 91352, 90043, 90037).

While State funding is not anticipated in 2018, in keeping with the program’s goal of continued annual growth, EBB’s goal will be to complete more than 2,000 retrofits in 2018.

Future Funding Opportunities:

CRMP continues to look beyond present funding sources, which include the CEA Loss Mitigation Fund, to find additional EBB funding: more funding means more incentive

payments for more homeowners. The number of houses statewide that need retrofits far exceeds funding now available or identified.

6. CEA Brace + Bolt

Program: Background:

CEA’s pilot program, *CEA Brace + Bolt* (“CEA BB”), provides each selected CEA policyholder up to \$3,000 toward a retrofit, as a grant to encourage strengthening their older houses located in CEA-identified high-seismic-activity areas. Once the brace-and-bolt retrofit is complete and verified, each participating policyholder will qualify for CEA’s new 20 percent Hazard Reduction Discount on their earthquake premium.

This initiative has a sound financial basis: Retrofitting sufficient numbers of older houses in California’s higher-seismic-risk areas can reduce the CEA’s long-term need for, and therefore its cost of, risk-transfer.

Operating within CEA Governing Board-approved program rules, the CEA BB program offers benefits to eligible CEA policyholders who:

- own a pre-1940 house in one of the 10 selected ZIP Codes whose characteristics qualify for a code-compliant brace-and-bolt retrofit; and
- have insured their house with CEA for at least three years.

The 10 ZIP Codes, five each in Northern and Southern California, are:

Northern California

94501
94602
94611
94705
94707

Southern California

90027
90048
91030
91104
91108

Additional information and analysis:

The CEA Brace + Bolt (CEA BB) pilot program launched with the delivery of letters of invitation mailed in October 2016 to approximately 3,200 CEA policyholders.

As of September 11, 2017, in progress were:

- Completed retrofits 49
- Permits received 27
- Extensions (considering) 19

To increase the number of completed retrofits, staff currently is considering the use of other strategies, including the possibility of a professionally managed construction package,

overseen by the CEA, to provide both retrofit inspections and the requisite code-based retrofit work.

Recommendation:

No action required—information only.

Governing Board Memorandum

September 20, 2017

Agenda Item 9: CEA Research Program: Projects

Recommended Actions: No action required—information only

Background:

With Governing Board support and approval, CEA launched a new Research Program in 2017. The program includes three tiers of funding for multiple disciplines of research, all relevant to CEA's mission to provide affordable, accessible earthquake insurance for those who own or rent residences in California.

Grant Program (Three Tiers)

Tier 1: Individual graduate/post-graduate student grants will be funded annually, with a primary focus of research. These grants will advance development of human resources and higher education. Those supported graduates/post-graduates who later move to research institutions, whether domestically or abroad, have the potential to increase California's and CEA's links to advanced research related to earthquake-associated behaviors and earthquake damage and insured loss.

Tier 2: The primary focus of the biennial research-grants program is research. Tier 2 grants will also advance development of institutional knowledge and expertise that will serve policymakers and the insurance industry, including CEA.

The Tier 2 grant will be geared toward early-career professionals, who have six years or less in their chosen career. Whether they continue at or move to research institutions domestically or abroad, or move into the private sector, this pool of experts will have the potential to increase California's and CEA's links to advanced research related to earthquake-associated behaviors and earthquake damage and insured loss.

Tier 3: Special Research Projects will continue, based on CEA's current competitive procurement process.

CEA Research and Legal staff have been collaborating on draft policies and procedures for the program. Anticipated rollout of the program is end of 2017.

CEA Research Forum

The three-tiered CEA Grant Program will be amplified and extended by continuing the CEA Research Forum, which includes participation of both academic and professional earthquake communities. The first forum was held in February 2017 at the Sacramento Convention Center. The 2018 Research Forum is being planned for January 2018.

Research Projects

1. Cripple Wall Performance Effects

With the execution of a detailed, negotiated contract, the Cripple Wall Performance Effects research project launched with an initial meeting by CEA and Pacific Earthquake Engineering Research (PEER) Center staff in December 2016.

The project consists of seven tasks over a 42-month timeline:

Task 1: Literature Review – anticipated completion before year end 2017.

Task 1.1: Preliminary Report and Workshop.

Task 1.2: Final Report.

Task 2: Analyzing Building Inventory and Defining Representative “Index Buildings.”

Task 2.1: Develop Initial List of Building Variants

Task 2.2: Refine Variant List

Task 2.3: Develop Index Buildings to be Tested and Modeled.

Task 3: Selecting Ground-Motion Records and Developing Loading Protocols

Task 3.1: Selecting and Scaling Ground-Motion Records

Task 3.2: Adoption of Loading Protocol

Task 4: Experimental Program

Task 4.1: Development of an Experimental Database and Validation of Numerical Models.

Task 4.2: Dynamic Shake Table Tests of Diaphragm-Cripple Wall Subassemblies.

Task 4.3: Hybrid Tests to Understand the Damage propagation During Shaking.

Task 4.4: Quasi-Static Component and Subassembly Tests.

Task 4.5: Development of a Comprehensive Shake Table Test Plan of a Full-Size Cripple Wall Supported House.

Task 5: Analytical Modeling.

Task 5.1: Model Validation and Calibration.

Task 5.2: Sensitivity Analyses of Short-Period Response.

Task 5.3: Development of Index House Numerical Models.

Task 5.4: Conduct Nonlinear Analyses.

Task 6: Development of Fragility-Modification Functions.

Task 6.1: Loss Model Calibration Framework.

Task 6.2: Fragility Function Database.

Task 6.3: Contractor-Estimator Workshop

Task 6.4: Engineering Demand parameter (EDP) Function Database

Task 6.5: Damage Function Development.

Task 6.6: PEER-Proprietary Model Calibration.

Task 6.7: Damage Function Adjustment Factors.

Task 7: Synthesizing and Reporting.

Task 7.1: Progress Reports.

Task 7.2: Report 1 for Portfolio Modelers.

Task 7.3: Report 2 for Lay Audience.

Task 7.4: Repository of the Data.

2. Update of CUREE General Guidelines and Development of Additional Engineering Guidelines

CEA and its PI claim adjusters rely on and use the Consortium of Universities for Research in Earthquake Engineering (CUREE) Publication No. EDA-02 *General Guidelines for the Assessment and Repair of Earthquake Damage in Residential Woodframe Buildings* in connection with both CEA and California Department of Insurance mandated training for earthquake-damage assessment and in performing post-earthquake damage assessments.

The CUREE Guidelines are an integral part of the evaluation and communication process when earthquake-loss claims are submitted by claim adjusters to CEA.

- When a claim adjuster investigates a claim and there is evidence of earthquake damage, the adjuster must complete the CUREE Guidelines “General Damage Earthquake Inspection Checklist,” which ensures consistent, complete inspections by all CEA PIs.
- The Checklist must be used by both employed and independently contracted adjusters.
- Optional forms include Attic and Crawlspace Checklists and the Occupant Questionnaire.

- Additionally, PIs are encouraged to sue the CUREE Guidelines to train claim adjusters to evaluate earthquake damage to residential structures.

CEA posted an RFQ/P on April 13, 2017, seeking a contractor to coordinate and manage an update to the current CUREE Guidelines, and to develop companion engineering guidelines for the engineering community to provide objective guidance regarding engineering aspects of the assessment and repair of earthquake damage to single-family woodframe dwellings. Responses were due June 30, 2017.

CEA received one response and an interview was held on September 7, 2017. Staff is working with the CEA Legal Department on contracting options.

Recommendation:

No action required—information only.

Governing Board Memorandum

September 20, 2017

Agenda Item 10: Governing Board approval of sole-source agreement with Southern California Earthquake Center to continue UCERF-related, California-specific seismic research

Recommended Actions: Approve CEA's entering into research agreement, as described

Background:

UCERF2

The CEA Governing Board has supported funding for a Uniform California Earthquake Rupture Forecast (“UCERF”) model since the project’s initiation in 2002. The first UCERF model (called “UCERF2”) was designed, in part, to address the lack of a statewide, uniform methodology to model “time-dependent” faults.¹

Before UCERF2, forecasting was performed for discrete California regions. The UCERF program ensures that all forecasting within California is accomplished using a uniform methodology, eliminating North-South differences caused by timing of the analyses or different analytical approaches.

CEA also has supported research to update ground-motion models (“GMM”) concurrently with each new UCERF model. The first CEA-supported GMM was NGA-West, which, with UCERF2, was incorporated into the 2008 U.S. Geological Survey National Seismic Hazard Model in California.

In simple terms, (1) rupture-forecast models show the likelihood, location, and magnitude of an earthquake rupture, while (2) GMMs quantify ground motions at specific sites for given events.

Both models provide key inputs for the commercial earthquake-loss models CEA uses.

UCERF3

In 2014, the Working Group on California Earthquake Probabilities (“WGCEP”) published the Third Uniform California Earthquake Rupture Forecast, UCERF3. That

¹ Time-dependent fault-modeling assumes the probability of fault rupture is small following an event but increases with time. “Time-independent” fault modeling assumes that the probability of an event is not related to the time elapsed since the last event.

study, like UCERF2, was led by the U.S. Geological Survey (“USGS”), the Southern California Earthquake Center, and the California Geological Survey, with partial financial support from the California Earthquake Authority.

Updates to the National Seismic Hazard Maps and models those maps represents multi-year projects, drawing on the expertise of hundreds of scientists. For example, the CEA Board approved funding for UCERF3 and NGA-West2 in October 2009, soon after the release of UCERF2.

Each successive forecast incorporates new data, innovations, and lessons-learned from recent earthquakes. UCERF3, overall, confirmed previous findings but with some significant changes because of model improvements.

Fault Systems, Not Segments

The USGS reports that past forecasting models “have generally assumed that earthquakes are either confined to separate faults, or that long faults like the San Andreas can be divided into different segments that only rupture separately.”²

In prior models, the edges of fault segments were considered “boundaries,” and earthquakes were expected to rupture within these boundaries.

But according to USGS, all three of the most-recent, largest earthquakes in California ruptured “right past” previous boundaries. These were the 1992 magnitude-7.3 Landers, the 1999 magnitude-7.2 Hector Mine, and the 2010 magnitude-7.2 El Mayor-Cucapah earthquakes. The 2011 magnitude-9.0 Tohoku (Japan) earthquake also ruptured past previously understood boundaries.

Consequently, UCERF3 considers California fault *systems*, not just fault segments.

Multi-fault ruptures:

One of the most significant changes in UCERF3 is its inclusion of *multi-fault ruptures*, where earthquakes are not confined to separate, individual faults but can occasionally rupture multiple faults simultaneously. Multiple-fault ruptures can lead to larger earthquakes, as well as earthquake “series,” where an earthquake triggers quakes on nearby faults (“jumping” from one fault to another), potentially growing longer, and therefore of greater magnitude than the originating fault can produce.

For example, the 2016 magnitude-7.8 Kaikoura (New Zealand) earthquake ruptured more than 12 separate faults, in some cases jumping large separations between individual fault segments.³

² UCERF3: A New Forecast for California’s Complex Fault System
<https://pubs.usgs.gov/fs/2015/3009/pdf/fs2015-3009.pdf> (last checked 8/22/2017)

³ <http://www.bbc.com/news/science-environment-39373846> (last checked 8/18/2017)

UCERF3 Findings:

The increased rate of larger earthquakes must be balanced by a decreased rate of lower-magnitude events in order to maintain the overall plate-tectonic, fault-system “budget.” So in UCERF3 (compared to previous forecasts, including UCERF2), the likelihood of moderate-sized earthquakes (magnitudes 6.5 to 7.5) is lower, but the likelihood of larger events is higher.

The estimated rate of earthquakes of around magnitude 6.7 (the size of the destructive 1994 Northridge earthquake) has decreased by about 30 percent. The expected frequency of such events statewide has dropped from an average of one per 4.8 years (in UCERF2) to about one per 6.3 years (in UCERF3).

As in UCERF2, the likelihood of magnitude 6.7 and larger earthquakes occurring somewhere in the Greater California Region in the next 30 years remains a near certainty (greater than 99%). But the likelihood that California will experience a magnitude 8 or larger earthquake in the next 30 years increased by almost 50 percent (from about 4.7% in UCERF2 to about 7% in UCERF3).

Results from the new UCERF3 forecast model vary across the state.

- A greater increase in the likelihood of larger earthquakes in the Los Angeles Region compared to most of California—the region has more faults that can host multi-fault ruptures.
- As in previous studies, UCERF3 considers the Southern San Andreas Fault the most likely to host a large earthquake.
- The Northern San Andreas Fault has a lower likelihood of hosting an earthquake (compared to the Southern San Andreas), partly because of the relatively recent 1906 earthquake on that fault.
- But the Hayward-Rodgers Creek and Calaveras Faults are more likely to rupture (compared to the Northern San Andreas), because it has been a long time since the last earthquakes occurred on those faults.

The commercial earthquake-loss models the CEA uses have been updated to incorporate the latest UCERF3 model, though in some cases quite recently. CEA is reviewing the impacts on its portfolio.

- It is expected that the potential for larger-magnitude events will continue to put upward pressure on the amount of risk-transfer CEA requires to maintain current claim-paying-capacity targets.
- As well, the regionalized changes in the new UCERF3/NGA-West2 models will, as with past model updates, result in both indicated increases and indicated decreases, depending on location.

Analysis:

The UCERF3 model represents a substantial advancement in science. It is also highly complex, yielding more than 250,000 fault-based ruptures (25 times more than the UCERF2 model.)

To deal with the complexity, a preliminary step toward the next iteration of rate-forecast models is identifying which of the models “branches” most influence results. The project proposed today will focus specifically on impacts to the CEA and, through combining analyses and workshops, identify areas for future research and refinement in a UCERF4.

Although CEA is not obligated to advance the scientific understanding of seismic risk in California, staff continues to believe that it is in the CEA’s best interests to do so. Seismic research is the underpinning for many of the CEA’s actions such as:

- Developing the structure and cost of innovative insurance products, using the best available science
- Understanding the amount of risk-transfer CEA needs to ensure the coverage needs and claims of future policyholders
- Measuring the effects of risk-reduction features on expected policyholder losses (e.g., to support a more robust hazard-reduction discount)
- Effectively communicating risk to CEA policyholders and other stakeholders
- Quantifying the anticipated total cost of a damaging earthquake using the CEA’s proprietary EARLE process

This project has been carefully designed to address issues of great importance to the CEA, and it is proposed to be managed and carried out with the cooperation of the same research partners as the UCERF3 project: the USGS and Southern California Earthquake Center will have leading roles in the development, progress, and quality control of the project, with oversight and appropriate management to be provided by the CEA Research Department.

Attachment A describes in detail the project, the project-management structure, anticipated project costs, and the deliverables schedule. As with past UCERF projects, USGS and SCEC will help support the overall costs of the project:

- Importantly, SCEC will use its national supercomputer allocation, without which the analysis cannot be performed since that time alone would cost at least \$100,000.
- Support for salary and travel adds about \$100,000 of additional contribution from SCEC and USGS.

Sole-source justification

As explained in the discussion and analysis above, the work is proposed to be done by what CEA staff regards as the parties uniquely and best qualified: the USGS and the Southern California Earthquake Center. To solidify that view, CEA staff prepared and advanced a formal sole-source justification, based on CEA’s written criteria, which has been approved by CEA’s general counsel and its CEO, each of whom found the proposed project to be appropriate and within the relevant sole-source criteria.

Recommendation:

Staff recommends that the CEA provide research funding for the proposed research project (as described in *Attachment A*), at a total expenditure level of \$369,771. Project funding will be incorporated into the CEA's 2018 budget. No augmentation is necessary for the 2017 budget (the 2017 CEA budget includes \$200,000 for seismic research, and that sum will not be expended in 2017).

The supporting agreement will be presented to the Governing Board for its review and approval upon the parties' agreeing in final form on all proposed project features.



Southern California Earthquake Center

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A PROPOSAL

Submitted to

**California Earthquake Authority
801 K Street, Suite 1000
Sacramento, CA 95814**

from the

**University of Southern California
Southern California Earthquake Center
University Park
Los Angeles, CA 90089-0742**

for

Evaluation of UCERF Uncertainties and Valuation of Uncertainty Reduction

Principal Investigators:

Thomas H. Jordan, SCEC Director
W. M. Keck Professor of Earth Sciences
213-821-1237; 213-740-0011 (fax)

John E. Vidale, SCEC Director-Designate
Dean's Professor of Earth Sciences
213-821-9613; 213-740-0011 (fax)

Duration:

January 1, 2018 to December 31, 2018

Total Cost:

\$369,771

University Business Office
Contact:

Evan Weisman
Department of Contracts and Grants
University of Southern California
Los Angeles, CA 90089-1147

ENDORSEMENTS

Thomas H. Jordan

John E. Vidale

Evan Weisman
Senior Contract and
Grant Administrator

August 2017

Name of Organization: University of Southern California
Southern California Earthquake Center

Type of Organization: Private University (A Non-Profit Corporation)

Primary Location: University of Southern California
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Professional Affiliations: PEER, EERI, FEMA, California OES, Los Angeles County
Emergency Survival Program, Earthquake Country
Alliance, American Red Cross, Los Angeles Unified
School District

Time in Business: 1880-present for University of Southern California
1991-present for Southern California Earthquake Center

Clients Served: National Science Foundation
United States Geological Survey
California Department of Transportation
California Earthquake Authority
Swiss Reinsurance
UNAVCO
National Aeronautics and Space Administration
Department of Homeland Security
California Governor's Office of Emergency Services
Department of Energy
Federal Emergency Management Agency
Pacific Gas and Electric Company
Southern California Edison Company
W. M. Keck Foundation
Jet Propulsion Laboratory

Management History: SCEC is managed by a Center Director, Thomas Jordan,
and by a Board of Directors (see www.sceec.org)

Web Site Address: www.sceec.org

Federal Tax ID (for USC): 95-1642394

Evaluation of UCERF Uncertainties and Valuation of Uncertainty Reductions

*A proposal from the Southern California Earthquake
Center to the California Earthquake Authority*

Summary

With the completion of the 3rd Uniform California Earthquake Rupture Forecast (UCERF3) project, which achieved its stated goals and resolved several first-order scientific questions (see Field et al. (2007b) for a synopsis), the question naturally turns to what further improvements are within reach (UCERF4). This proposal lays the groundwork for answering this question in the context of CEA's interests. Two promising project elements are:

- 1) Conduct logic-tree sensitivity analysis with respect to statewide losses
- 2) Host workshops to discuss possible improvements for UCERF4

The first element will assess the potential value of eliminating each epistemic uncertainty in UCERF3, or logic-tree-branch option as defined below, thereby indicating what future scientific pursuits would be most worthwhile from a cost-benefit perspective. Armed with this framework, we will then host workshops among the broader community to discuss the pathway to this goal of reducing influential uncertainties. Quantification of the relative value of scientific pursuits would be a significant advance, as past UCERF efforts were guided only by educated guesses. Eliminating highly unlikely and/or very low risk logic-tree-branch options can also simplify risk calculations and reduce computational expense. The workshops will also address whether other currently unrepresented features or uncertainties should be included in any forthcoming UCERF4, with rapid advancements in physics-based simulators likely getting significant attention. Finally, the workshops will provide a venue for user feedback, with adequate handling of the large rupture sets and accounting for epistemic uncertainties being prime topics.

Overview

The Working Group on California Earthquake Probabilities (www.WGCEP.org), a collaboration between the USGS, CGS, and SCEC, has now completed the 3rd Uniform California Earthquake Rupture Forecast (UCERF3), which was developed with significant support from the CEA. In so doing we have accomplished the three main goals identified for the project:

- 1) Relax fault segmentation assumptions and include multi-fault ruptures (UCERF3-TI; Field et al., 2014).
- 2) Apply more self-consistent renewal models (UCERF3-TD; Field et al., 2015).

- 3) Include spatiotemporal clustering to represent aftershocks and otherwise triggered events (UCERF3-ETAS; Field et al., 2017a).
- 4) Enable rapid update of the entire model following significant events.

Several earthquakes have reemphasized the importance of these goals since the UCERF3 project commenced, with the most dramatic being the Canterbury New Zealand sequence, which not only represented a spatiotemporal cluster of damaging earthquakes, but also was followed by the most complicated multi-fault rupture observed to date (the M 7.8 Kaikoura event). At least one leading scientific journal credited UCERF3 for being the cutting-edge in its ability to include such events (e.g., <http://www.sciencemag.org/news/2017/03/strange-behavior-new-zealand-quake-suggests-higher-chances-big-ones-elsewhere>), and other regions are now considering adopting UCERF3 methodologies.

That said, UCERF3 embodies assumptions, approximations, and estimated uncertainties that can be improved. In UCERF3, uncertainties are represented with a logic tree (Figure 1), where each branch represents an alternative viable model for how nature might produce the next earthquake. Although the influence of each uncertainty was quantified in the various UCERF3 publications, it was also emphasized repeatedly that such inferences depend heavily on the specific hazard or risk metric of interest. For example, one source of uncertainty might be very consequential for a site-specific study (e.g., a nuclear power plant or a dam), but relatively negligible with respect to statewide portfolio of assets. This means that forensic-level evaluations must be made on an application-specific basis, whereas only a few relatively simple hazard metrics were presented in the UCERF3 reports (e.g., the likelihood of $M \geq 6.7$ earthquakes inside specific regions, and hazard curves at specific sites of interest).

The bulk of the work proposed here is therefore quantifying the sensitivity of statewide loss estimates to each logic-tree branch for a representative CEA portfolio. In addition to the 5,760 branches associated with the long-term time-dependent UCERF3 model (UCERF-TD), we will include 15 different ground motion models (five empirical relationships times three different levels of added epistemic uncertainty, as applied in the 2014 USGS NSHMP; Petersen et al., 2015), and two different site-characterization models (Allen and Wald, 2009; Wills et al., 2015). These branches (Figure 1) lead to 172,800 different viable models (branch combinations), each of which has over a million distinct ruptures. The loss-modeling methodology described in Porter et al. (2012, 2017) will be applied, and access to high-performance computing resources will be required. The latter will be provided by SCEC through its HPC allocations at no cost to CEA.

The completion of UCERF3 has also led to questions about a future UCERF4, with many people assuming that follow up would be automatic. WGCEP participants, however, are well aware of the considerable time, effort, and resources put into UCERF3, so the appropriate question relates to what we would want to fix, or what improvements would make a UCERF4 model worth the effort. Addressing these questions before requesting resources is the primary motivation for conducting the workshops proposed here.

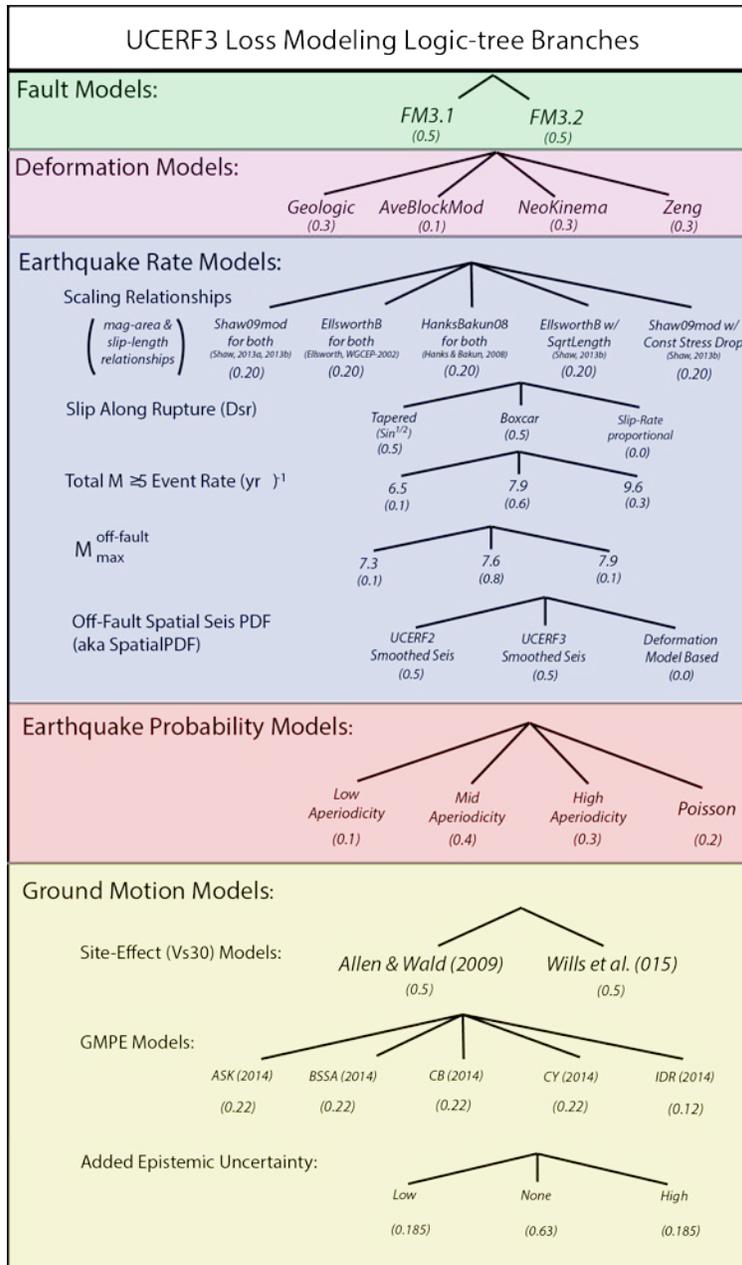


Figure 1. Logic-tree branches and associated weights to be utilized in this study. Those associated with ground-motion models are taken from the USGS 2014 NSHM (Petersen et al., 2015).

Reducing epistemic uncertainties (e.g., eliminating logic-tree branches) is one way to make improvements from UCERF3 to UCERF4. This elimination of branches can be achieved through improved models obtained from targeted research. We would obviously want to address the uncertainties that have the most influence, which again will depend on the hazard or risk metric of interest. With respect to the CEA's concerns, the logic-tree sensitivity analysis proposed here would allow us to produce a rank-ordered list quantifying the value of eliminating each logic-tree branch. Having this list ahead of the proposed workshops would enable informed, focused discussions on which scientific pursuits might be most fruitful in UCERF4 (balancing the

scientific effort needed to evaluate and potentially reject a branch against the value of doing so). This valuation will be focused on modeling aspects relevant to CEA's interests. CEA is not the only UCERF stakeholder, but CEA is uniquely qualified to be the initial partner in this effort, and the same methodology would be adapted to other applications and other stakeholders.

Our analysis will also indicate which logic-tree branches are negligible and can be ignored for numerical efficiency.

In addition to identifying the scientific studies needed to eliminate influential^[SA1] branches, the workshops will also review recent developments in all aspects of the model, including the inventory of faults, their slip rates, results from new paleoseismic studies, the influence of creep, how rupture area and slip scale with magnitude. We will also address what features or behaviors might be missing, such as super cycles and/or fault synchronization. "Super cycles" refer to long-term oscillating patterns in rates of seismic activity in a given region, that is, long periods of quiescence alternating with heightened earthquake activity. Results coming from physics-based earthquake simulators will figure prominently at these meetings, as they represent our best hope for addressing many outstanding questions, and rapid progress is being made on these types of models via SCEC's Collaboratory for Interseismic Simulation and Modeling (CISM).

The loss modeling proposed here builds on that published by Porter et al. (2017). This new analysis will go deeper in the following important ways:

- A CEA-specific portfolio will be the focus.
- We will add additional epistemic uncertainty to the ground-motion models (as applied by the USGS in the 2014 national maps), which will enable us to quantify the common assumption that most of the epistemic uncertainty is in these models, as opposed to the earthquake rupture forecast.
- More accurate site characterization models will be applied (Allen and Wald, 2009; Wills et al., 2015).
- In addition to considering mean annual losses, we will also attempt to quantify the influence of uncertainties on the portfolio loss-exceedance curve (LEC), which relates loss to a group of assets and the mean rate at which that level of loss is exceeded. This is non-trivial because correlated ground motions need to be considered when calculating portfolio loss, as described below.
- Consideration of additional modeling uncertainties (items 5-9 in the Appendix).

Benefits to CEA and its Policyholders

-
- The logic-tree sensitivity analysis will help indicate which future scientific studies will be most valuable or impactful with respect to CEA's risk metrics.
- The identification of negligible branches (tree trimming) should enable commercial loss modelers to provide reliable uncertainty estimates with far less computing power than demanded here, without significant loss of information.

- The workshops, coupled with the above analyses, will clarify what should be done in UCERF4 and beyond, enabling CEA to make a more informed decision on which specific elements warrant attention.

Tasks (Scope of Work)

1. Construct a proxy of CEA’s insurance portfolio from the Hazus-MH 2012 estimated inventory of all single-family dwellings in California, scaled down on a county-by-county basis (or another convenient geographic area to be defined) to reflect CEA’s spatially varying market penetration.
2. Using the methodology of Porter et al. (2012, 2017), calculate the mean loss for each of the ~6 million unique UCERF3 rupture scenarios (across all UCERF3-TD branches), each of the 15 ground-motion models, and each of the two site characterization models (180 million rupture scenarios). Losses will be saved at the census tract level, in case spatial variability is of interest, yielding about ~10 terabytes of data. High-performance computing will be accessed by leveraging SCEC’s resources.
3. Compute the statewide mean annual loss for each logic-tree-branch combination from the associated likelihood of each rupture (defined by UCERF3-TD), and compute the total model average by combining branch-combination values according to their relative weights.
4. Compute the potential value of removing each logic-tree-branch option as follows:
 - a. renormalize the weight of remaining branches so they sum to 1.0. For example, if we have removed the “Geologic” Deformation-Model option, divide the weights of the remaining options by their sum (0.7) to ensure the new weights sum to 1.0.
 - b. Re-compute the total model average with this branch missing, and then subtract the original total model average; this difference reflects the “value” of removing the given branch option.

Construct a rank-ordered list of values with respect to removing each branch option. Also present the information in graphical form through the use of tornado diagrams.

5. Apply the model-order-reduction technique of Porter et al. (2017) to identify which branches can be eliminated while still honoring the overall uncertainty level with respect to mean annual loss. Previous studies (e.g., Porter et al., 2017) imply that the number of logic-tree-branch combinations can be reduced by up to three orders of magnitude—from hundreds of thousands to hundreds—representing a huge reduction in computational demand.
6. Extend the above analyses from mean annual loss to the loss that has a specified probability of occurrence (a point on the loss exceedance curve), which requires (among other tasks) accounting for correlated ground motions in each rupture. In other words, rather than using just the mean (expected) loss for each rupture, we need a distribution of possible losses, which is influenced by the degree to which ground motions are spatially correlated (e.g., Jayaram and Baker, 2009). For example, consider the case in which all assets are in a town located on one side of a fault, and that the fault can produce only two different and equally likely earthquakes – one where the town is shaken very hard, and one where it is shaken very lightly. This would result in a bi-modal distribution of losses, with the mean value somewhere between. Unfortunately, it is not numerically feasible to compute a suite of correlated ground motions for each rupture, so our approach is to do so for a smaller set of

ruptures, and to use these results to establish general rules for converting the mean loss (computed above) to an approximate distribution for each rupture. Details are provided in the Appendix.

7. Compute the loss exceedance curve for each logic-tree-branch combination from the loss distribution and probability of each associated rupture, and apply steps 3-5 above to various points on the curve (the loss that has a specific probability of being exceeded rather than mean annual loss).
8. Document and present results.
9. Host workshops to discuss results and likely improvements in a UCERF4. To minimize travel expenses, we intend to have one workshop in Los Angeles (at USC) and another in the Bay area (at the USGS in Menlo Park). Examples of likely discussion topics were given in the Overview section above, and much more comprehensive treatments are given in the Discussion section of each UCERF3 report (Field et al., 2014, 2015, 2017).

Deliverables and Schedule

Project will begin on January 1, 2018 and will be completed by the end of that year.

Deliverables will include:

- 1) One or more reports describing the loss modeling and results (likely submitted to peer-reviewed journal(s) as well) and all data and source code will also be available; delivered by the end of 2018.
- 2) Report outlining goals and results of the workshops, delivered within three months of their completion (also likely published in a peer reviewed journal).

Project Personnel

Thomas Jordan (SCEC Director) – PI

John Vidale (SCEC Director-Designate) – co-PI

Edward Field (WGCEP chair) – Project manager

Keith Porter – Principal loss modeling scientist/engineer

Kevin Milner – IT Support

Christine Goulet – SCEC Executive Director of Special Projects

Research Budget: January 1, 2018 - December 31, 2018

I. SALARIES AND WAGES

Principal Investigators	
Thomas Jordan	0
John Vidale	0
Software Developer, 80%	90,000
Director for Special Projects	
Christine Goulet, 5%	<u>8,500</u>
TOTAL SALARIES AND WAGES	98,500

II. FRINGE BENEFITS

33.5% of I	<u>32,998</u>
TOTAL FRINGE BENEFITS	32,998

III. MATERIALS AND SUPPLIES

Computer Usage/Supplies/Workstations	0
Publication/Report Charges	<u>2,000</u>
TOTAL MATERIALS AND SUPPLIES	2,000

IV. SUBCONTRACTS

SPA Risk (PI: Keith Porter)	<u>100,000</u>
TOTAL SUBCONTRACT	100,000

V. PARTICIPANT SUPPORT COSTS

Project Workshops	<u>30,000</u>
TOTAL PARTICIPANT SUPPORT COSTS	30,000

TOTAL DIRECT COSTS	263,498
MODIFIED TOTAL DIRECT COSTS	163,498

VI. OVERHEAD

65% of MTDC	<u>106,273</u>
TOTAL OVERHEAD	106,273

TOTAL CEA BUDGET	369,771
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SCEC Cost Sharing

Salaries: SCEC will support the work of PIs Jordan and Vidale at a cost of ~\$30K. SCEC will support the balance of 20% of Kevin Milner's salary at a cost of \$44K (with fringe benefits and overhead)

Participant Support Costs: SCEC administrative staff will organize the project workshops including travel, venue set up, etc. This will cost ~ \$10K.

The United States Geological Survey will cover both Ned Field's time and travel costs of its personnel to the project workshops (the latter at a cost of ~\$8-10K).

Supercomputing Time: SCEC will make use of center allocations on national supercomputer machines at the University of Illinois, University of Texas, and possibly Oak Ridge National Laboratory. This computer time will cost at least \$100K.

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Appendix A:

Estimating portfolio loss exceedance curve (LEC)

The loss exceedance curve relates strongly to treatment of uncertainty in portfolio loss, so it is worthwhile to spend a page or so reviewing the sources of uncertainty in portfolio loss. Insurance portfolio loss represents an uncertain quantity that is bounded below but not above (at least effectively; loss to a large earthquake portfolio is unlikely to approach the total value of assets exposed). If one fixes the mean value of such a quantity but increases its uncertainty, the right-hand tail fattens. That is, the value with a high non-exceedance probability goes up. That situation applies in the present case, where we care about either the 1-year cumulative insurance loss with an exceedance probability between 0.004 and 0.01 (i.e., the 100- to 250-year loss), or the single-event insurance loss with similar exceedance probability. Either case represents a large, rare loss, the loss for which many insurers purchase reinsurance. To ignore important sources of uncertainty can lead to underestimating the likelihood of even-larger losses, which can lead to unacceptably high probability of a loss that exceeds the limits of reinsurance and produces a higher risk of financial ruin than the insurer intends. With this brief summary of why we care about uncertainty, let us compile a list of the most important sources of uncertainty:

1. Earthquake rupture forecast. UCERF3-TD involves 5,760 distinct models with nonzero probability. (UCERF3-TD incorporates several million nontrivial California ruptures, but their attributes are deterministic, given the UCERF3-TD logic-tree branch.)
2. Ground motion prediction equations. NGAWest-2 offers 5 models, 4 of which have 2 endogenous (within-model) continuous uncertain random variables, 1 (Idriss) with 1 explicit uncertainty and 1 that must be inferred to be useful in a portfolio risk analysis. The 2014 USGS NSHMP (Petersen et al., 2015) hypothesized the need for additional epistemic uncertainty, adding another variable with three options.
3. Vs30 model. Wald and Allen (2008) and Wills et al. (2015) offer two competing approaches to estimate Vs30, a site-condition parameter related to site amplification of ground motion.
4. Ground motion spatial correlation in a given rupture, which constrains the uncertainty in motion at each asset but increases variability of portfolio loss. The increase results from the way spatial correlation reduces the effect of the law of large numbers. With correlation, higher-than-expected losses are less likely to cancel out lower-than-expected losses in a single earthquake because more buildings in a metropolitan area can simultaneously experience higher-than-expected or lower-than-expected shaking.
5. Uncertain vulnerability, meaning that an asset of a given class subjected to a given level of ground motion experiences uncertain loss owing to variability of the engineering characteristics of assets within the class.
6. Uncertainty in mean vulnerability, meaning that all assets assigned to a specific asset class can have higher-than-expected or lower-than-expected loss in a given scenario, owing to uncertainty in the vulnerability model itself.
7. Demand surge, meaning the temporary increase in repair costs after major catastrophes, which seem to result mostly from increase in construction labor costs.

Other uncertainties exist that are harder to quantify or otherwise fall outside the framework of insurance loss modeling, such as the state of the economic cycle and various human factors such as policy decisions made after an earthquake. In any case, we wish to calculate the LEC for a portfolio that approximates all California single-family dwellings, accounting for each of items 1-4, and also making an earnest, first-cut attempt to address items 5-7. Here is how we aim to do so, in 3 general steps:

Step 1. Within OpenSHA, exhaustively calculate mean portfolio loss for each of 1, 2, and 3, i.e., for every rupture and every branch of UCERF3-TD, each NGAWest-2 ground motion prediction equation, each of three extra epistemic uncertainty values for the ground motion prediction equation, and each of two Vs30 models. Let us refer to a particular combination of rupture, UCERF3-TD branch, NGAWest-2 ground motion prediction equation, and degree of extra epistemic uncertainty as a scenario. Mean portfolio loss in a scenario then refers to the sum of the mean building repair cost for each asset conditioned on mean shaking.

Step 2. For a subset of scenarios in step 1 (combinations of rupture, ground motion prediction equation, added ground motion epistemic uncertainty, and Vs30 model), use a combination of Monte Carlo simulation (MCS) and moment matching (MM) to simulate many realizations over uncertainties 4-7: MCS for uncertainty 4, MM for 5 through 7. MM is more efficient than MCS but seems ill suited to simulating spatially correlated random fields of ground motion. Characterize the conditional distribution of portfolio loss, conditioned on rupture, ground motion prediction equation, added ground motion epistemic uncertainty, and Vs30 model. We hope the distribution will approximate some parametric probability distribution such as lognormal or beta, but the subsequent analysis can be completed even without a good parametric distribution. If the conditional distribution matches a parametric one (e.g., according to the Lilliefors goodness-of-fit test at 5% significance level), perform a regression analysis of parameters such as logarithmic standard deviation against convenient scalar independent variables (e.g., mean loss from step 1, earthquake magnitude, added ground motion epistemic uncertainty, and possibly additional geometric parameters such as average horizontal distance between pairs of buildings experiencing nonzero loss).

If the conditional distribution does not match a parametric distribution (e.g., the Lilliefors significance level exceeds 5% for lognormal, beta, etc.), then we calculate the first several moments of the nonparametric conditional distribution for each step-1 scenario and regress them against the selected scalar independent variables.

With either a parametric distribution or a nonparametric distribution, we will then be able to estimate the cumulative distribution function of loss at any given value, conditioned on knowledge of the independent variables. Let \mathbf{X} denote the vector of independent variables, let \mathbf{x} denote a particular vector value of \mathbf{X} , let Y denote uncertain loss as a fraction of portfolio limit of liability conditioned, and let y denote a particular value of y . Let $F_{Y|\mathbf{X}=\mathbf{x}}(y)$ denote the cumulative distribution function of Y evaluated at y conditioned on $\mathbf{X} = \mathbf{x}$, i.e., the probability that Y will take on a value less than or equal to y , given the occurrence of a step-1 scenario with mean loss, earthquake magnitude, etc., taking on vector value \mathbf{x} . Parametric distributions such as lognormal or beta generally have convenient ways to evaluate their cumulative distribution functions when one knows their parameter values. See Grinstead and Snell (2012) section 10.1 for a method to evaluate the probability mass function of a discrete-valued nonparametric distribution based solely on its moments; the cumulative distribution function evaluated at y is simply the sum of masses up to and including that of y .

Step 3. Use the regression analyses produced in step 2 to evaluate the cumulative distribution function of loss for all scenarios in step 1 at each of many loss levels. Let N_k denote a set number of loss levels at which we will evaluate the loss exceedance curve, let k denote an index to those loss levels, say $N_k = 26$, with $k \in \{0, 1, 2, \dots, N_k - 1\}$, and let us select loss levels in logarithmic increments of fraction of portfolio limit of liability, say $\{10^{-5}, 10^{-4.8}, 10^{-4.6}, \dots, 10^0\}$ times portfolio limit of liability, i.e., loss level k is associated with $10^{-5.0+0.2 \cdot k}$ times the portfolio limit of liability.

Why choose $N_k = 26$ loss levels in 25 increments of a factor of $10^{0.2}$? These quantities represent an initial selection that will be confirmed and if necessary revised in collaboration with the CEA, but they seem reasonable. The total replacement cost of all single-family dwellings in California is approximately \$3

trillion according to our own internal estimate. The CEA insures on the order of 10% of that amount, i.e., on the order of \$300 billion (<https://goo.gl/vxhgWf>). It has claims-paying capacity of on the order of \$15 billion (<https://goo.gl/E61ntr>), about 5% of our estimate of the total replacement cost of all insured property. Deductibles cause a ratio of claims to repair cost on the order of associated with repair costs on the order of 10^{-5} times total replacement cost might amount to something on the order of $5 \cdot 10^{-6}$ times total replacement cost, or \$1.5 million, about 0.5% of the CEA's capital (<https://goo.gl/E61ntr>). Thus, the repair-cost bounds of 10^{-5} and 10^0 times replacement cost new seem to reasonably correspond to the loss domain of interest to the CEA, while 25 logarithmic increments seem to offer reasonable resolution for the loss exceedance curve.

Let N_i denotes the number of scenarios in step 1, and let i denote an index to them, i.e., $i \in \{0, 1, 2, \dots, N_i - 1\}$. Each scenario i has an occurrence rate λ_i that accounts for its occurrence rate conditioned on UCERF3-TD branch and the product of the weights associated with the combination of branch, ground motion prediction equation, etc. Then the loss exceedance frequency of loss level k is given by

$$LEC(10^{-5.0+0.2 \cdot k}) = \sum_{i=0}^{N_i-1} \lambda_i \cdot (1 - F_{Y|X=x}(10^{-5.0+0.2 \cdot k})) \quad (\text{A-1})$$

The loss exceedance curve is estimated by evaluating LEC at each value of k and connecting the discrete values piecewise with curves or lines.

Governing Board Memorandum

September 20, 2017

Agenda Item 11: Establishment by CEA of a nonprofit charitable foundation to support financial-incentives and mitigation activities

Recommended Actions: Approve the establishment of the CEA nonprofit charitable foundation

Background:

Established by law, CEA's Earthquake Loss Mitigation Fund holds monies CEA uses to carry out mitigation programs for all Californians, including, at present:

- Funding most Earthquake Brace + Bolt (EBB) grants paid by the California Residential Mitigation Program ("CRMP")
- Paying personnel and administrative costs to support EBB-grant programming
- Funding research on retrofit performance of single-family houses
- Paying to support and develop new "pre-engineered standards," to enable cost-effective retrofits of more types of seismically vulnerable houses

While EBB as a start-up program has made good progress over the past four years, completing more than 3,200 seismic retrofits, the number of houses in need of EBB strengthening far exceeds the level of funding available or identified at this time. CEA estimates that more than **1.2 million older houses** in high-seismic-hazard areas in both Northern and Southern California are particularly vulnerable to earthquakes because of their construction types—this estimate describes an approximately **\$3 billion challenge** in terms of cost to retrofit.

These older houses are not bolted to their foundations, and they commonly have unbraced "cripple walls" (low stud-walls between the foundation and first floor) that form a crawl-space. In a strong earthquake, the crawl-space is vulnerable to collapse, dropping the house to the ground or causing it to slide off its foundation.

This resulting damage can be extremely costly to the homeowner. For example, because of the moderate (6.0 M) 2014 South Napa earthquake, owners of houses that suffered this type of damage received construction estimates of up to \$300,000 for repairs, including the extensive and expensive work involved in lifting the house while the foundation is rebuilt beneath it.

Basic code-compliant retrofits of pre-1979 houses—that is, completing the steps highlighted in the California Insurance Code to support favorable earthquake-insurance pricing (bolting frame to foundation, bracing cripple walls with plywood or equivalent)—can greatly reduce the likelihood of this expensive and dangerous damage to family homes. Typically, the retrofits are

both quick to accomplish and reasonable in cost. And if the homeowner of the retrofitted house is a CEA customer, the price of the CEA earthquake insurance policy is reduced by up to 20 percent.

Funding Retrofit Grants, To Date

While CEA (with funds in its Earthquake Loss Mitigation Fund) provides the only ongoing funding source for retrofit grants, CEA has also received funds (1) as a result of two appropriations to the Department of Insurance by the State of California, then granted to CEA for CRMP use, and (2) from FEMA (through a sub-grant approved by Cal OES), also for CRMP use.

1. Department of Insurance appropriation. In the 2015–2016 and 2016–2017 State budgets, respectively, two \$3 Million appropriations to the Department of Insurance allowed the Department to grant \$3,000,000 to CEA for each of two years, under an agreement that the grant proceeds were to be used for CRMP-EBB grants. With CEA funding the related administration costs, the state funds contributed to 1,000 retrofits in EBB’s 2016 program, with a similar 1,000 retrofits state-funded anticipated for EBB’s 2017 program (still in progress).

The CEA understands the state is not planning to authorize funding to benefit the 2018 EBB program.

2. Also in 2015, CEA applied for and received \$300,000 from FEMA from its Hazard Mitigation Grant Program (HMGP), to provide retrofit grants for 100 houses in Napa.

CEA now has another application pending with FEMA’s HMGP, seeking \$3 Million to retrofit 1,000 houses beginning in 2018.

TOTAL RETROFITS TO DATE

2014	9
2015	535
2016	1630
2017	2,000 (in progress)
2018	2,000-plus (goal)

Significant, Additional Funding Sources Are Essential

To accelerate the strengthening of the most vulnerable housing stock in California, CEA must consider stimulating and fostering significant, additional funding sources. To explore one promising source, CEA staff is recommending to the CEA Governing Board that it authorize staff to begin the process of establishing a nonprofit, federal-tax-exempt foundation.

Mitigation Remains a Good Investment—Retrofit Projects Create Jobs

According to independent research conducted under the direction of the National Institute of Building Sciences—*Natural Hazard Mitigation Saves, version 2*—mitigation remains a good investment. The research concludes that all natural-hazard mitigation measures studied (including brace-and-bolt retrofits) are more cost-effective than the 4:1 benefit/cost ratio (BCR) estimated in the earlier 2005 study. An updated BCR is due to be released in 2018.

In addition, EBB retrofit projects directly create jobs. A critical component of the EBB program is the Contractor Directory that program participants can use to identify and hire a FEMA-trained contractor to undertake their project. The Directory features 845 sole-proprietors and small businesses ready and willing to perform retrofit work.

In an effort to determine how many jobs an EBB project creates, a CEA-staff review looked at the relationship of retrofits performed to jobs created and found that 1,000 retrofits lead to 40 direct jobs. (*Assumptions: (1) Average of 80 hours of labor per retrofit (based on sample of 74 actual invoices with reported hours). (2) 2,000 hours is a full-time equivalent.*)

This estimate does not consider the indirect jobs and other beneficial, induced activities created through retrofit activity.

Proposal

The foundation described below could greatly expand funding, participation, and support beyond the limited means of CEA's Earthquake Loss Mitigation Fund, and would support many additional and needed retrofit grants statewide, while also supporting carefully selected mitigation projects and research.

Foundation operations would be completely transparent. Its functions would include receiving tax-favored contributions from a variety of sources, maintaining these funds in separate, insured accounts, and then disbursing from accumulated funds sums earmarked for clearly defined grant programs and other appropriate mitigation-related purposes, such as relevant, productive research. The foregoing activities all would be conducted under the supervision of a board of trustees selected by the CEA Governing Board.

California enjoys one of the largest economies in the world—accumulated private donations could be a critical source of funding for residents. With a charitable foundation as an accumulator of contributed funds, individual and corporate donors would be permitted to claim federal and state charitable deductions for the charitable portions of their contributions to the foundation. In addition, the foundation could have strategic relationships with other foundations, providing additional funding and expanding the foundation's reach.

The resulting financial support for mitigation programs would produce benefits not otherwise available.

As a first step, the CEA Governing Board would approve the basic foundation-establishing documents:

- Statement of Purpose
- Articles of Incorporation

Articles of Incorporation would be filed with the California Secretary of State to establish the legal existence of the foundation.

In December, the Board would be asked to approve (for the foundation) a detailed business plan and adopt a set of bylaws, soon after which point, application for tax-exempt status would be made and the results reported.

Recommendation:

Authorize CEA staff to file Articles of Incorporation to incorporate a nonprofit charitable foundation under California law and obtain for it a federal tax identification number. Other proposed steps in foundation formation and organization, as expressly noted above, would be reserved for future action, in compliance with and according to additional approvals from the CEA Governing Board.

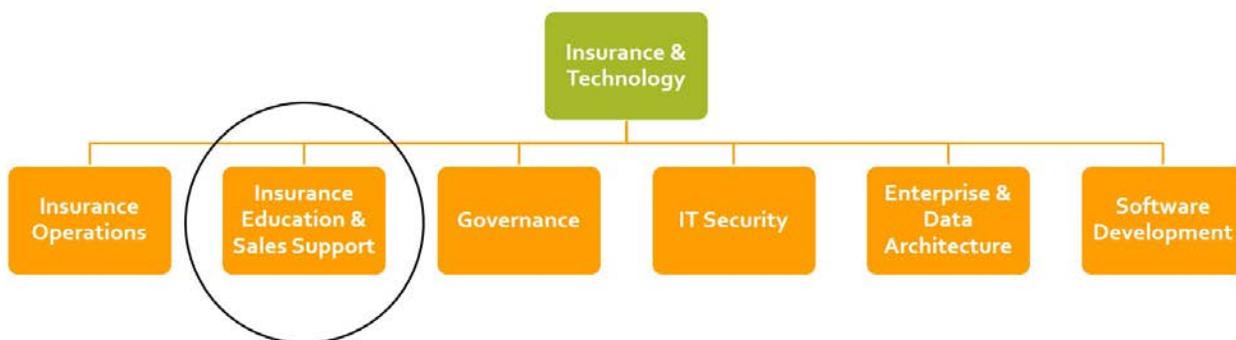
Governing Board Memorandum

September 20, 2017

Agenda Item 12—Part I: Update: CEA Insurance & Technology Department

Recommended Action: No action required—information only

On July 5, 2017, Insurance Education & Sales Support was added as a new functional team within the Insurance & Technology Department. It was created by merging certain insurance education and sales support functions from Insurance Operations and the CEA Communications Department. The purpose of the merger is to create synergies and alignment among insurance, marketing, sales, and technology functions.



Functions within the new Insurance Education & Sales Support team include:

- Agent/Sales Training
- Participating Insurer Sales Support
- Websites and Online Tools
- Centralized Policy Processing (CPP)
- Insurance Information Desk
- Insurance Application Support

Functions remaining within the Insurance Operations team include:

- Product Management
- Policy Management
- Claims
- Participating-Insurer Relationship Management
- Insurance Analytics
- Complaint Management
- Regulatory Engagement

Insurance Operations Update:

- Completed 2017 mid-year CEA book of business review meetings with participating

insurers.

- Finished participating insurer/CEA claim-file reviews for the six largest participating insurers.
- Continued to define and plan the 2019 CEA rate and form filing – the task is proceeding on schedule.
- Preparing for CEA annual Claim Manager Meeting on October 3rd.
- Expanded internal CEA book-of-business analysis and reporting capabilities in support of other CEA-department business-intelligence needs.

Insurance Education & Sales Support Update:

- Completed onboarding of the fourth participating insurer onto the Centralized Policy Processing administration and claim-processing system (CPP Diamond).
- Two additional participating insurers have contracted to implement CPP Diamond this year, and several other participating insurers are lining up for a 2018 implementation.
- Developed new reports for CPP Diamond that help compare and reconcile any data differences with the existing CEA EPICenter data system.
- Worked with CPP Diamond vendor Insuresoft on accelerated implementation program (first three phases are in progress).
- Strategy development underway for the agent/sales training function with more focus on participating-insurer specific and regional engagements, combined with a new outreach program.
- Since the CEA policy can only be sold by CEA participating insurers and their respective sales teams, CEA's strategic focus will be to fully equip agents and sales staffs to effectively sell CEA policies, including education, software tooling, and marketing assistance.
- Developed new and improved versions of existing agent/sales support tools and began working on a CEA-website redesign.
- Implemented monthly online newsletters for stakeholders interested in CPP Diamond and agents interested in the CEA Marketing Value Program (MVP).

Information Technology Update:

- Implemented additional cybersecurity monitoring for enhanced detection and reporting of vulnerabilities and threats.
- Rolled out multifactor authentication (MFA) for improved system-login and access security; process is proceeding incrementally across the CEA, by department and role.
- Making final preparations to host CPP Diamond in the CEA cloud environment.
- Kicked off project to define functions and roles for earthquake incident-response within the incident-response and collaboration software developed by CEA (building a “library” of incident responses that started with ransomware).

- Implemented Spanish-language version of CEA Premium Calculator. Chinese version in development.
- Rolled out new data warehouse for policy and claim information with feeds from EPICenter and CPP Diamond, creating a cornerstone for future business-intelligence reporting and automated testing.
- Added premium-write-off functionality to EPICenter.
- Began preparatory work on the 2019 rate and form filing software updates across the CEA-application portfolio.

Governing Board Memorandum

September 20, 2017

Agenda Item 12—Part II: Contract for Strategic Consulting on Insurance Marketing

Recommended Action: Approve increasing spending limit in Aartrijk Group contract, from \$100,000 to \$150,000 and approve negotiating related contract amendment

Background:

- CEA Communications team procured and initiated a contract with the Aartrijk Group in 2016 to provide strategic agent/insurance marketing and related consulting.
- Original contract spending is limited \$100,000 (below Governing Board approval threshold to contract).
- In July 2017 the Insurance Education & Sales Support team was created within the CEA Insurance & Technology department, and Aartrijk Group contract-management was transferred to that new team.
- Insurance Education & Sales Support team wishes to engage Aartrijk in additional agent/insurance strategic consulting, but the current contract spending limit does not permit it.

Analysis:

- In effectively creating a strategic agent/insurance sales and distribution plan and an execution roadmap, CEA would benefit from additional strategic consulting.
- Additional strategic consulting could be placed within the existing contract scope of work with the Aartrijk Group.
- In order to fund the additional, required work, the Aartrijk Group contract would be amended to support an annual spend of up to \$150,000.
- Governing Board approval is needed since the expenditure level would exceed the delegated staff contracting-authority threshold.
- The requested contract-spending increase does not require budget augmentation—the existing budget will cover the additional consulting.

Recommended Action:

CEA staff recommends the Board approve an increased expenditure limit in the Aartrijk Group contract, from \$100,000 to \$150,000, to support additional consultation on agent/insurance marketing, and approve amended contract negotiation and execution by CEO Glenn Pomeroy.

Governing Board Memorandum

September 20, 2017

Agenda Item 13: Increase funds available for existing contract with Randle Communications, whose services support CEA strategic community-outreach efforts

Recommended Action: Authorize CEA staff to enhance contract scope-of-work and increase funding, within existing community-outreach budget

Since June 2016, CEA has worked with Randle Communications under a contract and level of funding that did not require Board authorization, for assistance with strategic community outreach. Specifically, the contracted support for community outreach included identifying and contacting community and thought leaders, and then scheduling meetings with groups to help raise awareness of and familiarity with the California Earthquake Authority.

Background:

CEA information delivered throughout California through CEA spokespersons have featured live presentations of new, cost-effective earthquake-insurance products now available to homeowners, condo-unit owners, and renters, as well as information about the California Residential Mitigation Program (CRMP), which is jointly managed by CEA and Cal OES.

Working under an agreement with Randle Communications already has enabled CEA to deliver more than 75 presentations to community groups throughout the state, and more than 30 additional presentations have been scheduled into early 2018.

Analysis:

CEA's statewide community-outreach efforts have been very well received.

People receiving these presentations are grateful for the updates on their potential risk for residential earthquake damage and loss, and for the new information from CEA on how new coverage choices and deductible options can help make a CEA policy more affordable.

As a result, through simple referrals and friendly recommendations, these successful presentations have created increasing demand for additional outreach to community groups. CEA staff members are traveling tirelessly to keep up with this growing interest.

In addition, these community-outreach efforts have created new opportunities to engage more strategically with home-insurance agents selling CEA policies, which is creating an opportunity to expand the value of these community-outreach presentations even further.

To build the successful effort further, CEA staff recommends expanding the contract scope-of-work and increase the annual funding to support that work, from the \$99,000 originally planned in June 2016 to \$180,240, all within the existing CEA community-outreach budget.

NOTE: The Board previously approved limited 2016 spending for community outreach at its December 2015 meeting and limited 2017 spending for community outreach at its December 2016 meeting .

Recommendations:

- Authorize CEA staff to amend the CEA agreement with Randle Communications to enhance the contract scope-of-work and increase annual contract funding and expenditure, from \$99,000 to \$180,240, to be accomplished within existing 2017 CEA budget.
- Staff also requests that the Board authorize a similar expenditure of \$180,240 for the (forthcoming) 2018 CEA budget, which would allow CEA to contract with Randle for a term extending through December 31, 2018.

Governing Board Memorandum

September 20, 2017

Agenda Item 14: Contract update and request for contracted expenditure increase for Advertising and Creative Services

Recommended Action: Authorize CEA staff to enhance scope-of work and increase advertising spending, within existing, approved advertising budget

Since 2012, CEA has been creating and implementing advertising campaigns designed to last about two years. CEA's "Blueprint" campaign concluded in 2013, CEA's "California Rocks" campaign concluded in mid-2015, and CEA's "Risk-Is-Real" campaign will be concluding at the end of 2017. CEA is now developing its next advertising campaign, to roll out in early 2018.

Background:

Following completion of a competitive procurement process, the Board authorized CEA staff in December 2016 to contract with Runyon Saltzman, Inc., for advertising and creative services. At that time, although staff noted that it would not be possible to determine precisely the costs associated with producing a new CEA advertising campaign for 2018 (the contract services approved in 2016 were to be performed in 2017), staff estimated related costs within the proposed contract to be \$330,000 for creative concepting, testing, and ad production.

Analysis:

Through development of a creative concept featuring CEA policyholders in future advertising, CEA staff has concluded that the campaign would be significantly enhanced by presenting CEA-policyholder videos on CEA's website. These additional, longer-format (two-to-three minutes in length) videos could complement 30-second TV and radio ads, and would enable CEA to add more policyholder stories most cost-effectively.

CEA staff also has concluded that a "style guide" should be produced, to support and document the new advertising campaign—the guide would include the advertising mantra, story, message points, copy, and design elements. And to further complement CEA's new 2018 advertising campaign, staff will update the CEA-policy-brochure graphic design and messaging.

Given these enhancements, CEA staff plans would necessarily expand the contractual scope-of work and increase contract expenditures, from \$330,000 estimated in December 2016 to \$537,000—the new, higher expenditure would fall within the existing, approved advertising budget. (**NOTE:** The Board approved advertising spending for 2017, including all 2017-budget funds for this contract, at its March 2016 meeting. The Board approved advertising spending for 2018, including all 2018-budget funds for this contract, at its March 2017 meeting.)

Recommendation:

Authorize CEA staff to enhance the contractual scope-of-work, and increase related contractual spending authority from \$330,000 to \$537,000, for advertising and creative services, all within CEA's existing agreement with Runyon Saltzman, Inc.

Governing Board Memorandum

September 20, 2017

Agenda Item 15: CEA Enterprise Risk Management Program: Progress update in developing the CEA enterprise risk management framework and program plan

Recommended Action: No action required—information only

The CEA Enterprise & Strategic Risk Advisor and members of the CEA Enterprise Risk Management (ERM) Committee are continuing their work in developing an enterprise-wide risk-management framework and program plan.

Since the June 2017 CEA Governing Board meeting, program work has continued to focus on refining and finalizing the risk-control summaries for each priority risk. In August, the ERM Committee undertook an intensive, collective review of all risk-control summaries and made adjustments to the titles and focus of the priority risks.

Based on that work, the CEA’s ERM Program now has 14 priority risks:

Financial Risks	Insurance Risks	Operational Risks	Strategic Risks
<ul style="list-style-type: none"> • Risk Transfer • Financial Management – Investments and Accounting 	<ul style="list-style-type: none"> • Policy Contracting and Servicing • Claim Handling • Earthquake Science and Modeling • EBB programs 	<ul style="list-style-type: none"> • Business Continuity • Cyber/Data Breach • Legal – Compliance and Litigation • Workforce • Succession Planning • Information Systems 	<ul style="list-style-type: none"> • Legislative/Regulatory • Reputation

The CEA Executive Team and ERM Committee have also identified the occurrence of a major, damaging earthquake in California as an overarching risk consideration. In light of that consideration, risk owners have been asked to consider the risk drivers, checkpoints and limits, controls, and response for each priority risk in both normal (steady-state) conditions and for each of a range of earthquake scenarios. Those scenarios include a single major earthquake, such as the 2008 ShakeOut scenario for Southern California or a Hayward-fault earthquake in the San Francisco Bay Area, and a multiple-earthquake sequence, such as events occurring sequentially in the Canterbury region of New Zealand in 2010–2011.

At the completion of the August review sessions, the ERM Committee reviewed and approved the following scorecard, which shows for each priority risk, the status for each major element of the risk-control summary. The work on defining risk drivers, risk controls and mitigation steps, and risk measures and assessments is nearing completion. As a next step, a risk-monitoring and reporting workgroup is being formed, to help build out the responses and reporting structure for each priority risk.

Risk Driver Defined	Controls/ Mitigation	Measurement / Assessment	Checkpoints / Limits	Monitoring / Reporting	Response	Risk Name
▲	▲	▲	▲	■	■	Risk Transfer
▲	▲	▲	▲	■	■	Financial Mgmt (Investments, Accounting)
■	■	▲	▲	▲	■	Policy Sales and Servicing
■	■	▲	▲	■	■	Business Continuity
■	■	■	▲	■	■	Cyber / Data Breach
▲	▲	■	■	■	■	Legislative/Regulatory
■	■	■	■	▲	■	Claim Handling
■	■	■	■	■	■	Legal - Compliance and Litigation
■	▲	▲	▲	▲	■	Reputation
■	■	■	■	■	■	Earthquake Science and Modeling
■	■	■	■	▲	▲	Workforce
■	■	■	■	■	■	Succession Planning
■	■	▲	▲	■	■	Information Systems
▲	▲	▲	▲	■	■	CEA B&B programs

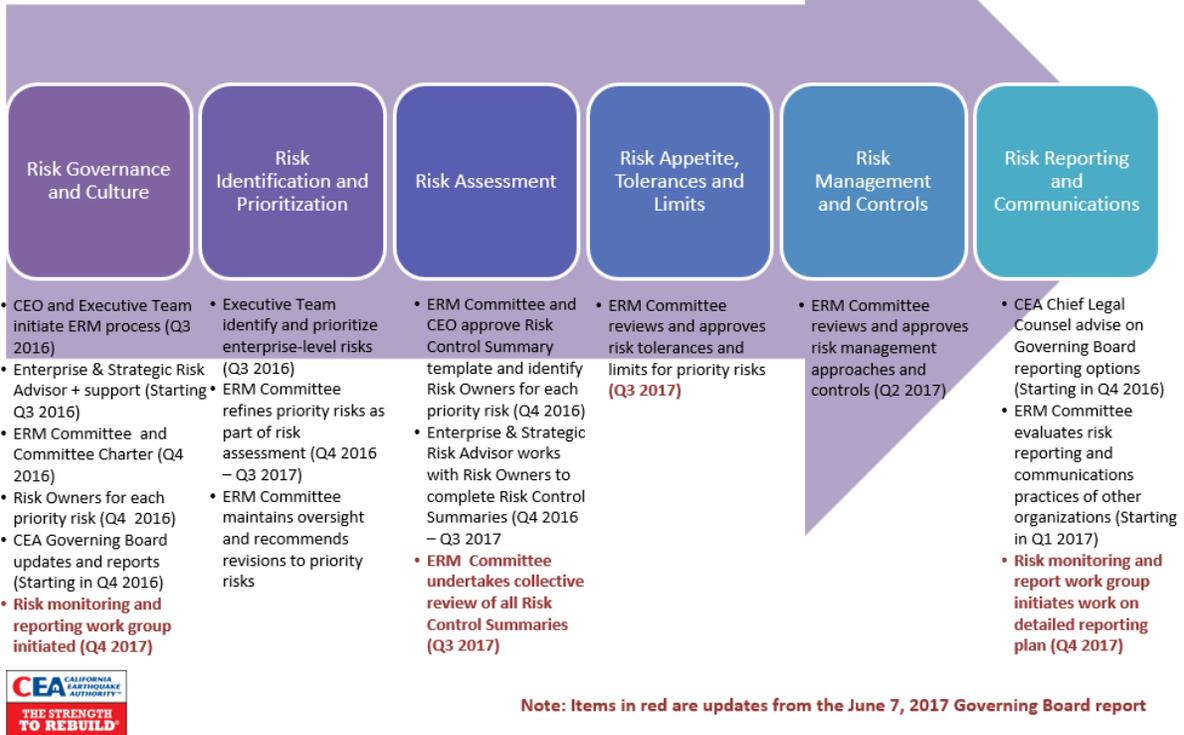
Legend	
■	Complete
▲	Progressing
■	Initiated

During fourth quarter 2017, the Enterprise & Strategic Risk Advisor and ERM Committee will focus on integrating all the data developed thus far into an enterprise-wide risk-management framework. The framework is being developed in accordance with the Own Risk and Solvency Assessment (ORSA) guidance provided by the National Association of Insurance Commissioners. CEA’s ERM Framework incorporates the following key principles:

- Risk Culture and Governance
- Risk Identification and Prioritization
- Risk Appetite, Tolerances, and Limits
- Risk Management and Controls
- Risk Reporting and Communication.

Below is a graphical summary of the activities undertaken to date by CEA staff in each of the five areas.

ERM Framework and Progress to Date



The ERM Committee is also developing an ERM program plan for 2017/2018. It will detail the work that CEA will undertake to build out the CEA’s ERM Framework, dashboard analytics, and risk-capital and solvency assessments, and to address post-earthquake response-planning priorities revealed through the ERM efforts.

Recommendations: None—information only

CEA Governing Board Memorandum

September 20, 2017

Agenda Item 16: Quantitative-metrics report and request that Board adopt successor plan to the current (2015–17) CEA Strategic Plan

Recommended Action: No action required—information only

Chief Operations Officer Kellie Schneider will present to the Board the periodic CEA-operations metrics report and propose Board adoption of a successor plan to the current (2015–17) CEA Strategic Plan.

California Earthquake Authority

Strategic Plan ▫ 2017–2019

Our Mission

The California Earthquake Authority is California's not-for-profit provider of residential earthquake insurance—privately funded and publicly managed, with programs to encourage and support effective action to reduce the risk of earthquake damage and loss.

Our Vision

CEA promotes and supports long-term family and community resilience by providing risk education, loss mitigation, and insurance protection to help Californians prepare for and recover from damaging earthquakes.

Our Core Values

Integrity

We earn the trust of others by conducting ourselves with fairness, honesty, and transparency.

Public Service

Our not-for-profit mission allows us to focus on serving the public.

Policyholder Service

We are committed to providing excellent service to our policyholders.

Financial Strength and Stability

We are prepared for and committed to paying all covered policyholder claims.

Innovation

We continually strive to identify and achieve the best solutions to meet ongoing business and consumer needs.

Collaboration

We join with key stakeholders to promote and support earthquake readiness throughout California.

Respect

We treat others professionally and with respect in all our work.

The CEA's Strategic Goals

Goal 1. Educate

Help Californians learn about and understand their seismic risks, and how earthquake-loss mitigation and insurance can help them prepare to survive and recover from damaging earthquakes.

Goal 2. Mitigate

Encourage Californians to strengthen their homes and secure their belongings to help increase their safety and reduce their risk of earthquake damage.

Goal 3. Insure

Help Californians understand and manage their risk of financial loss from damaging earthquakes by providing affordable and valuable earthquake-insurance products.

Goal 4. Organizational Resilience

Facilitate efficient operations, effective resource and enterprise risk management, financial strength and acumen, appropriate legal and compliance oversight, and a positive and professional corporate culture in support of CEA's mission.

Educate

Goal 1. Educate

Help Californians learn about and understand their seismic risks, and how earthquake-loss mitigation and insurance can help them prepare to survive and recover from damaging earthquakes.

Innovation

Develop new ways to help Californians understand their earthquake risks, the value and benefits of earthquake-risk mitigation through seismic retrofitting, and the financial-preparedness features of CEA earthquake-insurance products.

1. Promote how CEA insurance can help Californians recover from earthquake damage.
2. Provide strategic marketing support for participating insurance companies that offer CEA policies.
3. Train insurance agents how to properly inform policyholder decisions about seismic retrofitting and earthquake insurance.
4. Broaden awareness of the risk for earthquake damage and the need for earthquake insurance and mitigation through proactive outreach to civic and community organizations throughout California.
5. Engage with media representatives to promote increased interest in and awareness of earthquake preparedness, mitigation opportunities, and earthquake insurance.
6. Offer educational outreach to a variety of consumer-facing professional groups to help enhance home resiliency and financial protection for more Californians.

Research

Enhance CEA insurance products and earthquake-risk awareness through knowledge gained from quality research in social sciences and in seismic science and engineering.

1. Through ongoing research and analysis, adjust CEA's educational messages to help increase take-up for CEA earthquake insurance.

2. Help Californians understand their risk for earthquake damage based upon, among other things, the age and type of their residential structure and its proximity to known faults.

Technology

Use technology to effectively present CEA information to policyholders and the public.

1. Identify, acquire, and apply best-practice technology solutions in all operational and supporting functions within CEA.
2. Together with participating insurers, create a shared online path for consumers to follow, beginning with risk-education and mitigation, and concluding with information needed to purchase a CEA policy.
3. Ensure technology and communications readiness to support an effective and timely CEA response to policyholders filing claims after a damaging earthquake.
4. By using state of the art technology, ensure ongoing customer service is accessible, prompt, and effective.
5. Deliver risk-education information to all interested parties through the comprehensive use of technology-based solutions.

Mitigate

Goal 2. Mitigate

Encourage Californians to strengthen their homes and secure their belongings to help increase their safety and reduce their risk of earthquake damage.

Innovation

Offer financial incentives for residential retrofits and other mitigation measures, and lead related guideline and building-code development to help increase the safety of older houses, which are more vulnerable to earthquake damage.

1. Collaborate with the California Governor's Office of Emergency Services to offer financial incentives—with significant funding from CEA's Mitigation Fund—to promote seismic retrofits of vulnerable single-family houses.
2. Identify, develop, and use non-CEA funding sources to further promote and expand mitigation activities, which will relieve pressure on CEA's limited funds.
3. Develop and support statewide mitigation-related education programs and activities by working cooperatively with stakeholders and other community-based organizations.
4. Promote seismic retrofits by offering actuarially sound premium discounts for CEA insurance products.
5. In collaboration with the Federal Emergency Management Agency, provide program expertise, management services, and funding to help ensure delivery of a comprehensive "pre-standard" (pre-building-code document) for the evaluation of light, wood-frame residences.

Research

Through careful, fully collaborative needs-assessments, support and commission original seismic science and engineering research, to help build among all relevant communities a richer understanding of potential earthquake damage to residential structures and to develop effective mitigation approaches that can reduce earthquake damage.

1. Commission and sponsor—and when needed, lead—research to understand and evaluate potential earthquake damage to vulnerable single-family houses, using numerical modeling and physical (e.g., shake-table) testing of building components and structures.
2. Complete research projects that will identify and quantify effective mitigation efforts to support premium incentives.

Technology

Use technology to promote innovative residential earthquake-loss-mitigation measures, demonstrating their value in helping families secure their possessions and protect their homes.

1. Develop a modern, responsive, effective website to demonstrate, promote, and secure consumer program participation in statewide mitigation programs supported by the CEA.
2. Use technology to promote building-code-based methods for, and the benefits of, homeowners taking mitigation measures.

GOAL 3: Insure

Help Californians understand and manage their risk of financial loss from damaging earthquakes by providing affordable and valuable earthquake insurance products.

Innovation

Develop, create, and—collaboratively, with CEA participating insurers—implement programs and create and distribute products that enhance CEA and participating-insurer effectiveness in helping Californians understand and manage their earthquake risk.

1. Continuously develop innovative and affordable earthquake-insurance choices.
2. Develop and promote business practices that make doing business with CEA easy and satisfying for participating insurers, vendors, and policyholders.
3. Continue as a world leader in developing innovative financial tools and techniques to further enhance CEA's financial foundation and support its business strategies.
4. Maintain and enhance best-in-class methods and training so that participating insurers may promptly, fairly, and consistently adjust CEA earthquake claims.

Research

Lead research to enhance CEA's effectiveness in helping Californians manage their risk of earthquake damage.

1. Continue to design and implement innovative earthquake-insurance coverage options, supported by expert financial and business analyses, that are thoroughly tested through research and the accurate measurement and evaluation of policyholder response.
2. Actively support research that advances prompt and accurate loss evaluation and state-of-the-art repair of earthquake damage to residences.

3. Promote ongoing consumer and insurance agent research to support new and innovative earthquake-insurance marketing and sales programs.
4. Support earth-science and engineering research to help inform earthquake-loss modeling and CEA business planning and decision making.

Technology

Implement and continuously improve CEA insurance solutions to support and provide value to participating insurers, agents and producers, and policyholders.

1. Continuously update CEA business processes, frameworks, and technologies to better serve CEA's insurance stakeholders.
2. Use industry best technology practices to provide and maintain systems necessary to support CEA insurance operations.
3. Create, promote, and distribute to CEA participating insurers the tools needed to encourage sales of, and enhance services for, CEA insurance products.
4. Collaborate with CEA participating insurers to incorporate CEA's claim-handling expectations—through training and published guidelines, standards, and protocols—to ensure proper reporting and technology use as the bases for timely and accurate claim-processing.
5. Institute effective, forward-looking insurance-technology solutions, both for present-day CEA business and for supporting future growth and new opportunities.

Organizational Resilience

Goal 4. Organizational Resilience

Facilitate efficient operations, effective resource and enterprise risk management, financial strength and acumen, appropriate legal and compliance oversight, and a positive and professional corporate culture in support of CEA's mission.

Innovation

Continuously improve internal processes according to best practices, to achieve greater efficiencies while pursuing improved timeliness and quality.

1. Commit to routinely modifying operational strategies according to industry best practices.
2. Identify common ground among internal business partners, and form strategic partnerships that enhance organization-wide capabilities.
3. Develop and implement an enterprise-wide risk-management framework that fosters an organizational culture of risk management that is consistent with CEA's strategic goals.
4. Identify, develop, and implement stewardship techniques that promote fiscally prudent expenditures.
5. Grow existing techniques and apply new strategies to retain, recruit, and engage high-quality professionals.

Research

Support ongoing research designed to optimize a diverse and talented CEA workforce.

1. Develop techniques and implement strategies to increase diversity throughout CEA.
2. Support and commission original research through careful and collaborative needs assessments.
3. Investigate what changes to CEA's operational framework can be achieved to fundamentally add measurable value throughout its workforce.

Technology

Use technology to improve efficiency, capacity, quality, competence, and timeliness. Incorporate automation to enable strategic partnerships.

1. Implement technology systems to improve quality, reduce costs, manage risks, increase efficiency, and expand access to information that is relevant throughout CEA's workforce and external stakeholders where appropriate.
2. Endorse active use of new technology that benefits CEA's workforce by providing access to user guides and comprehensive training.
3. Inspire confidence and trust in information technology through strong policies and procedures regarding privacy and security of electronic information.

California Earthquake Authority

Insurance Operations - Governing Board Report

All Companies - As Of 8/23/2017 - Policies in Force on: 07/31/2017

TOTALS	Policies In Force	%Total	Exposure	%Total	Written Premium	% Total	Avg Written Premium
Homeowners	671,106	70.6 %	340,063,551,369	84.7 %	498,742,024	78.6 %	743
Homeowners Choice	73,161	7.7 %	42,932,050,848	10.7 %	70,575,103	11.1 %	965
All Homeowners Total	744,267	78.3 %	382,995,602,217	95.4 %	569,317,127	89.8 %	765
Manufactured Homes (Mobilehomes) - Homeowners	26,141	2.7 %	3,399,748,003	0.8 %	3,458,573	0.5 %	132
Manufactured Homes (Mobilehomes) - Homeowners Choice	2,031	0.2 %	362,730,630	0.1 %	433,680	0.1 %	214
All Manufactured Homes (Mobilehomes) - Homeowners Total	28,172	3.0 %	3,762,478,633	0.9 %	3,892,253	0.6 %	138
Condo	109,063	11.5 %	12,067,503,500	3.0 %	53,198,296	8.4 %	488
Renters	69,508	7.3 %	2,552,560,000	0.6 %	7,727,463	1.2 %	111
Grand Total	951,010	100.0 %	401,378,144,350	100.0 %	634,135,138	100.0 %	667

California Earthquake Authority

Insurance Operations - Governing Board Report

All Companies - As Of 8/23/2017 - Policies in Force on: 07/31/2017

TOTALS	Policies In Force	% Total	Exposure	% Total	Written Premium	% Total	Avg Written Premium
Homeowners - by Cov A Ded							
25% Total	3,397	0.4 %	1,917,226,110	0.5 %	2,402,374	0.4 %	707
20% Total	2,859	0.3 %	1,607,950,221	0.4 %	2,480,639	0.4 %	868
15% Total	547,627	57.6 %	274,532,964,898	68.4 %	406,934,597	64.2 %	743
10% Total	91,935	9.7 %	48,543,301,528	12.1 %	68,379,186	10.8 %	744
5% Total	25,288	2.7 %	13,462,108,612	3.4 %	18,545,227	2.9 %	733
Homeowners Total	671,106	70.6 %	340,063,551,369	84.7 %	498,742,024	78.6 %	743
Homeowners Choice - by Cov A Ded							
25% Total	2,227	0.2 %	1,334,709,734	0.3 %	1,781,693	0.3 %	800
20% Total	1,526	0.2 %	942,650,940	0.2 %	1,565,068	0.2 %	1,026
15% Total	34,232	3.6 %	20,953,281,413	5.2 %	35,167,680	5.5 %	1,027
10% Total	22,741	2.4 %	13,153,183,463	3.3 %	21,101,902	3.3 %	928
5% Total	12,435	1.3 %	6,548,225,298	1.6 %	10,958,761	1.7 %	881
Homeowners Choice Total	73,161	7.7 %	42,932,050,848	10.7 %	70,575,103	11.1 %	965
All Homeowners Total	744,267	78.3 %	382,995,602,217	95.4 %	569,317,127	89.8 %	765

California Earthquake Authority

Insurance Operations - Governing Board Report

All Companies - As Of 8/23/2017 - Policies in Force on: 07/31/2017

TOTALS	Policies In Force	% Total	Exposure	% Total	Written Premium	% Total	Avg Written Premium
Manufactured Homes (Mobilehomes) - Homeowners - by Cov A Ded							
25% Total	13	0.0 %	1,797,862	0.0 %	2,122	0.0 %	163
20% Total	13	0.0 %	2,148,219	0.0 %	1,913	0.0 %	147
15% Total	20,245	2.1 %	2,419,611,453	0.6 %	2,466,325	0.4 %	122
10% Total	4,608	0.5 %	764,907,207	0.2 %	753,437	0.1 %	164
5% Total	1,262	0.1 %	211,283,262	0.1 %	234,775	0.0 %	186
Manufactured Homes (Mobilehomes) - Homeowners Total	26,141	2.7 %	3,399,748,003	0.8 %	3,458,573	0.5 %	132
Manufactured Homes (Mobilehomes) - Homeowners Choice - by Cov A Ded							
25% Total	10	0.0 %	1,626,011	0.0 %	1,483	0.0 %	148
20% Total	7	0.0 %	1,430,075	0.0 %	1,406	0.0 %	201
15% Total	722	0.1 %	118,236,356	0.0 %	150,781	0.0 %	209
10% Total	728	0.1 %	136,266,574	0.0 %	158,726	0.0 %	218
5% Total	564	0.1 %	105,171,614	0.0 %	121,284	0.0 %	215
Manufactured Homes (Mobilehomes) - Homeowners Choice Total	2,031	0.2 %	362,730,630	0.1 %	433,680	0.1 %	214
All Manufactured Homes (Mobilehomes) - Homeowners Total	28,172	3.0 %	3,762,478,633	0.9 %	3,892,253	0.6 %	138

California Earthquake Authority

Insurance Operations - Governing Board Report

All Companies - As Of 8/23/2017 - Policies in Force on: 07/31/2017

TOTALS	Policies In Force	% Total	Exposure	% Total	Written Premium	% Total	Avg Written Premium
Condo - by Cov A Ded							
25% Total	876	0.1 %	128,956,000	0.0 %	478,291	0.1 %	546
20% Total	568	0.1 %	85,052,000	0.0 %	353,025	0.1 %	622
15% Total	73,032	7.7 %	8,735,385,000	2.2 %	37,889,688	6.0 %	519
10% Total	4,542	0.5 %	756,319,000	0.2 %	2,818,617	0.4 %	621
5% Total	7,729	0.8 %	1,219,673,000	0.3 %	4,152,035	0.7 %	537
No Cov A	22,316	2.3 %	1,142,118,500	0.3 %	7,506,641	1.2 %	336
Condo Total	109,063	11.5 %	12,067,503,500	3.0 %	53,198,296	8.4 %	488
Renters Total	69,508	7.3 %	2,552,560,000	0.6 %	7,727,463	1.2 %	111
Grand Total	951,010	100.0 %	401,378,144,350	100.0 %	634,135,138	100.0 %	667

California Earthquake Authority

Losses & Loss Adjustment Expenses (LAE) Paid - Cumulative to June 30, 2017

Event Code	Event Name	Date of Event	Magnitude	Location	# of Paid Claims	Losses Paid	LAE Paid	Total Paid Losses & LAE
98010	Chino	1/5/1998	4.3	3 mi. W of Chino	1	\$1,385.72	\$124.71	\$1,510.43
98050	San Juan Bautista	8/12/1998	5.3	7 mi. SSE of San Juan Bautista	1	161,204.93	13,643.13	\$174,848.06
98070	Redding	11/26/1998	5.2	3 mi. NNW of Redding	1	4,029.72	362.67	\$4,392.39
	1998 Minor Quakes				2	4,199.20	377.93	\$4,577.13
99050	Hector Mine	11/16/1999	7.0	28 mi. N of Joshua Tree (near Palm Springs)	25	137,361.81	12,362.47	\$149,724.28
	1999 Minor Quakes				1	4,037.26	363.35	\$4,400.61
00030	Napa	9/3/2000	5.2	17 mi. ESE of Santa Rosa; 6 mi. NNE of Sonoma; 3 mi. WSW of Yountville	15	278,130.07	25,031.71	\$303,161.78
01010	Ferndale	1/13/2001	5.4	53 mi. WNW of Ferndale	1	34,764.54	3,128.79	\$37,893.33
	2001 Minor Quakes				1	52,896.82	4,760.70	\$57,657.52
01040	West Hollywood	9/9/2001	4.2	West Hollywood	10	67,044.15	6,033.94	\$73,078.09
	2002 Minor Quakes				1	8,361.24	752.51	\$9,113.75
03090	San Simeon	12/22/2003	6.4	7 mi. NE of San Simeon	86	2,692,628.02	242,339.74	\$2,934,967.76
04120	Parkfield	9/28/2004	6.0	7 mi SSE of Parkfield	1	7,032.59	632.93	\$7,665.52
07240	Chatsworth	8/9/2007	4.5	4 mi NNW of Chatsworth	1	7,813.88	703.24	\$8,517.12
07250	Alum Rock	10/30/2007	5.6	5 mi NNE of Alum Rock	1	6,149.20	553.42	\$6,702.62
08280	Chino Hills	7/29/2008	5.4	5.5 mi SE of Diamond Bar	8	145,967.19	13,089.08	\$159,056.27
09320	Calexico	12/30/2009	5.9	22.7 mi SE of Calexico	1	275.88	24.83	\$300.71
	2009 Minor Quakes				2	8,627.67	776.49	\$9,404.16

California Earthquake Authority

Losses & Loss Adjustment Expenses (LAE) Paid - Cumulative to June 30, 2017 (continued)

Event Code	Event Name	Date of Event	Magnitude	Location	# of Paid Claims	Losses Paid	LAE Paid	Total Paid Losses & LAE
10330	Ferndale	1/9/2010	6.5	27 mi W of Ferndale	3	23,901.50	2,151.13	\$26,052.63
10360	Baja California Mexico	4/4/2010	7.2	16 mi SW from Guadalupe Victoria, Mexico	17	81,066.58	7,296.00	\$88,362.58
	2010 Minor Quakes				1	225,000.00	0.00	\$225,000.00
12410	Brawley	8/26/2012	5.3	4 mi North of Brawley, CA	2	23,833.24	2,145.00	\$25,978.24
	2012 Minor Quakes				3	146,471.18	13,182.41	\$159,653.59
13430	Greenville	5/23/2013	5.7	7 mi WNW of Greenville, CA	1	1,500.00	135.00	\$1,635.00
14460	Westwood	3/17/2014	4.4	6mi NNW of Westwood, CA	6	67,989.89	6,119.09	\$74,108.98
14470	La Habra	3/28/2014	5.1	1mi S of La Habra, CA	84	458,354.56	41,251.91	\$499,606.47
14480	American Canyon	8/24/2014	6.0	4mi NW of American Canyon, CA	195	3,421,165.83	307,904.93	\$3,729,070.76
	2014 Minor Quakes				3	18,859.35	1,697.34	\$20,556.69
	2015 Minor Quakes				2	5,877.69	529.00	\$6,406.69
Total					474	\$8,095,929.71	\$707,473.45	\$8,803,403.16

Claims History Report Glossary

Event Code: A 5 digit code that the CEA assigns to all earthquakes expected to produce paid losses. This code is used to track statistics for a particular earthquake.

Event Name: This is generally the name given to the earthquake by the USGS (United States Geological Survey).

Date of Event: Date that the earthquake occurred.

Magnitude: Richter scale magnitude assigned by USGS.

Location: This is assigned by USGS and is usually a city close to the earthquake.

of Paid Claims: A numeric count of the claims that received a payment for damage caused by a particular earthquake.

Losses Paid: Total dollar amount of all claims paid to the policyholders for a particular earthquake.

LAE Paid: "LAE" stands for Loss Adjustment Expense which is always 9% of paid losses. This is the amount paid to the Participating Insurers for handling the claim.

Total Paid Losses and ALE: The sum of Losses Paid and LAE Paid.

Minor Quakes: Losses paid for damage from minor earthquakes that were initially not expected to generate a claim and therefore were not issued a CEA event code.

CEA Project Portfolio

Schedule	Scope	External Resources	Project Cost	Overall Score	Portfolio #	Project Name	PM	Status	Target Start Date	Start Date	Project % Complete	Target End Date	End Date
✔	✔	✔	✔	✔	2016-01	CEA Agent App	Stephenie Dagata	Active	01/04/16	01/04/16	12%	02/15/18	
✔	✔	✔	✔	✔	2016-02	Training and Registration Form	Stephenie Dagata	Completed	01/04/16	01/04/16	100%	08/03/17	08/03/17
✔	✔	✔	✔	✔	2016-03	Combine Agent Databases	Stephenie Dagata	Completed	01/04/16	01/04/16	100%	08/03/17	08/03/17
✔	✔	✔	✔	✔	2017-01	CPP Data Warehouse & Reporting	Paul Stubbles	Completed	01/03/17	01/03/17	100%	07/31/17	07/31/17
✔	✔	✔	✔	✔	2017-02	Written Premium Write Off	Terri Kletzman	Completed	02/01/17	02/01/17	100%	12/31/17	09/01/17
✔	✔	✔	✔	✔	2017-03	Emerg Mgmt/Bus Continuity	Paul Stubbles	Active	01/03/17	01/03/17	45%	06/30/18	
⚠	✔	✔	✔	⚠	2017-04	ECMS	Jason Haxton	Active	01/03/17	01/03/17	60%	12/31/17	
✔	✔	✔	✔	✔	2017-05	Procurement Tracking System	Terri Kletzman	Active	02/01/17	02/01/17	10%	12/29/17	
✔	✔	✔	✔	✔	2017-06	End to End Website	Terri Kletzman	Cancelled	02/01/17	02/01/17	5%	09/29/17	04/14/17
✔	✔	✔	✔	✔	2017-07	QuakeGrade (SVIMA P2)	Terri Kletzman	Completed	01/03/17	01/03/17	100%	09/01/17	06/08/17
✔	✔	✔	✔	✔	2017-08	Self Service BI Reporting	Paul Stubbles	Active	01/03/17	01/03/17	50%	12/31/18	
✔	✔	✔	✔	✔	2017-09	EQA Redesign	Stephenie Dagata	Active	01/03/17	01/03/17	7%	02/15/18	
✔	✔	✔	✔	✔	2017-10	ZIP Code Validation	Terri Kletzman	Completed	01/03/17	12/01/16	100%	02/01/17	01/03/17
✔	✔	✔	✔	✔	2017-11	Human Resource Information Systems	Terri Kletzman	Active	02/01/17	02/01/17	10%	11/01/17	
⚠	✔	✔	✔	⚠	2017-12	eDiscovery	Jason Haxton	Active	01/03/17	01/03/17	71%	12/31/17	
✔	✔	✔	✔	✔	2017-13	Rate and Form Filing Project 2019	Terri Kletzman	Active	06/05/17	06/05/17	5%	12/31/18	

Legend	
●	Project Status is at 0 - 2
●	Project Status is at 3 - 5
●	Project Status is at 6 - 7
●	Project Status is at 8 - 10



CEA GOVERNING BOARD MEETING DATES FOR - 2017

March 15, 2017 – Wednesday

June 7, 2017 – Wednesday

September 20, 2017 – Wednesday

December 6, 2017 – Wednesday

CEA ADVISORY PANEL MEETING DATES FOR - 2017

September 7, 2017 – Thursday - **ADDED**

[IMPORTANT NOTE: This schedule is for future meetings that have been proposed and approved by the respective bodies named. Meeting dates, times, and locations are subject to change. The final dates, times, and locations will be announced on official Public Notice, issued by the CEA 10 or more days before the date of the meeting. Public Notices are also posted on the CEA Web site www.EarthquakeAuthority.com]