

Strategic Plan Comments

As of June 2, 2006

Comment #	Reference	Comment
1	General	<p>In reading the current NEHRP legislation, specifically those aspects related to DHS/FEMA's responsibilities, and looking at the strategic plan, I do not see any mention of the response, or preparedness aspects defined in the legislation. Section (2) Department of Homeland Security and Federal Emergency Management Agency, (a) Program Responsibilities sub-sections iii, iv, vi, and viii.</p> <p>The response and preparedness focus as with other measures, should be woven throughout the document. The full description of the expectations should be specifically addressed in connection with the description of FEMA and its responsibilities outlined on page 7 of the Strategic Plan.</p> <p>The inclusion of this information is not to dismiss any other aspect of the Strategic Plan, such as mitigation, but rather to make the Plan a balanced document that supports all of the defined NEHRP requirements.</p> <p>Within the state emergency management agencies, many earthquake programs are contained outside of mitigation program areas. Persons in those programs which may focus more on operational aspects may find the current Plan less than useful because they can not identify with it. If we are to expect partnering and collaboration in addressing the seismic hazard in the U.S., we need to provide a document that sets the stage for such actions.</p>
2	General	<p>Comment: NEHRP has resulted in significant improvements for earthquake hazard reduction via industry practice and the advancement of building codes and standards. Activities need to continue, but the structure should be revised so that guidance and recommendations are adequately provided to ANSI accredited SDOs while there is sufficient time to influence the direction and scope of research and program activities.</p> <p>REASON: To assure cost-effective development of improved provisions for building codes and standards that address earthquake and post-earthquake disaster resistance and do not jeopardize the advance of other disaster resistant provisions and practices, it is imperative that groups with a scope larger than the scope of NEHRP adequately address and provide guidance to NEHRP as an on-going component of the process.</p> <p>SUGGESTION: Continue future efforts with an emphasis on guidance to an ANSI accredited SDO and to that segment of the building community that chooses to exceed minimum requirements of building codes and referenced standards. Expand the program to include the development of an appropriate methodology and tools to verify cost-effectiveness and to include post-earthquake disaster reduction.</p>
3	General	<p>The goals and objectives for the most part are still valid. The objectives should receive a quantifiable assessment to see where they are and where they would like to be in the next 5 years and build from that. NEHRP should also address Tsunami in the next Strategic Plan. Presently, there is a national awareness and it falls under the NEHRP umbrella. Finally, I suggest that the objectives should be prioritized, not only within the goal, but throughout the Strategic Plan.</p>

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		<p>REASON: It appears that the old strategic plan was well thought out and it should not be scrapped. However, progress over the last five years should be measured and where the most progress has been made, future limited resources should be allocated accordingly. Using the old plan as a base, we should be able to see what goals and objectives should be altered/ revised/ dumped/ insert new, etc. and pick quantifiable results or expectations, as objectives, for the next five years.</p> <p>SUGGESTION: A Tsunami event on the west coast, Alaska, and Hawaii is possibly more likely than an earthquake. Before mitigation can be addressed, the public needs to know what is really the possibility of destruction by this event. An educational program may be needed first, which could be a goal/objective in the new plan.</p>
4	General	<p>The explicit concern for social / behavioral / economic science in the current version is welcome, but is presented in a way that is isolated from the other action items. A more explicit enumeration of the social / behavioral / economic science research needed to be undertaken and/or applied within each of the objectives and action items would be more helpful. Such a list should not be conclusive or limiting, but suggestive of how scientific knowledge about human behavior, thinking, and social dynamics can help improve achievement of strategic objectives.</p> <p>While a number of fugitive comments in the current document note that 'urbanization' is associated with growth of vulnerable populations in seismically active areas [viz., "demographic shifts toward earthquake-prone cities," p. 45], the generic item #6 [p. 55], "Advance understanding of the social and economic implications of earthquakes," does not seem to give explicit attention to what should be a strategically significant topic for social science research.</p> <p>It just seems important to the program's mission to consider: How will the future growth and movement of populations and economic activity, from place to place, affect the vulnerability to earthquake hazards? (Or, for that matter, to all hazards?)</p> <p>Very broadly, even simplistically speaking, it appears that disaster-prone areas also offer amenities that are attractive to human settlement. To what extent is it feasible for public policy to attempt to direct human settlement away from disaster-prone areas? [Historical experience suggests it is not easy, but not necessarily impossible.] And, if feasible, to what extent and in what form is it appropriate for public policy to do so?</p> <p>Finally, speaking of "all hazards," many homeland security analysts have concluded from the US experience of the past five years that a comprehensive, all-hazards strategy is a more appropriate path to raising the broad level of homeland security than is a congeries of "stovepiped" policies and programs targeted on discrete risks or threats. A corollary observation is that "risk management" in practice often has been, rather, risk <i>shifting</i> from one threat, population, location, or industry to another.</p> <p>Moreover, it is mainly since the last reauthorization of the NEHRP (PL 108-360 in 2004)--and particularly in the past year, in the wake of Hurricanes Katrina and Rita--that public concern about the inefficiencies and contradictions of incoherent homeland security policies and programs has become acute.</p>

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		<p>Under the circumstances, the update of the program's strategic plan should broaden its focus to account for potential tradeoffs and synergies between measures for mitigating earthquake hazards and those required to mitigate other threats and hazards, both from natural and human sources. For instance, building codes should aim toward greater architectural <i>resiliency</i> in response to a broad spectrum of prospective threats (if not 'all' hazards). Revising building codes by simply adding more burdensome and costly requirements to mitigate the threat from earthquakes <i>and</i> fires <i>and</i> floods <i>and</i> chemical threats <i>and</i> biological/disease threats <i>and</i> radiological threats <i>and</i> cyber-attacks, and so on is bound to prove impracticable.</p> <p>While it would be desirable for future legislation to mandate a broader approach, existing law does not prohibit the agencies involved in the NEHRP, in the next strategic plan, from rationalizing earthquake hazard mitigation against the demands of an "all hazards" framework. They should do so.</p>
5	Pg. 5, Paragraph 1, Line 4	<p>Remove comparisons to worldwide events.</p> <p>REASON: Comparisons to worldwide catastrophic events may no longer be appropriate for justifying modifications to building codes and standards in the United States, which as a result of successful NEHRP activities has some of the most advanced design and construction provisions incorporated into building codes.</p> <p>SUGGESTION: Delete: "worldwide during the 20th century, there were ten earthquakes that each killed in excess of 50,000 people, and over 100 earthquakes that killed in excess of 1000 people." If such statistics are deemed necessary update and reference industrialized nations with codes and standards exceeding the minimum requirements of current codes and standards used in the United States.</p>
6	Pg 12, 3 rd sentence under Prediction of strong ground motion	<p>Typical seismic networks are NO LONGER composed of instruments to only record weak motion. All seismic networks in the US have a diverse set of instruments, many of which are designed for strong-motion recording. However, there is a great need to expand the strong-motion database for a variety of reasons, one of which is to assist in the development of and the validation of the synthetic seismograms mentioned here.</p> <p>REASON: As is it seems to reflect seismic networks of more than 5 years ago and also separates out the need for synthetic codes from the need for real data. They should be more closely linked.</p>
7	Pg. 12, Paragraph 2, Line 7	<p>Add specific areas of further investigation as sub-bullets to the section "Understanding performance of structural systems."</p> <p>REASON: NEHRP has been in existence and funded for several years. Some accomplishments have been made. There should be a list of specific new research areas and areas identified as requiring further research as a result of NEHRP.</p> <p>SUGGESTION: For example, a specific earthquake hazard reduction activity would be the development of a standard methodology for determining the R-Factors of various building constructions using an accredited American National</p>

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		Standards Institute (ANSI) standards development organization (SDO).
8	Pg. 12, Paragraph 2, Line 8	<p>Provide clarification that reduction of financial losses in and of themselves is not necessarily justification for modification of building codes and referenced standards.</p> <p>REASON: The primary focus of building codes is life safety with additional consideration for property protection, welfare of the general public, and safety of emergency responders. Codes and standards activities often need to be substantiated as cost effective for advancement in the building codes and standards.</p> <p>SUGGESTION: Expand this section to specifically call out that “Designing structures to explicitly reduce financial losses,” may be beyond the scope of building codes and standards but may be appropriate considerations for owners of specific projects and as guidelines for offerings by insurance companies. Possible language might be: “Designing structures to explicitly reduce financial losses including losses larger than can be substantiated in codes and standards development.”</p>
9	Pg. 12, Paragraph 2, Line 8	<p>Provide clarification for reduction of financial losses.</p> <p>REASON: Are the financial losses the costs directly related to the design, construction, repair, reconstruction, and use of buildings; the costs related to disaster relief activities; or both. The costs being reduced should be clearly stated.</p> <p>SUGGESTION: Adequately define “financial losses.” If financial losses include both there should be discussion of both types of losses in the financial plan.</p>
10	Pg. 13, Paragraph 2, Line 4	<p>Eliminate: “represents the next generation of code development”</p> <p>REASON: “Performance-Based Seismic Design.” The creditability and effectiveness of performance based design as a compliance method for building codes has not been quantified or qualified. There are many hurdles and potential flaws and problems with performance based design for code development. In the United States there has not been any significant adoption or use of existing performance-based design code documents, although the International Code Council has published ICC Performance Code for nearly a decade. The statements in this section can not be verified or substantiated and are unqualified claims (demonstrating the flaws of a document not appropriately processed though an ANSI accredited SDO) that are not truly representative of the needs or direction of codes and standards development in the United States. NEHRP efforts should not be leading performance-based code development, but should be developing materials that are required as such codes become developed and adopted in the United States.</p> <p>SUGGESTION: Delete: “represents the next generation of code development and”</p>

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11	Pg 14, 1 st paragraph	Comments about Earth Scope are as if it is in the future. It has been funded and is well underway. Update this.
12	Pg. 17, Paragraph 1, Line 1	<p>Eliminate all references to “pre-standard” and continuation of the development of NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures.</p> <p>REASON: It is time for a significant change in NEHRP with regard to codes and standards development. Now that significant advances have been made through the development of pre-standards through a quasi-government process, it is now most appropriate for NEHRP to serve as a research mechanism with appropriate review and a process to make individual recommendations to American National Standards Institute (ANSI) accredited standards writing organizations (SDOs) to advance codes and standards. Such efforts need to be well coordinated with the SDO and responsive to needs and issues identified in the SDO processes. This approach is imperative so that further standards development for adoption as reference standard in model building codes adequately consider all constituents of the building community and consider new provisions with consideration of other building loads. Cost effective seismic provisions may substantially increase the cost of provisions for other hazards. Most standardization for “new buildings and other structures” has occurred in an ANSI accredited SDO process and this should continue.</p> <p>SUGGESTION: Eliminate all references to “pre-standard” throughout the document for seismic design of new buildings and other structures, and eliminate any reference for the continued development of NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures in its present form. It is time for a new publication and title that is responsive to issues identified an ANSI accredited SDO process and which incorporates the findings of NEHRP program activities.</p>
13	Pg. 17, Paragraph 1, Line 2	<p>Add provisions for recommendations for codes and standards development to be “cost-effective.”</p> <p>REASON: Any mandatory requirements developed as a result of NEHRP activities must be cost-effective for resisting building loads and load combinations. As provisions for new construction become more expensive, owners and occupants will tend to occupy existing less disaster resistant construction. The cost-effectiveness model should also include the impact of seismic resistance provisions on the costs of wind, fire, snow, ice, water and other building load resistance provisions.</p> <p>SUGGESTION: Add new goal: “Goal E. Evaluate the results of NEHRP activities recommended for consideration by an ANSI accredited SDO for incorporation into a standard and by reference a building code with an appropriate cost-effectiveness model. The cost-effectiveness model shall be developed through an ANSI accredited SDO and consider the increase in initial cost of construction (including design costs), social and economic impact for local jurisdictions (including the costs related to continue to occupy existing less safe buildings than to construct new facilities), and the cost increases imposed on other disaster resistance construction requirements.” Add new sections to the strategic plan as appropriate.</p>
14	Pg. 17, Paragraph 1, Line 2	<p>Add new Goal F on Post Earthquake Disasters</p> <p>REASON: While NEHRP has made considerable improvements in design and construction practices and requirements in building codes and</p>

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		<p>standards for resistance to seismic forces, limited or no consideration as been afforded the resistance to disasters that result from the seismic event. Fires after earthquakes can be extremely damaging and result into conflagrations. Emergency responders may not have useable access routes and water supplies may be disrupted. Building design requirements should consider total burnout without collapse. Tidal or flood surges resulting from seismic activities must be designed for. If a structure survives an earthquake it should also survive loads from flooding.</p> <p>SUGGESTION: Add new "Goal F. Develop effective practices and policies for post-earthquake loss-reduction and accelerate implementation. Promote post-earthquake loss-reduction activities and support those who adopt, implement, and enforce such policies and practices." Add appropriate new sections to the strategic plan.</p>
15	Pg. 18, Paragraph 1, Line 4	<p>Add "cost-effective"</p> <p>REASON: Adoption of earthquake loss-reduction measures by states and communities must be cost justified.</p> <p>SUGGESTION: Add "cost-effective" after "and evaluating".</p>
16	Pg. 18, Paragraph 4, Line 3	<p>Eliminate the continued development of "pre-standards" for new buildings and other structures.</p> <p>REASON: NEHRP has significantly advanced standards for improved resistance to seismic events. Further development should be via an ANSI accredited SDO and (as indicated in previous comments) consider construction costs, societal and economic impacts, and impact on provisions for other disaster resistance.</p> <p>SUGGESTION: Delete: "and pre-standards" following "guidelines".</p>
17	Pg. 18, Paragraph 5, Line 4	<p>Eliminate the continued development of "pre-standards" for new buildings and other structures.</p> <p>REASON: NEHRP has significantly advanced standards for improved resistance to seismic events. Further development should be via an ANSI accredited SDO and (as indicated in previous comments) consider construction costs, societal and economic impacts, and impact on provisions for other disaster resistance.</p> <p>SUGGESTION: Delete: "and pre-standards" following "guidelines".</p>
18	Pg. 18, Paragraph 6, Line 4	<p>Delete "NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures."</p> <p>REASON: NEHRP has significantly advanced standards for improved resistance to seismic events. Further development should be via an ANSI accredited SDO and (as indicated in previous comments) consider construction costs, societal and economic impacts, and impact on provisions for</p>

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		<p>other disaster resistance. A new publication and process is in order. Guidelines developed for new buildings that may not be considered cost-effective or otherwise appropriate as minimum requirements in building codes and reference standards may be useful to owners or programs (possibly insurance companies) that exceed minimum building code requirements. The guidelines could also serve as the tool to present new information to an ANSI accredited SDO for the development of a document like the American Society of Civil Engineers (ASCE) Structural Engineering Institute (SEI) Minimum design Loads for Buildings and Other Structures (ASCE/SEI 7). This is especially important with one of the current bullet son page 12 being: "Designing structures to explicitly reduce financial losses."</p> <p>SUGGESTION: Replace with new method of communicating to appropriate ANSI accredited SDOs. Possibly "NEHRP Guidelines for Seismic Resistance of New buildings and Other Structures."</p>
19	Pg 19, #1 of Goal C, last sentence	<p>"NEHRP will also propose to implement the ANSS." This makes no sense here. The ANSS is the critical part for accomplishing all 3 parts of goal C. Its the ANSS that allows NEHRP to "deliver rapid, accurate reports..." It is what holds together the NEIC, regional networks and provides data to the IRIS DMC. So not sure what this statement is doing here.</p>
20	Pg 19, #1 of Goal D	<p>Here is a good place to put in mention of ANSS and maybe Earth Scope. These are the two biggest and best monitoring efforts out there. Add InSAR (satellite-based) and you have pretty much all of it.</p>
21	Pg. 21, Paragraph 4, Line 5	<p>"Promote" needs to be clarified.</p> <p>REASON: Throughout this document the terms "promote" and "advocate" are used in reference to adoption of codes and standards. NEHRP provisions developed with utilizing a true ANSI accredited SDO throughout the process have been challenged at state levels. Some states did not want to adopt provisions of NEHRP, in part because an appropriate consensus process was not followed throughout the development process and/or because the justification of the cost effectiveness of requirements was not adequately demonstrated. The Federal Emergency Management Administration communicated with states (at least once in writing) advising that Federal funds including those not related to disaster mitigation may be in jeopardy if state codes were not consistent with the NEHRP provisions. This seems to be more of a "mandate" without due consideration of states' rights than "advocate" or "promote." These terms are used in several places in the strategy. The entire process related to the performance of buildings and building codes and standards should now be shifted to an existing ANSI accredited SDO process.</p> <p>SUGGESTION: Clarify "promote" and "advocate" the adoption of NEHRP provisions. If the process is intended to continue to "mandate" under the threat of loss of Federal funding, then the process is not a voluntary process, as with other codes and standards at the state and local level, but instead could be interpreted as Federal legislation implemented at the state level. It is misleading to the reader of the strategy to use the terms "promote" and "advocate" to express the process used in previous efforts to encourage the adoption of NEHRP provisions in building codes.</p>
22	Pg. 24,	<p>Eliminate "promote seismic reduction through the adoption of building codes with up-to-date seismic provisions" and replace it with a more</p>

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	Paragraph 2, Line 1	<p>appropriate mechanism to assure provisions are developed with adequate consideration of the issues and needs facing state and local jurisdictions.</p> <p>REASON: Throughout this document the terms “promote” and “advocate” are used in reference to adoption of codes and standards. NEHRP provisions developed with utilizing a true ANSI accredited SDO throughout the process have been challenged at state levels. Some states did not want to adopt provisions of NEHRP, in part because an appropriate consensus process was not followed throughout the development process and/or because the justification of the cost effectiveness of requirements was not adequately demonstrated. The Federal Emergency Management Administration communicated with states (at least once in writing) advising that Federal funds including those not related to disaster mitigation may be in jeopardy if state codes were not consistent with the NEHRP provisions. This seems to be more of a “mandate” without due consideration of states’ rights than “advocate” or “promote.” These terms are used in several places in the strategy. The entire process related to the performance of buildings and building codes and standards should now be shifted to an existing ANSI accredited SDO process.</p> <p>SUGGESTION: Replace: “NEHRP also places a high priority on working with states and local governments to promote seismic risk reduction through the adoption of building codes with up-to-dates seismic provisions.” with “NEHRP focuses on the advancement of cost-effective earthquake hazard mitigation strategies through an ANSI accredited SDO such as the ASCE/SEI process which develops and maintains the Minimum Design Loads for Buildings and Other Structures.”</p>
23	Pg. 25, Paragraph 1, Line 3	<p>Expand on the information obtained from providing “state-of-the-art risk-reduction standards to all Federal agencies.”</p> <p>REASON: Incorporating hazard mitigation measures in federal buildings is an excellent test for feasibility, affordability, impact on other building use requirements, and practicality prior to introducing new provisions as minimum requirements for building codes.</p> <p>SUGGESTION: Expand the scope of this section to clearly identify the use of Federal building design and construction as a mechanism to verify and substantiate recommended changes to standards for new building and other structures prior to submitting the recommendations to the appropriate ANSI accredited SDO.</p>
24	Pg. 25, Paragraph 5, Line 4	<p>Eliminate or move to the lowest priority “curricula at K-12 schools.”</p> <p>REASON: These are many other much higher priority issues that must be addressed under NEHRP than this activity, including two recommended additional goals, E. Cost-effectiveness measurement tool and F. Post earthquake disaster reduction.</p> <p>SUGGESTION: “K-12 schools” or add language to emphasize this portion of the program as a low priority for the length of the new strategic plan.</p>
25	Pg. 27, Paragraph 5, Line 1	<p>Current consolidation of the three regional model building codes is not an indication of a “trend toward a unified national codes”. Delete any reference to the number or type of model building codes or building codes. This is not important for the development of information via NEHRP.</p>

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		<p>REASON: The statement that “NEHRP supports the development and periodic revision of model building codes” needs to be addressed with adequate consideration of Comment 12 regarding page 21, paragraph 5, line 1. Further, the consolidation of the three model building codes is not a clear indication of a trend to a national building code. Each jurisdiction, based on its climate, geography, political, economic, social needs, and geology will require a code developed with provisions that satisfy the needs of the constituents of that jurisdiction. NEHRP should not be encouraging of focusing efforts on the development of a national building code; this should not be a consideration in NEHRP. PCA strongly encourages the development of building codes that are most appropriate for the jurisdiction having authority and opposes programs or efforts that remove this authority from those jurisdictions. It would be nearly impossible to develop one comprehensive national model building code, yet one national building code that adequately addresses the needs of every jurisdiction and their constituents throughout the United States. Development of appropriate recommendation for improved seismic provisions can be effectively managed via NEHRP regardless of the number of model building codes or the number of building codes. All references to one model or one national building code should be removed from the document. In addition, there is no substantiation that there is a trend toward on unified national codes. The trend continues to be state and local building codes with modifications and amends to nationally developed models. Individuals are often misleading by referring to the adoption information provided on the International Code Council (ICC) website. A state is listed as having adopted a specific I-code, but in some states the limitation may be for any jurisdictions having a building code (as not all jurisdictions have building codes) or applying to state-owned buildings, or other unique sets of building such as multi-family and places of assembly. This might be an example of activities developed with an emphasis from the views of the Federal government and academics view rather than on actual practice at the state and local level. This is another reason to consider broader involvement and a process that uses an ANSI accredited SDO to further the developments of an effective NEHRP program.</p> <p>SUGGESTION: Delete: “The current trend is toward unified national codes for both new and existing buildings, such as those developed by the International Code Council and those being developed by the National Fire Protection Association (NFPA). These codes are replacing the three regionally based model codes and are expected to be implements throughout the Nation. The NEHRP Recommended Provisions serve as the resource documents for these model building codes for new buildings, while”.</p>
26	Pg. 29, Paragraph 1, Line 1	<p>Delete reference to “pre-standard.”</p> <p>REASON: Discussion of pre-standard should be removed as per previous comments. Further investigations in other countries should now become more restricted, focusing on earthquakes of high magnitude in countries have requirements for new construction comparable or more restrictive than those being used in the United States. Based on age of construction, investigations of such earthquakes should provide adequate information for a variety of types of construction and retrofits. Reduction in resource expenditures for investigations may be used for other higher priority elements of NEHRP and elements not currently within the scope of NEHRP such as tsunami impacts.</p> <p>SUGGESTION: Delete: “and pre-standards” after “upgrade guidelines.”</p>

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27	Pg. 29, Paragraph 2, Line 3	<p>Replace NEHRP Recommended Provisions with appropriate ANSI accredited SDO.</p> <p>REASON: To assure cost-effectiveness, balance, inclusion of all industry segments, and adequate consideration of impact on other codes and standards provisions, discontinue the maintenance of NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures. Relinquish responsibility to and ANSI accredited SDO such as ASCE/Structural Engineering Institute in the development of Minimum Design Loads for New Buildings and Other Structures (ASCE 7). Cease all activities that support the development of “pre-standards” as related to new buildings and other structures. Continued development without utilization of full scope of building loads and without consensus via an ANSI accredited SDO process at the conception of recommendations has the potential to misdirect activities with regard to the development of the best information for consideration in building codes and standards. Similar concerns may also exist for aspects of NEHRP not related to “buildings and other structures.”</p> <p>SUGGESTION: Replace: “NEHRP will support periodic review of the NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures,” with: “NEHRP will provide recommendations to an appropriate ANSI accredited SDO to develop appropriate reference standards such as ASCE/SEI 7 Minimum Design loads for Buildings and Other Structures.”</p>
28	Pg. 29, Paragraph 3, Line 2	<p>Delete first bullet item starting with “Maintain the NEHRP”</p> <p>REASON: Discussion of pre-standard should be removed as per previous comments. Further investigations in other countries should now become more restricted, focusing on earthquakes of high magnitude in countries have requirements for new construction comparable or more restrictive than those being used in the United States. Based on age of construction, investigations of such earthquakes should provide adequate information for a variety of types of construction and retrofits. Reduction in resource expenditures for investigations may be used for other higher priority elements of NEHRP and elements not currently within the scope of NEHRP such as tsunami impacts.</p> <p>SUGGESTION: Replace with: “Provide recommendations for cost-effective seismic design and construction requirements to an appropriate ANSI accredited SDO.”</p>
29	Pg. 29, Paragraph 3, Line 6	<p>Delete “pre-standard.”</p> <p>REASON: Discussion of pre-standard should be removed as per previous comments. Further investigations in other countries should now become more restricted, focusing on earthquakes of high magnitude in countries have requirements for new construction comparable or more restrictive than those being used in the United States. Based on age of construction, investigations of such earthquakes should provide adequate information for a variety of types of construction and retrofits. Reduction in resource expenditures for investigations may be used for other higher priority elements of NEHRP and elements not currently within the scope of NEHRP such as tsunami impacts.</p> <p>SUGGESTION: Support the development of guidelines for lifeline systems.</p>

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30	Pg. 30, Paragraph 4, Line 8	<p>Eliminate "performance-based." Information should be useful for any codes, standards, or practices regardless of whether performance-based, rational design, prescriptive, etc.</p> <p>REASON: "Performance-Based Seismic Design." The credibility and effectiveness of performance based design as a compliance method for building codes has not been quantified or qualified. There are many hurdles and potential flaws and problems with performance based design for code development. In the United States there has not been any significant adoption or use of existing performance-based design code documents, although the International Code Council has published ICC Performance Code for nearly a decade. The statements in this section can not be verified or substantiated and are unqualified claims (demonstrating the flaws of a document not appropriately processed though an ANSI accredited SDO) that are not truly representative of the needs or direction of codes and standards development in the United States. NEHRP efforts should not be leading performance-based code development, but should be developing materials that are required as such codes become developed and adopted in the United States.</p> <p>SUGGESTION: Delete: "performance-based." If there is a need for inclusion of "performance-based", then a definition of performance-based is imperative. "Performance-based" means many different things to many different people.</p>
31	Pg 33, 2 nd bullet under objective 1	<p>Here is the "proposing to implement ANSS" again. ANSS is being implemented and has been for most of the last five years, just at a rate of only 10% called for in its authorizing legislation.</p> <p>REASON: This seems still out of date</p> <p>SUGGESTION: something like "NEHRP plans to accelerate the development of the ANSS".</p>
32	Page 33, Paragraph 1, Line 1	<p>Include provisions for cost effectiveness.</p> <p>REASON: Advancement of provisions must include adequate consideration of the cost-effectiveness considering initial and life-cycle costs for design and construction, economic and society impacts (such as relocating businesses to lower seismic risk areas), and impact on the cost of other provisions of codes and standards for resistance to other loads.</p> <p>SUGGESTION: Add specific language to this paragraph that includes the development of methodologies and tools via an ANSI accredited SDO to evaluate and substantiate adoption and/or use of recommendations and guide information.</p>
33	Pg. 45, Paragraph 2, Line 7	<p>Include societal impacts of costs related to new seismic provisions.</p> <p>REASON: Decisions may be made to continue operations in older existing buildings than to relocate to more earthquake resistant buildings due to higher initial costs to design and construction the more earthquake resistance buildings.</p> <p>Businesses may relocate to areas of lower seismic risk eliminating local employment. New provisions may have a cost that impedes the use of</p>

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		<p>practices to resist other more frequently occurring hazards.</p> <p>SUGGESTION: Include provisions for cost-effective analysis of new requirements on local jurisdictions.</p>
34	Pg 63, Paragraph 1, Line 1	<p>Consider all new efforts for buildings and other structures to be addressed by an ANSI accredited SDO. NEHRP should continue research and development activities and to prepare guides to be considered in codes and standards development and to design and construct in a cost-effective manner that exceeds acceptable levels in building codes and standards.</p> <p>REASON: List of individuals involved in workshops did not represent balance in accordance with an ANSI accredited SDO process. In both workshops approximately 50% of the participants were from government entities, the next largest group was academics followed by those representing quasi-government organizations. There was no direct representation from the building material interests and other interest groups may not have been adequately represented.</p> <p>SUGGESTION: Continue future development of all guidance and recommendations through appropriate ANSI accredited SDOs and rely on these entities to identify needs and research projects.</p>
35	(1) Page 17 (2) page 18 (3) page 25	<p>(1) Goal Asupport those who adopt, implement, and enforce such policies and practices. (2) Implement policies and practices that reduce vulnerability of Federal facilities. (3) ICSSC was established to assist Federal departments....which....recommend uniform practices and policies...in EO 12699...</p> <p>Comment: Guidance for Federal agencies to adopt the national consensus standards should be developed by NIST. Specifically that include the IBC and at a minimum the seismic provisions of the IBC.</p> <p>Reason for Comment: Currently there is no Federal standard in adopting the IBC. States and local organizations typically pass ordinances adopting the code in its entirety and make themselves responsible for enforcing the code. DoD specifically deletes the portions of the code that outlines enforcement of code compliance and the organization that performs the plan reviews. Code compliance is an ad hoc activity modified for each individual building or contract. Some design-build projects allow the contractors to review their own plans and perform their own special inspections. This is a conflict of interest and is not allowed by the code. This is potential violation of public safety.</p> <p>Suggestion for Revision: NIST will develop guidelines for Federal agencies to adopt national consensus standards such as the international Building Code.</p>
36	Page 1 of Executive Summary	<p>Paragraph Cited: Executive Summary, first paragraph, third sentence, now reads: "As recent earthquakes around the world have demonstrated, high population densities and development pressures, particularly in urban areas, are increasingly vulnerable."</p> <p>Comment: This doesn't make sense. How can a development pressure be vulnerable?</p>

Comment #	Reference	Comment
		<p>Reason for Comment: The first paragraph of the Executive Summary is the most important paragraph in the document. It needs to have something to say, and to be well-written</p> <p>Suggestion for Revision: Rewrite, for example as: "As recent earthquakes around the world have demonstrated, high population densities and development pressures, particularly in urban areas, have made society increasingly vulnerable to seismic hazards."</p>
37	Page 1 of Executive Summary	<p>Paragraph Cited: Executive Summary, first paragraph, fourth sentence, now reads:</p> <p>"Unacceptably high loss of life and enormous economic consequences are associated with recent global earthquakes, and it is only a matter of time before the United States faces a similar experience."</p> <p>Comment: Confused sentence. What is a global earthquake? What is a similar experience?</p> <p>Reason for Comment: The first paragraph of the Executive Summary is the most important paragraph in the document. It needs to have something to say, and to be well-written</p> <p>Suggestion for Revision: Rewrite, for example as: "Unacceptably high loss of life and enormous economic consequences are associated with recent earthquakes in South Asia, and it is only a matter of time before a major urban area in the United States is subjected to the damaging ground motions of a great earthquake."</p>
38	Page Numbers: page 39 (text) and page 55 (Table) Paragraph Cited: In the first objective of Goal D ("1. Improve monitoring of earthquakes and earthquake-generating processes.") also in the Table on page 53	<p>Comment: Something important is missing in the document: mention should be made, of the benefits of improving estimates of earthquake location. And, a plan to implement these methods should be included in the strategy for NEHRP.</p> <p>Reason for Comment: Under Goal D there is discussion from page 39 to page 47, organized under six different sub-headings that each describe a particular objective. I think something is missing, that should be included on pages 39 or 40 under the first objective ("1. Improve monitoring of earthquakes and earthquake-generating processes."), namely, a discussion of the benefits of improving estimates of earthquake location. Research done by many individuals in the last ten years has shown how the precision of earthquake locations can be improved by a factor somewhere between ten and a hundred. What is now needed, is a commitment to implement the methods developed in this research, in which the location of large numbers of earthquakes is determined all at once (locating the earthquakes accurately relative to each other). The benefits of more precise earthquake locations will be seen in numerous ways, including</p> <p>(1) the identification of sub-surface seismogenic structures,</p> <p>(2) opening up new possibilities for understanding the way in which each earthquake changes the stress field in which neighboring earthquakes occur, and</p>

Comment #	Reference	Comment
		<p>(3) allowing new understanding of the patterns of microseismicity and the way in which these patterns are related to the time of occurrence and location of subsequent damaging earthquakes.</p> <p>There is the need to identify and provide funding for the data centers that will apply the new methods of earthquake location on scales much larger than has been done to date.</p> <p>In this regard, it may be noted that the IRIS Consortium ran a workshop in October 2004 on data products in seismology (see the resulting report, obtainable as www.iris.edu/USArray/documents/USArrayProducts.pdf), and the concept of improving earthquake locations was assigned a top priority (see for example page 20 of the IRIS report) because it has such a strong influence on the quality of almost all quantitative studies of earthquake ground motion. In particular, all the activities listed in the Table on page 53 of the NEHRP Strategic Plan would benefit from improved earthquake locations. The USGS National Earthquake Information Center provides a very valuable service in locating earthquakes throughout the United States (for example, in its Preliminary Determination of Epicenters), but the basic methods have changed very little in several decades, and proven research methods that can provide better locations now need to be implemented on a large scale.</p> <p>Suggestion for Revision: On page 39 or page 40, insert sentences along the following lines:</p> <p>"Research done by many individuals in the last ten years has shown how the precision of earthquake locations can be improved by a factor somewhere between ten and a hundred. What is now needed, is a commitment to implement the methods developed in this research, in which the location of large numbers of earthquakes is done all at once (locating the earthquakes accurately relative to each other). The benefits of more precise earthquake locations will be seen in numerous ways."</p> <p>And in the Table on page 53, include a new row D.1 Implement modern methods of earthquake location (Lead Agency: USGS) (Support Agencies: NSF, FEMA)</p>
39	Page Numbers: 5 Paragraph Cited: paragraph 2/sentence 2	<p>Comment: The text refers to a large inventory of existing structures and that they lack earthquake-resistant design. It also says they have not been retrofitted to meet current design codes. While true, the manner of presentation is misleading in that it suggests that existing buildings must meet current design codes. Renovation and repair of existing buildings may be subject to federal, state or local codes but it is not generally the case that existing buildings that are _static_ beyond normal operation and maintenance would have to meet current design codes.</p> <p>Reason for Comment: The use of the word codes in this manner is misleading and should be deleted in favor of a more appropriate term that conveys the concept that while there are no legal documents (codes) that apply to _static_ existing buildings there are guidelines and recommended practices that one can voluntarily apply if choosing to improve a _static_ existing building.</p> <p>Suggestion for Revision: Change the second sentence to read as follows _&have not been improved in accordance with guidelines and practices focused on securing increased structural integrity of existing buildings not undergoing repair, renovation, or reconstruction._</p>

Comment #	Reference	Comment
40	Page Numbers: 7 Paragraph Cited: Paragraph 2, last sentence	<p>Comment: In mentioning local and state agencies as a foremost challenge to the use of knowledge to foster risk reduction the document, by omission, is suggesting that all federal buildings (e.g. DoD, DOE, Department of State, GSA, NASA, NARA, etc.) are not a challenge and are therefore already using and applying risk reduction techniques. We do not believe that to be the case and suggest that here and as appropriate throughout the revised plan that NEHRP develop and implement a leadership goal of seismic risk assessment and loss reduction for federal properties.</p> <p>Reason for Comment: As NEHRP is a federal lead program it is logical that federal agencies can more easily apply the results of federal research and seismic programs to their own buildings and in so doing create a series of test beds and informational examples for use by the private sector and state and local government building owners.</p> <p>Suggestion for Revision: Change the sentence to read _The foremost challenge facing NEHRP is to develop and deploy seismic knowledge in federal sector buildings and facilities and encourage through leadership by example the application of that knowledge among the private sector and state and local agencies responsible for their own buildings or regulating private sector construction.</p>
41	Page Numbers: 7 Paragraph Cited: Paragraph 4/Sentence 2	<p>Comment: FEMA is noted as translating results into measures for state and local government. There does not appear to be any mention of the federal Sector and there should be.</p> <p>Reason for Comment: The federal sector has a significant US and global building inventory and builds considerable new buildings each year and FEMA should be working with other agencies as the federal leader in the area of seismic risk reduction.</p> <p>Suggestion for Revision: add a new second sentence as follows: FEMA leads federal agencies who are the owners and authorities having jurisdiction for federal buildings in their application and us of effective earthquake loss reduction measures within federal buildings and to use those efforts as test beds for the private sector and state and local government as well as appropriate international entities.</p>
42	Page Numbers: 7 and 8 Paragraph Cited: Paragraph 5/Sentence 2 and Paragraph 3/Sentence 4	<p>Comment: Removal of barriers is one area of focus but the counter to that is creating opportunities. With the creation of opportunities then the barrier issue is less acute.</p> <p>Reason for Comment: Opportunities create a market pull and vacuum to application and use of technology that is not appropriately covered when just removing technical barriers.</p> <p>Suggestion for Revision: change the sentence to read _&.removing technical barriers, creating technical opportunities, evaluating &._</p>
43	Page Numbers: 8 Paragraph Cited: Figure 1	<p>Comment: the figure does a good job of showing the linkage between the four agencies but in not being straight, the perimeter conveys the concept that the four pieces should connect with others. The figure should be enhanced to show the four pieces in bold and then surrounding pieces representing other federal agencies, the public, state and local government, etc.</p> <p>Reason for Comment:</p>

Comment #	Reference	Comment
		<p>Suggestion for Revision:</p>
44	<p>Page Numbers: 9 Paragraph Cited: Paragraph 3/Sentence 1</p>	<p>Comment: Reference is made to the IBC, IRC and NPFA under the heading of _Example of NEHRP Coordination: State-of-the-Art Building Codes_ but no reference is made to the organization that develops the IBC and IRC; the International Code Council (ICC).</p> <p>NFPA is an organization and is mentioned. The reference to the inclusion of the NEHRP recommendations into NFPA documents is misleading as only one NFPA _code_(NFPA 5000) addresses this issue. The reference to NFPA should be deleted.</p> <p>Reason for Comment: The ICC develops the IRC and IBC and should be mentioned if NFPA is to be mentioned by name. Model building codes such as those of the ICC and standards such as those developed by the NFPA are developed in the voluntary sector.</p> <p>Only through adoption will they have any impact on earthquake hazards. Adoption of the NFPA 5000 document, while widely anticipated when the plan was written, has not occurred, although it has been developed. With only a very limited number and size of localities adopting that document, none of whom are at any considerable seismic risk, it is not meaningful to reference that publication. The extent of the adoption and use of the IRC and IBC nationally and internationally for federal construction overseas support their being mentioned in the text.</p> <p>Suggestion for Revision: delete _, and the codes being developed by the National Fire Protection Association (NFPA). _</p>
45	<p>Page Numbers: 9 Paragraph Cited: Paragraph 3/Last Sentence</p>	<p>Comment: What is the process showed? How does the success apply to both long and short term efforts?</p> <p>Reason for Comment: What is described in the paragraph is not a process but simply NEHRP impacting building code efforts _ although the text does not even cover what the NEHRP activities were. One familiar with the process can conclude NEHRP was responsible for underlying research and/or code change submittals, but this is not covered in the text. Changing the codes is an effort but it is not clear why it is both a short and long term effort.</p> <p>Suggestion for Revision: delete the last sentence or rewrite the paragraph to more clearly explain why state-of-the-art building codes are both long and short term efforts and are a success. Also what is described is not a process but an activity (that of model code writing).</p>
46	<p>Page Numbers: 9 Paragraph Cited: Paragraph 6/Last Sentence</p>	<p>Comment: See above regarding the IRC, IBC and NFPA. NFPA was not developing model codes but simply one code, NFPA 5000. That document has been published and has been adopted in three localities in the U.S. The reference to NFPA should be deleted.</p> <p>If not then the term codes should be changed to code and the ICC should be mentioned as the publisher of the IRC and IBC.</p> <p>Reason for Comment: see above</p>

Comment #	Reference	Comment
		<p>Suggestion for Revision: delete _,and will also&.NFPA._</p>
47	<p>Page Numbers: 9 Paragraph Cited: Paragraph 7</p>	<p>Comment: The example shows the impact of NEHRP activities on seismic safety only if one understands and agrees that the impact is achieved through code development.</p> <p>Little material is presented on the adoption and implementation of codes, which is where the true impact is achieved.</p> <p>Reason for Comment: The adoption, implementation and enforcement of building codes is what reduces seismic risk and the example does not convey this.</p> <p>Suggestion for Revision: Include a map of the U.S. showing the adoption rate of the codes that NEHRP influenced and the amount of new construction, renovation, etc. in those states that is impacted. Also include any adoption rate for existing _static_ buildings.</p>
48	<p>Page Numbers: 12 Paragraph Cited: Set of Bullet Points</p>	<p>Comment: A challenge not mentioned is the implementation and enforcement of building codes, design standards and other related guidelines.</p> <p>Reason for Comment: The development and adoption of building codes does not guarantee that resultant construction will satisfy the criteria. Federal, state and local government agencies have limited resources to conduct plan review and construction inspection to ensure that what is required by codes is satisfied. For instance some federal agencies conduct none or very limited inspection of federal construction, leaving field verification of compliance to the contractor hired to construct the facility. Where state and local government conduct enforcement and inspection activities they too may not have the resources to fully ensure compliance.</p> <p>Suggestion for Revision: Add a bullet as follows: _Ensuring that federal, state and local authorities having jurisdiction have resources to govern compliance with building codes, standards and other regulations._</p>
49	<p>Page Numbers: 13 Paragraph Cited: Paragraph 2/Last Sentence</p>	<p>Comment: The statement is made that a NEHRP effort to develop performance-based codes is proposed to be led by FEMA and NIST, with support from NSF and USGS. It should be made clear that this effort is not intended to yield a separate federal code but is intended as a means to provide input to the voluntary sector codes and standards process. The topic of performance-based seismic design, codes and standards should be addressed by a public/private partnership with NEHRP agencies providing necessary and relevant research and support and then collaborating with the voluntary sector to develop and implement resultant codes and standards.</p> <p>Reason for Comment: The concurrent development of public sector and private sector codes and standards creates conflict, wastes resources and is not productive. The National Technology Transfer and Advancement Act encourages the federal sector participation with the voluntary sector codes and standards developers as opposed to development of separate standards.</p> <p>Suggestion for Revision: Revise the paragraph so that it conveys the message that performance criteria can allow for innovation and the recognition that different conditions may require different solutions. In addition the ability to measure and express performance affords the</p>

Comment #	Reference	Comment
		<p>opportunity for anyone to establish a goal that is higher than a minimum performance _floor_ and effectively express how much better they are than the floor. Revise the paragraph to recognize the work on performance-based seismic design that has been accomplished in the International Building Code and International Building Performance Code of the ICC. The latter provides a total performance basis for building design and construction. The former recognizes that different buildings have different required degrees of protection and therefore includes an approach that relates the stringency of the code with respect to seismic design to the risk associated with seismic forces as well as the critical nature of the building being addressed. Also revise the paragraph to convey the understanding that NEHRP agencies will continue to work with the private sector in the development, adoption and implementation of codes and standards as well as the application of those codes by federal agencies for federal buildings.</p>
50	Page Numbers: 18 Paragraph Cited: Item 3	<p>Comment: Reference should be made to supporting adoption of the ICC Codes as the most efficient way to assist state and local government officials to develop and adopt earthquake loss reduction measures.</p> <p>Reason for Comment: In other places the plan is focused on NEHRP participating in the voluntary sector model codes and standards development process. The results of that process are adopted by state and local government and in working with them, as outlined in item three, NEHRP would logically want to see state and local government adopt the results of the voluntary sector codes and standards process.</p> <p>Suggestion for Revision: Change the sentence to read as follows: _NEHRP will collaborate &..to provide assistance in their adoption and implementation of building codes and standards such as those of the ICC and ASCE and to provide technical and other assistance for developing, adopting and evaluating other earthquake loss-reduction &.. Communities._</p>
51	Page Numbers: 18 Paragraph Cited: Item 4	<p>Comment: The Interagency Committee on Seismic Safety in Construction (ICSSC) provides a focal point for the federal sector in implementing improved seismic codes and standards and leading the way with their adoption and implementation. The ICSSC appears to need to increase their efforts and get more involved with the adoption and application of seismic criteria by the agencies.</p> <p>Reason for Comment: NIST chairs the ICSSC and a search on the NIST web site seems to indicate that the most recent literature on the ICSSC is about two years old. No listing of the ICSSC members could be found nor any record of past meetings or future meetings. The plan must reinforce the leadership of the federal agencies in this area and provide for a robust program of federal adoption and application of the resultant codes, standards and practices in their new and existing buildings.</p> <p>Suggestion for Revision: Revise the item as follows: _NEHRP will &.. agencies, and other appropriate federal committees, councils, boards, etc., in &..government and effectively communicate those efforts so that public and private sector interests are aware of them and can actively monitor and participate in them.</p>
52	Page Numbers: 18 Paragraph Cited: Item 5	<p>Comment: Education and training should also be provided to building regulatory authorities, but they are not mentioned specifically in this item or in any of the five items under goal A.</p> <p>Reason for Comment: Building regulatory authorities (code officials, plan reviewers, inspectors, fire service, etc.) are an integral component of the</p>

Comment #	Reference	Comment
		<p>process and system by which building safety can be enhanced and they should be provided specific educational and training support that will help them in their efforts to ensure building safety.</p> <p>Suggestion for Revision: Add _building officials and related regulatory authorities_ to the list of entities in item five that should have education and training support.</p>
53	Page Numbers: 18 Paragraph Cited: Goal B/Item 2	<p>Comment: No guidance is provided related to how national organizations would consider the information provided by NEHRP. The plan should outline what NEHRP would like national organizations that develop codes and standards to do. In reality if NEHRP is going to support publication of the materials listed in the item then NEHRP needs to outline in the plan how they would transfer that information to these organizations and be a proponent for its application and use. In addition the activity in the last sentence to work with associations to promote the use of new technology should be made into a separate item.</p> <p>Reason for Comment: A process of publishing materials for consideration by the national organizations that develop codes and standards is only a first step in code amendment and enhancement advocacy. In addition, those materials must be submitted to the organization in a way that fits within established formats for model codes and standards. The activity to promote use of new technology with trade associations is a separate and distinct activity from transfer of information to codes and standards entities.</p> <p>Suggestion for Revision: Revise the item to read as follows: _NEHRP will& and pre-standards. NEHRP will then work with appropriate private sector organizations to adapt this information into a format that fits within model codes and standards and will foster the submission of appropriate materials to and consideration of national organizations that develop model codes and standards for buildings and lifelines._ Also delete _ and private sector professionals_ from the title of the item add a new item entitled _Facilitate technology transfer to private sector professionals and trade associations_ that includes the last sentence of item one.</p>
54	Page Numbers: 18 Paragraph Cited: Goal B/Item 3	<p>Comment: It is unclear how item three differs from item one supporting goal B. Both address seismic standards and codes.</p> <p>Reason for Comment: Codes and standards are one means of achieving improvements in building safety. There are many others that include education and programs that provide incentives to apply new technology. Items in goal B appear to be out of order and should be reordered.</p> <p>Suggestion for Revision: Renumber item two as item one as change must first start with a knowledge base. Revise item one as noted above and renumber as item two.</p> <p>Add a new item three as suggested above to focus on facilitating technology transfer to professionals and trade associations (e.g. beyond minimum code efforts). Finally take current item three and renumber as item four and revise to move the revision of guidelines into revised item three and have the new item four focus on post-earthquake investigations, knowledge gaps, etc. to yield information to drive further revisions to technology, codes, standards and professional practices.</p>
55	Page Numbers: 19 Paragraph	<p>Comment: Data acquisition by monitoring real buildings and assessing the forces on those buildings and resultant deflections and damage (if any) is not addressed and should be.</p>

Comment #	Reference	Comment
	Cited: Goal C	<p>Reason for Comment: This will provide additional information on the effects of earthquakes in real buildings that is not available if only ground shaking is addressed.</p> <p>Suggestion for Revision: Add the following to item one: _NEHRP will also develop and implement a program to measure and report on the structural performance of buildings during seismic events and use those data to identify enhancements to design and construction guidelines and new technology needs to increase building performance.</p>
56	Page Numbers: 21 Paragraph Cited: Item 1	<p>Comment: The text describing activities to implement item one (information on hazards and loss-reduction measures) does not include codes, standards, design guidelines, and similar documents.</p> <p>Reason for Comment: It is through these documents that loss-reduction measures can be communicated to decision makers and the public.</p> <p>Suggestion for Revision: Consideration should be given to adding a specific activity that would result in the availability of a program that policy makers and others could use to enter location, economic and design information and based on suggested risk factors be provided recommended minimum criteria for application in building design and construction.</p>
57	Page Numbers: 24 Paragraph Cited: Paragraph 1	<p>Comment: The text should not rely solely on seismic advisory boards and the creation of those boards in about 30 states.</p> <p>Reason for Comment: States may already have boards and public bodies that act to do the job that a seismic safety advisory board and it is those bodies that in some states NEHRP should communicate with instead of establishing another board at the state level.</p> <p>Suggestion for Revision: Add new 2nd and 3rd sentences as follows: _In implementing that step NEHRP also recognizes that the establishment of a statewide _seismic authority_ may cause conflict with existing state boards. In those states where there are statewide codes and existing building code boards NEHRP will work to utilize that existing state board in lieu of establishing a separate seismic safety advisory board._</p>
58	Page Numbers: 24 Paragraph Cited: Paragraph 2	<p>Comment: The text does not reflect the current situation regarding building codes.</p> <p>Reason for Comment: Significant developments since the plan was last written necessitate changing the text. The ICC codes have been updated and virtually all federal, state and local agencies have adopted them. The NFPA does not have a seismic-resistant code, thus its reference in the plan would be misleading.</p> <p>Suggestion for Revision: Revise the paragraph as follows: _NEHRP also places&. 2000.</p> <p>Those documents were revised and enhanced in 2003 and again in 2006. Currently the IBC is used as a basis for building codes in 47 states and the IRC in 45 states; the others still using legacy codes of the ICC founders. NEHRP will increase its efforts to actively promote the adoption and</p>

Comment #	Reference	Comment
		implementation of the latest IBC and IRC by at risk states and communities. (For a discussion&.. partnerships._
59	Page Numbers: 25 Paragraph Cited: Paragraph 2/Last Sentence	<p>Comment: The text concerning model building codes is incorrect and should be revised. In addition there should be no need to compare NEHRP recommended provisions and the model code.</p> <p>Reason for Comment: With the formation of the ICC through the consolidation of the US model code groups there is essentially only one model building code. In addition, as the plan is clearly focused on NEHRP participating in the code development process, there should be little difference between the NEHRP recommendations and the model code. The NTTAA also encourages NEHRP participation with the voluntary sector such that separate federal guidelines and documents are discouraged. What is suggested below is consistent with the concept of public _ private collaboration and then the result of the voluntary sector being adopted by the federal sector for its buildings, with amendment as warranted for federal ownership scenarios as opposed to NEHRP publishing guidelines separate from the result of the public _ private collaboration in the form of codes and standards.</p> <p>Suggestion for Revision: delete the last sentence. Also revise the rest of the paragraph to align with the concept that NEHRP will conduct research and provide that research in the form of proposed changes to codes and standards and participate in their development in the voluntary sector. With respect to the federal sector, as the agencies adopt those codes and standards, then NEHRP could work with the agencies on amendments and additions to those codes that may better align the minimum requirements with the federal sector interests as the building owner.</p>
60	Page Numbers: 26 Paragraph Cited: Paragraph 1/Last Sentence	<p>Comment: Revise the text to refer to a singular code group, the appropriate codes and local government. Also NEHRP action to support training and enforcement should be directly with state and local government as well as through entities that work with them.</p> <p>Reason for Comment: See above, as the ICC is the singular US code group. When the plan was drafted it is likely the authors were considering the three code groups that subsequently formed the ICC. Also for clarification and consistency throughout the document. Training and associated activities are also best delivered directly to state and local government as well as through entities like the ICC that work with them.</p> <p>Suggestion for Revision: Change the last sentence to read as follows: _Similarly, as state and local government adopt model building codes, NEHRP will work to help facilitate their effective implementation and enforcement of those codes directly and through the ICC and other organizations that work with them.</p>
61	Page Numbers: 27 Paragraph Cited: Paragraph 1/Sentence 2	<p>Comment: NEHRP need not publish separate guidelines for design, construction, and evaluation when it is conducting research and transferring that research into model building codes and standards. It would seem more appropriate, given the NTTAA, for NEHRP agencies to conduct their research in cooperation with the private sector and then support the private sector in their efforts to develop codes and standards and the public sector in their efforts to adopt and implement those codes and standards.</p> <p>Reason for Comment: A possible duplication of effort exists wherein NEHRP develops guidelines and at the same time works with those who develop, adopt and implement codes and standards. It seems more logical to develop a technical basis for the codes and standards, take that to the voluntary sector, participate with the voluntary sector in their work and then support the development of support and enhancement materials for</p>

Comment #	Reference	Comment
		<p>those codes and standards with others in the public and private sectors.</p> <p>Suggestion for Revision: Change the paragraph to reflect the approach of collaboration with others in the public and private sector to yield one set of codes, standards and guidelines and support materials instead of working with the codes and standards entities and then concurrently developing separate and possibly duplicative guidelines. If NEHRP has recommendations that are not adopted into codes and standards then NEHRP can and should communicate them to adopting entities for their consideration but not in the form of separate guidelines.</p>
62	Page Numbers: 27 Paragraph Cited: Item 1 First Paragraph	<p>Comment: The statement about codes and standards is incorrect.</p> <p>Reason for Comment: Actions that have occurred since the current plan was issued render the text inaccurate. The trend toward unified codes throughout the US has been underway for some time. Most recently the three founders of the ICC fully consolidated as the ICC and there is now one set of nationally recognized model building codes in the US. Virtually all federal, state and local agencies adopting codes have adopted the ICC Codes. The statement that _these codes are replacing the three regionally based model codes_ is misleading, as only the ICC Codes have been utilized in updating or replacing those three codes. NFPA does not replace those codes and should not be mentioned.</p> <p>Suggestion for Revision: Revise the paragraph to read as follows: _NEHRP supports the development and regular periodic maintenance of model building codes and relevant reference standards. The basis for all but a handful of federal, state and local building regulatory provisions is the International Codes developed by the International Code Council. Those ICC codes embody reference standards such as those developed by ASCE, ASTM, ASHRAE, NFPA, UL and others. These codes replace & and have been adopted and implemented throughout the nation (see www.iccsafe.org for relevant federal, state and local adoption information). The NEHRP& for new and existing buildings. FEMA is&in the ICC Codes and relevant reference standards&. between the model code and reference standards and the& agencies._</p>
63	Page Numbers: 28 Paragraph Cited: Item 2 Paragraph 1	<p>Comment: NEHRP R&D is noted as providing a technical basis for improved design, construction, evaluation, and upgrade guidelines and pre-standards. This would appear to conflict with the NEHRP effort to help with the upgrading of codes and standards, and does not track with the first bullet under item two. NEHRP should more effectively coordinate its work with the private sector and others in the public sector leading to development of codes and standards.</p> <p>Reason for Comment: Eliminate duplication, track with the NTTAA and foster collaboration.</p> <p>Suggestion for Revision: Revise the first sentence and add a new second sentence as follows: _NEHRP currently supports&for improvements and enhancements to model codes and standards that form the basis for requirements that govern the design and construction of buildings. NEHRP also uses the results of that program to provide the technical basis for & pre-standards for lifelines._</p>
64	Page Numbers: 29 Paragraph Cited: Item 3 First	<p>Comment: The activities related to the NEHRP guidelines and commentary are directed at immediate use by practicing engineers but the objective is focused on improving seismic standards and codes. To some degree these are mutually exclusive and more importantly the latter conflicts with objective one under goal B.</p>

Comment #	Reference	Comment
	Paragraph	<p>Reason for Comment: The development of research and guidance and transfer of that information into codes and standards is one way of achieving better building design and construction. The transfer of that information into guidelines, recommended practices and similar criteria is another that may transcend minimum codes and standards. In both cases commentary and supporting information is needed to facilitate implementation. The plan seems to mix and match codes, standards, guidelines, etc. and should do a better job identifying the separate and distinct ways to transfer the information generated concerning better buildings and tailor the information transferred to the various user audiences.</p> <p>Suggestion for Revision: Consider making objective one focus on codes and standards and objective three on improvement in design and construction practice beyond code.</p>
65	Page Numbers: 30 Paragraph Cited: Paragraph 1	<p>Comment: It is likely that the NEHRP guidelines are now not the first of their kind as much has transpired since the plan was written.</p> <p>Reason for Comment: If the guidelines and other research has been effectively transferred to into codes, standards and practice as envisioned by the plan then in a revision to the plan there should be no need to present what is in the paragraph, but instead focus in the plan on how additional research can be transferred.</p> <p>Suggestion for Revision: Update the paragraph to address what is planned for the next 5 years, which in this case should be continuing to transfer the results of research and field investigations to guidelines to improve design practice.</p>
66	Page Numbers: 35 Paragraph Cited: Paragraph 1/Sentence 2	<p>Comment: There is likely further generation mapping that has been used in updates to the IBC.</p> <p>Reason for Comment: Time has transpired since the last plan was developed.</p> <p>Suggestion for Revision: Change the 2nd sentence as follows: _The latest generation of these maps has been incorporated into the 2006 International Building Code and as a result of the widespread adoption of the IBC throughout the US, the information is used by building designers and regulator authorities. The information is also used&.clients._ Also add a sentence as follows: _As this information is updated and enhanced it will be taken to the voluntary sector codes and standards organizations for their consideration in updating their documents, consistent with other objectives in the plan._</p>
67	Page Numbers: 35 Paragraph Cited: Paragraph 3	<p>Comment: NEHRP should transfer the concept of urban seismic hazard mapping to more state and local governments.</p> <p>Reason for Comment: The concept of urban seismic hazard mapping has significant value to local government in adapting a model building code to better address their unique needs. It is assumed that since the plan was developed that the three test areas have been conducted and work is ready to take the concept national.</p> <p>Suggestion for Revision: Include a sentence or two that describe how NEHRP will take the concept of urban seismic hazard mapping national to key state and local government agencies through their code adoption and zoning application processes.</p>

Comment #	Reference	Comment
68	Page Numbers: 45 Paragraph Cited: Paragraph 1	<p>Comment: Change the paragraph to focus on the ability to use NEES as a prediction method to validate compliance with performance based codes.</p> <p>Reason for Comment: Simulation research on NEES should be at a point where it could provide a basis for determining and validating compliance with building code criteria focused on earthquake resistance.</p> <p>Suggestion for Revision: Consider changing the text or adding new text that provides for activity to use NEES as a tool to model building performance and validate compliance with building codes and standards.</p>
69	Page Numbers: 50-53	<p>Comment: Update the resultant tables of objectives under the goals as suggested in the comments provided on specific goals and objectives.</p> <p>Reason for Comment:</p> <p>Suggestion for Revision:</p>
70	Page Numbers: 56 Paragraph Cited: Paragraph 1	<p>Comment: The statement that _There currently exists a fundamental disconnect in that there is not a clear link for research results to be incorporated into codes and standards development and implementation activities_ is incorrect.</p> <p>Reason for Comment: The ICC code development process and all standards development processes are open and available at any time for submission of change to existing documents and material for new documents. The NTTAA further encourages federal participation in these processes. Federal agencies cannot assume that private sector or other public sector interests will take the published results of their research and develop and integrate them into ongoing codes and standards processes.</p> <p>Interestingly if the disconnect exists then it is a self admission that the activities in the plan to transfer the results of research to codes and standards has been a failure. Federal agencies that conduct research and investigations are the experts in their work and they need to work hand in hand with those who can _translate_ their efforts into effective codes and standards criteria.</p> <p>Suggestion for Revision: Revise the 2nd sentence to more accurately reflect the current situation. If the decision is made to not change the sentence then the plan needs to be revisited and reinforced with respect to needed activities to address any disconnect.</p>
71	Page Numbers: 56 Paragraph Cited: Paragraph 1/Last Sentence	<p>Comment: Is an-ad hoc working group of NEHRP best equipped to address information transfer and coordination related to codes and standards?</p> <p>Reason for Comment: Based on the comment about their being a disconnect between research and codes, standards, and practices it is believed that the NEHRP agencies are not fully conversant on the most effective ways to secure changes to codes and standards and affect their adoption and implementation.</p> <p>Suggestion for Revision: Add private sector entities and state and local government to the ad hoc working group with NEHRP agencies.</p>

Comment #	Reference	Comment
72	Page Numbers: 17-20 Paragraph Cited: Broad Program Goals	<p>Comment: The NEHRP effort has done an admirable job in educating society about Earthquake Hazards. As a result the ability to see the risks around us has improved greatly.</p> <p>What still needs work is to better integrate this understanding into our day to day economy. The subsequent comments generally aimed at stimulating action to improve this understanding. If we consider that at some level we are all investors then we seek to invest in are good risks with favorable rates of return. Promisingly NEHRPs products to date have encourage innovative financial solutions to mitigate hazards_yet there is more work to be done, namely develop indicators that will encourage financial markets to devote more resources into preventative measures.</p> <p>This comment is in reference to the Broad Program Goals (pp17-20). The stated goals of equal priority and mutual dependency are:</p> <ul style="list-style-type: none"> A. Develop effective practices and policies for earthquake loss-reduction and accelerate their implementation B. Improve techniques to reduce seismic vulnerability of facilities and systems C. Improve seismic hazard identification and risk-assessment methods and their use D. Improve the understanding of earthquakes and their effects <p>Comment on the above:</p> <p>Goal A _ To support those who adopt policy and practices provide guidance to integrate earthquake hazard reduction into all stages of project development. Implementation can be accelerated by clarifying funding. The stages referred to are: concept, advanced planning, type-selection, preliminary design, detailed design, construction, asset management/maintenance, rehabilitation, retirement.</p> <p>Funding refers to sources of money to realize the NEHRP goals, these could be existing sources that require a clarification of expected deliverables or new funding sources.</p> <p>Goal B _ Technique improvement should be targeted and be useful to practitioners of the various disciplines and stakeholders in all stages of project development.</p> <p>Since the challenges are varied and evolving it would seem to be advantageous to encourage development of alternate types of structural systems and design philosophies. _Structural systems_, as it is used above, refers to isolation and dissipation devices. Alternate design philosophies refer to capacity design on an element level and a facility level.</p> <p>Goal C _ With respect to local risk assessment, improve understanding of maintenance impact on the reliability of mitigation efforts and hence reliability of risk assessment.</p> <p>Goal D _ With respect to understating effects of an earthquake, improve understanding of repair and retrofit behavior</p> <p>Reason for Comment: It should be acknowledged that basic educational efforts have made great progress and that the Broad Program Goals can be better realized if NEHRP products that clarify risk definition on the capacity side of the equation are advanced.</p>

Comment #	Reference	Comment
		<p>Suggestion for Revision:</p>
73	<p>Page Numbers: Program Value Added Synergies Paragraph Cited: Program Value Added Synergies</p>	<p>Comment: Program Value Added Synergies</p> <p>NEHRP's Plan runs across all disciplines that seek achieving the common goal of providing infrastructure for a resilient economy.</p> <p>The Plan would benefit from explicit efforts to further understanding of the challenges facing those tasked with implementing NEHRP's goals. This does not refer to the cost of implementing the NEHRP strategic plan itself but the cost faced by the implementation of the products, or goals of the plan.</p> <p>This understanding could be translated into realization strategies on many levels: planning (land-use and concept), design (model codes), construction (performance specifications), maintenance (reliability indicators), post event recovery (reliability indicators, economic impact mitigation) and retirement (economic impact mitigation).</p> <p>Reason for Comment: NEHRP document seems by implication weighted towards a rehabilitation mindset and in my mind needs to address the challenges in creating new infrastructure--where model codes are but one tool in the decision making process and only very influential at certain stages of project development. In order to develop other tools opportunities to develop "Value Added Synergies" must be seized.</p> <p>Suggestion for Revision:</p>
74	<p>Page Numbers: pages 11-15 Paragraph Cited: Future Challenges, Opportunities and Priorities</p>	<p>Comment: Comment pertains to section Future Challenges, Opportunities and Priorities (pp11-15), where the Stated Challenges are:</p> <ul style="list-style-type: none"> - Understanding performance of structural systems - Designing structures to explicitly reduce financial loss - Improving the effectiveness of earthquake risk mitigation efforts through utilization of both existing and new research in the social, behavioral and economic sciences <p>Comment:</p> <p>To meet these challenges sustainably, a more straightforward approach to financing is needed. Part of developing such an approach is the creation of a larger and more flexible funding pool. Creation of this resource is dependent on the <u>collateral</u> that can be provided by the disciplines that create, maintain and retire infrastructure. <u>Collateral</u> as it is being referred to, is not a physical asset, but rather reliable indices that define risk and hence the ability to repay loans used to create, rehabilitate, maintain and retire infrastructure in hazardous areas.</p> <p>As a result, I would add the list of challenges:</p> <ul style="list-style-type: none"> - Expand knowledge of financial solutions, instruments, partnerships, etc.

Comment #	Reference	Comment
		<ul style="list-style-type: none"> - Expand knowledge of post-event repairs - Expand understanding of relative impact on performance of variables other than model codes. These include consideration of earthquake at early stages of project development, maintenance, disaster management plan, etc.. <p>With respect to the Stated Opportunities in the following NEHRP proposed activities or growth areas:</p> <ul style="list-style-type: none"> - Real-Time Seismic Monitoring and Reports of Ground Motion Intensities - Prediction of Strong Ground Motion and Its Effect on Structures - Earthquake Engineering Simulation and Testing - Performance-Based Seismic Design - Monitoring of Strain and Physical Properties within and Across Active Fault Zones - Improved use of Social Sciences to More Effectively Mitigate Earthquake Risks <p>Comment: Opportunities that need to be explicitly seized:</p> <ul style="list-style-type: none"> - Study the lessons learned in the Catastrophic Bond Market (CAT), Municipal Bond Market (MUNI) and Public Private Partnerships and use these to temper the performance goals being developed for the nascent Performance Based Design Practice. <p>- Take advantage of maturing isolation and energy dissipation device market in stimulating a new dynamic infrastructure paradigm</p> <p>I would suggest adding another area of growth. I will refer to this as I do in practice, Dynamic Infrastructure Design (DID). DID would be a new paradigm namely, design for movement, flexible use, post-event recovery and managed retirement. The base assumption of this philosophy is that the design concept will seek to manage the challenges presented during the life-cycle of the structure beyond the model code provisions applied in detailed design. DID would not be codified but instead is a product of collaborated land-use planning, architectural planning and engineering performance planning.</p> <p>Comment on Priorities Given the realities of implementing the Alfred E. Alquist Seismic Safety Act of 1983 and the subsequent amendment, Senate Bill 1953 (SB1953) in the State of California, which have stated performance goals, it seems to be of paramount importance to develop better ways to realize NEHRP_s goals.</p> <p>Priority should be given to find ways to:</p> <ul style="list-style-type: none"> - Meet the Financial Challenges - Develop Dynamic Infrastructure Paradigm <p>Reason for Comment: Reason for comment on these three areas is that the current NEHRP document does not respond to the implementation</p>

Comment #	Reference	Comment
		<p>obstacles currently existing in California. Interaction and study of this experience would be of national if not interantional value in the overall effort of better integrating seismic safety into our day-to-day economy.</p> <p>Suggestion for Revision:</p>
75	<p>Page Numbers: 1, 2, 8, 9, 17, 21, 33, and 34</p> <p>Paragraph Cited:</p> <p>Paragraph/Sentence: Page 1: paragraph 2/last sentence Page 1: paragraph 3/goal C</p> <p>Page 2: paragraph 3/joint action and interagency coordination (information dissemination, coordination with external stakeholders)</p> <p>Page 8: paragraph 2/sentences1-2</p> <p>Page 9: Example of NEHRP Coordination: State-of-the Art Building Codes</p>	<p>Comment:</p> <p>1. There is a need for better dissemination and explanations of information and products provided by NEHRP. Problems exist in disseminating and understanding NERP information and products. These include:</p> <p>a. Confusion about the national seismic hazard maps. The USGS produces a series of hazard curves at grid points across the US through the national hazard mapping program (http://earthquake.usgs.gov/research/hazmaps/products_data/2002/hazcurve.php), and publishes only three maps (only three points on the curves), i.e., the ground motion with 500-, 1,000-, and 2,500-year return periods (equivalent to 10, 5, and 2 % PE in 50 years). In other words, the three maps (ground motions with 500-, 1,000-, and 2,500-year return periods) are just three out of an infinite number of possibilities that are being produced by the USGS. There could be ground motion maps with 100, 5,000, or any number between 100 and 100,000 years of return period. Therefore, all the points on the hazard curves or hazard maps with 10 %, 5 %, 2 %, or other PE produced by the USGS are equally valid. Unfortunately, only three maps (10, 5, 2 % PE maps) are published and are mistakenly treated as the only maps possible for policy considerations. This confusion has led the users to believe there are only three maps (10 %, 5 %, and 2 %) possible. The other equally valid map possibilities are not utilized, discussed, or described; they are ignored. This confusion has also caused great difficulty in selecting an appropriate hazard level for minimizing seismic risk in the New Madrid area in particular. These were evidenced by the facts that many communities have chosen alternative hazard levels other than the national standard (ground motion with 2% PE in 50 years). For example, Memphis and Shelby County has chosen the ground motion with 10% PE in 50 years for building design. Kentucky has chosen the ground motion with 5% PE in 50 years for building design in western Kentucky.</p> <p>b. Confusion between the seismic hazard maps and the design maps. The seismic hazard maps and design maps are fundamentally different. The seismic hazard maps were produced by the USGS, while the design maps were produced by the Building Seismic Safety Council (BSSC) through FEMA. The hazard maps produced by the USGS should be infinite, but only three (10 %, 5 %, and 2 %/50) were published. The BSSC selected the 2 %/50 hazard maps as the bases for reasons that are not clearly specified or easy to find. Although the seismic design maps were based on the national seismic hazard maps (2 %/50), they were produced according to a set of rules established by the BSSC. This confusion may lead to a de-facto policy setting by the USGS.</p> <p>c. What is the ground motion with 2%/50? Is it hazard or risk? The concepts of seismic hazard and risk are fundamentally different. They need to be defined clearly defined public policy is made based on the risk, not the hazard. This confusion causes problems. In the New Madrid Seismic Zone (NMSZ), there is about 10% PE that a large earthquake (similar to the 1811-1812 events of about M7.5) could occur in the next 50 years (http://eqint.cr.usgs.gov/eq-men/html/neweqprob-06.html). However, ground motions with 10%, 5%, 2% PE have been produced. It does not make good sense that there is about 10% PE of an M7.5 earthquake in the next 50 years, while policy decisions are being based on ground motion with</p>

Comment #	Reference	Comment
	<p>Page 17: Goal C</p> <p>Page 19, 21, 33, and 34: Objective and implementation of Goal C</p>	<p>2%/50. There should be consistency and clear explanations.</p> <p>2. Improve seismic hazard identification and risk assessment methods and their use (Goal C). Although PSHA has been widely used in seismic hazard and risk assessments, there is a problem in the hazard calculation (i.e., equating the conditional exceedance probability of the ground-motion attenuation relationship (a function) to the exceedance probability of the ground-motion uncertainty (a variable). This results in using the ground-motion uncertainty (spatial distribution) to extrapolate occurrence of ground motion (temporal distribution) or so-called ergodic assumption, in other words, using the ground-motion uncertainty to predict the occurrences of ground motion in the future. Prediction of ground motions that could recur in millions of years is a ridiculous concept because we have no way of knowing what the tectonic regime would be in 1 million years. What is known about geology and seismology in the NMSZ is that large earthquakes of about M7.5 recur about every 500 years in the past few thousand years. PSHA could create ground motion events (earthquakes) with return periods of 1,000, 2,500, 10,000, etc. years from a single earthquake of about M7.5 with a recurrence interval of 500 years, but this is the result of the problem in the hazard calculation. The methodologies used for the hazard and risk assessments need to be thoroughly reviewed.</p> <p>3. Coordination with external stakeholders. There is a need to greatly improve coordination with external stakeholders in states, communities and federal agencies. The lack of coordination has hindered positive development of public policies to minimize seismic risk, particularly in the NMSZ area. This is evidenced by the problems experienced during the adaptation of IBC and IRC in states and communities in the central US. There were limited inputs from external stakeholders, particularly the inputs from the stakeholders in the communities where the impact is significant, being considered in process to select the design ground motion level and standards.</p> <p>Reason for Comment: 2% in 50 map is overly conservative for the central US. The uncertainty in input parameters is very large. Predicted ground motions are unrealistically large at distances away from the most active areas. Fictitious faults are used to extend the influence of the NMSZ too far from its defined locations. This causes problems for code authorities. Federal agencies use the maps as a red light-green light deciding factor without understanding the uncertainties in the maps or realizing the need for design professionals. Groups in opposition to construction of such things as landfills can cite the 2% map as reason not to build. While seismic safety is very important, it must be augmented with explanations and realistic outcomes to be useful in public policies.</p> <p>Suggestion for Revision: Abandon the 2% map as too conservative except possibly in the well defined areas of the NMSZ. Do not extrapolate the influence of major earthquakes to the extent currently being done. If there is a 10 % chance in 50 years for a M7.5 earthquake then use the 10% in 50 years map for design as well.</p>
76	<p>Page Numbers: 11</p> <p>Paragraph Cited: Figure 2 - Current Funding 20% FEMA 2% NIST</p>	<p>Comment: Based on the Figure 2 funding diagram and general description of each agency's roles and responsibilities on p.7-8, the NEHRP program is currently skewed toward understanding earthquakes, instrumentation, public awareness programs and advanced warning systems based on monitoring. This is important and takes into consideration the demand side of the equation in earthquake engineering. However, based on the same funding chart, the capacity side of the equation appears to have substantially less funding, with only 2% funding from NIST. NIST participation is essential in forming the basis of performance based design procedures to understand existing infrastructure capacity and developing new guidelines for new facilities.</p>

Comment #	Reference	Comment
	30% NSF 48% USGS	<p>Overall, funding code reforms and improvements and developing outreach programs which seek real-world input to such code reforms from practicing professionals, owners, and constructors seem to be more practical and prudent ways to approach earthquake hazard mitigation while new technologies such as monitoring and advanced warning systems are developed and tested. As a practicing professional, I recommend re-considering the allocation of funding such that there is more of a balance in understanding structural behavior and capacity, and measuring designed performance goals with real-world performance.</p> <p>Reason for Comment:</p> <p>Suggestion for Revision:</p>
77	Page Numbers: 17-20	<p>Comment: This is a brief overall comment on the 4 goals. Generally, I think these present very appropriate goals for reducing seismic hazards in a variety of ways.</p> <p>However, I believe that Goal A (Develop effective practices and policies for earthquake loss-reduction and accelerate their implementation) has received inadequate attention and insufficient funding in the past. Scientific and engineering advances are far ahead of implementation, and it is time to give society an opportunity to catch up. I would encourage an increased emphasis on implementation and outreach. It is vital to develop products designed to reach a variety of audiences, to be informed by audience needs when designing them, and to offer viable options for action suited to each audience. To do this demands an integrated multi-disciplinary multi-agency approach. I would suggest a committee of the NEHRP agencies whose charge is to design such an integrated program, strategically using the talents of each of the agencies.</p> <p>Reason for Comment:</p> <p>Suggestion for Revision:</p>
78	Page Numbers: p.13 Paragraph Cited: Section Heading- Performance-Based Seismic Design (entire section)	<p>Comment: I am highly supportive of the effort to identify various lifelines which currently lack performance-based design provisions and to develop those procedures for such infrastructure, but I would add several steps to the goal, in particular with respect to FEMA's role in the process.</p> <p>First, FEMA/Homeland Security needs to help local agencies identify critical lifelines and infrastructure through a coordinated disaster management plan, which identifies both primary and secondary lifelines and provides an overall redundant system of infrastructure. Currently, FEMA places the onus for planning as well as coordination on the local agencies. While local agencies understand their systems and needs best, they do not necessarily have the staff or the budgets required to handle the larger coordination issues at the regional, state and federal levels.</p> <p>Secondly, once critical infrastructure and lifelines are identified through the disaster management plan, FEMA and NIST must help local agencies to create performance objectives and goals which are commensurate with the coordinated disaster management plan and consistently applied between jurisdictions.</p>

Comment #	Reference	Comment
		<p>Third, FEMA and NIST must also work to help agencies determine which aspects of their infrastructure are most important in the disaster management plan. In the case of port agencies for example, the maintenance and seismic worthiness of the pier substructures are often much more valuable from a disaster management standpoint than the facilities, buildings or other light structures which sit on top of the pier substructures and are often leased by commercial or private interests.</p> <p>For many local agencies, retrofit or upgrades of entire facilities are cost-prohibitive. By recognizing components of infrastructure which are important, FEMA is really guiding these agencies to prioritize and target disaster management funds in a meaningful way, thereby helping to alleviate the problem posed when market and commercial interests dictate and control levels of performance and the useful life of whole facilities based on market priorities and minimal investment.</p> <p>The other benefit is that private development can proceed cost effectively if relieved of the burdens of higher levels of performance of the key infrastructure.</p> <p>Finally, by acknowledging key infrastructure, FEMA should also provide clear, straightforward, and direct funding chains to instigate these efforts at the local agency level which do not create competition between different agencies with critical infrastructure. For example, local transit agencies should not have to compete for the same FEMA disaster management funds as local water agencies or hospitals. While many local agencies which maintain and operate critical lifelines have conceptual plans for lifeline management in a post-disaster scenario, few have funding to assess and improve their critical facilities to the level of performance required to meet the local and regional disaster management planning goals. With a higher level of coordination and more avenues for seeking funds, FEMA can create more of an impetus for these local agencies to move toward performance-based design measures. The true benefit for funding and implementing performance-based design procedures in critical lifelines is that it forms the backbone of risk assessment and lifeline risk management for the federal government, which can be measured for success over time. This measured rate of success further helps validate funding pools and resources to link performance with true life cycle costs and overall sustainability of the facility.</p> <p>Reason for Comment:</p> <p>Suggestion for Revision:</p>
79	Page Numbers: 17 Paragraph Cited: Paragraph 8 (Objective 1)/sentences 2-3	<p>Comment: Objective should specify effective risk communication components. There is additional detail within the body of the document, but not here.</p> <p>Reason for Comment: As stated, this objective appears focused on decision-makers; public risk communication will be essential for personal preparedness and support of any measure requiring public spending.</p> <p>Suggestion for Revision: Add between sentences 2 and 3: NEHRP will identify audiences and develop appropriate risk communication content and delivery for public consumption.</p>
80	Page Numbers: 22 Paragraph	<p>Comment: Sentence addresses determining audience needs but not determining who the audiences are.</p>

Comment #	Reference	Comment
	Cited: Paragraph 2/sentence 1	<p>Reason for Comment: Audiences, particularly among the public, must be identified in order to determine their needs. This will tie the capabilities described in this paragraph with the activities described in paragraph 4.</p> <p>Suggestion for Revision: Granted, it's just one word, but Sentence 1 should read, "NEHRP and its partners...risk issues and to better identify and determine the needs of NEHRP audiences."</p>
81	General	<p>Comment: -Focus on real interagency coordination -Maintain a strong federal/state partnership -Support lifeline systems risk studies -Focus on community education of earthquake hazards and preparedness -Fund earthquake hazard policy organizations</p> <p>Reason for Comment: We are an active participant and partner with NEHRP and support going forward with a strong program and coordinated strategy.</p> <p>Suggestion for Revision:</p>
82	General	<p>Comment: As NIST embarks on the process for revising the strategic plan of the National Earthquake Hazard Reduction Program, SEI very much looks forward to working with NIST in crafting the future direction of NEHRP and maintaining the close working relationship between the NEHRP Provisions and the various national consensus seismic design standards such as ASCE 7.</p> <p>Reason for Comment:</p> <p>Suggestion for Revision:</p>
83	General	<p>The Strategic Plan must establish a process to articulate specific measurable goals for seismic risk reduction of all NEHRP activities.</p> <p>Articulation of specific and measurable goals for seismic risk reduction is critically important. Technology exists to facilitate the monitoring of seismic risks. For example, a recent scenario for a repeat of the 1906 San Francisco event documents expected losses explicitly. Similar scenarios could be generated for other seismically vulnerable areas. In this way, a NEHRP Program component could be evaluated on the basis of the reduction of risks. For example, fifty percent of the deaths and major injuries from the San Francisco event are attributable to five percent of the building inventory in the form of three building types (nonductile concrete, weak story residential, and unreinforced masonry). A NEHRP thrust to identify these buildings and fix them could reduce losses by a factor of two in San Francisco alone. There can be no success in reaching NEHRP goals without such a process.</p>
84	General	<p>The Strategic Plan must emphasize interagency cooperation and integration of funded programs at the both the planning and implementation stages.</p> <p>Interagency cooperation is the heart and sole of a successful NEHRP program. The Integration of activities among the agencies is particularly</p>

Comment #	Reference	Comment
		<p>important in stimulating critical research and transferring results into practice. For example, Performance-Based Engineering (PBE) is perhaps the most important technical tool for practitioners to meet the seismic challenge. <i>FEMA 356</i> is a technically sound PBE framework for the rehabilitation of buildings; however there is a huge challenge to generate the required data to make it efficient and effective in practice. NSF is investing heavily in an independent NEES research effort to identify and meet major seismic challenges. USGS has made great progress in the development of improved ground motion parameters over the years. NIST needs to make sure that new performance-based standards, like <i>FEMA 356</i>, are kept up to date in the early stages of development. Yet all these independent efforts are not coordinated in any formal way at the agency level. This makes for a confusing and inefficient atmosphere in the research and practicing communities, not to mention the more general public. Interagency cooperation is such a critical factor for the success of the NEHRP program that any weakening of it, or lack of attention to its importance, can produce disastrous results.</p> <p>To facilitate agency interaction, the program should have a visible place and designated staff within each NEHRP agency. Frequent substantive interaction between management and staff in these agencies is essential. The Interagency Coordinating Committee should meet on a regular basis and should not only keep each other abreast of current activities, but also begin to work together in a truly collaborative fashion to define specific priorities and funding decisions. The lack of coordination in the federal budget process remains a challenge for true integration of the NEHRP program, but this could be overcome, if the agencies were to target specific research and implementation issues that require interagency and interdisciplinary focus, and together, set funding priorities to address them.</p>
85	General	<p>The Advisory Committee on Earthquake Hazards Reduction must be assembled and convened.</p> <p>An external, non-federal Advisory Committee on Earthquake Hazards Reduction was established by Title I of P.L. 108-360. It is a critical element in the continued effectiveness of NEHRP, and needs to be put in place immediately. Guidance by the Advisory Committee will ensure strategic direction, program coordination, and program effectiveness, and provide a source of advice to the ICC on specific challenges that would benefit from greater collaboration.</p>
86	General	<p>The Strategic Plan must also give high importance to living up to the <i>NEHRP Post Earthquake Coordination Plan</i>.</p> <p>Earthquakes provide critical data to help us better understand earthquake processes, ground shaking, the performance of the built environment, and socioeconomic consequences. Unfortunately, much important data from actual earthquakes is lost or neglected. This greatly impedes progress in the reduction of future losses. Funding for reconnaissance and data gathering, as well as pre-event planning and coordination, is critically needed. This is another area where better interagency cooperation and interaction might avoid inefficiencies and confusion in the field.</p>
87	General	<p>NEHRP Agencies must work closely with the NEHRP Coalition and other interested organizations to advocate for increased funding levels for seismic risk reduction.</p> <p>In 2003 EERI published <i>Securing Society Against catastrophic Losses</i>, in which we called for tripling federal appropriations to the nation's earthquake program to take advantage of advances in science, engineering, and technology that would enable us to accelerate programs to reduce future losses. Although Congress authorized significant funding increases, appropriations lag seriously behind. The need for additional funding</p>

Comment #	Reference	Comment
		<p>cannot be overemphasized. Earthquake mitigation policies and strategies have been effective in reducing losses to other natural and manmade hazards. Accelerated research and implementation reduces our country's vulnerability and losses to not only earthquakes, but also to hurricanes, floods, blast and impact. Programs such as ANSS and NEES will provide significant results if funded at their intended levels. The NEHRP Coalition has been created to work on behalf of earthquake program, to obtain funding at the authorized levels. It includes representatives from dozens of associations that are involved in earthquake science, engineering, and emergency management. We urge the NEHRP agencies to work with the Coalition and with individual organizations, such as EERI, to take advantage of their commitment to the future of the earthquake program and the expertise of their members.</p> <p>EERI looks forward to working closely with the NEHRP agencies to ensure that the program's strong commitment to research and effective implementation results in programs, policies, and practices that reduce future earthquake losses.</p>
88	General	<p>Comment: The environment associated with hazard mitigation as it relates to building codes and standards development, adoption and enforcement has changed significantly since the late 90's. The three major US model code organizations which operated independently when this plan was first written have now fully consolidated as the ICC and local government have adopted and are enforcing one common nationally recognized set of building codes throughout the U.S. - This suggests increased emphasis on implementation and enforcement of building regulations while concurrently striving to update and enhance those regulations as new information becomes available.</p>
89	General	<p>Comment: With a mission to reduce earthquake losses, it would seem the following NEHRP activities would be relevant and appropriate and should be included or addressed in the final plan.</p> <p>Identify the magnitude of the current earthquake loss problem, the contributing factors and determine the ways to most effectively address each contributing factor. There are likely lessons learned from the past NEHRP and non-NEHRP experiences and, coupled with any differences in the political, technical, economic or social landscape since the initial plan was developed, it seems appropriate to start at the beginning, take stock of where we are and then look at that within the context of the current external environment.</p> <ul style="list-style-type: none"> • Determine programs, technologies and activities that are available today to address earthquake losses. Coupled with the activity above this will provide a metric of what is available today to address the current problem. • Conduct a gap analysis to identify shortcomings between what we have today and what is needed to address the current problem. With a handle on the problem and possible solutions NEHRP should be able to compare that to what is currently available and being applied to the issue. The difference between what is available and what is needed makes up future opportunities, each of which need to be assessed to determine their potential contribution to addressing the problem. • Conduct needed research and studies leading to identification of solutions to fill the gaps and then prioritize that work based on anticipated cost benefit. For those that have a high potential to address problems the research will be critical in documenting their potential contribution and garnering support for the development and implementation of those solutions.

Comment #	Reference	Comment
		<ul style="list-style-type: none"> • Develop and implement specific solutions to address specific gaps. These could be technical, administrative, policy-related or programmatic and would logically be developed and implemented by collaborative efforts of the public and private sector. • Measure and evaluate the performance of the solutions. This is needed so NEHRP can determine how the various activities are performing and contributing to addressing the problem. • Report the results. This is critical to highlight success and keep the program and its progress continually in the minds of the public, decision makers, and other interested parties. • Adjust the plan based on the results achieved. A process should be in place to check off activities as they are done, adjust them if needed, and add additional activities as new issues or problems are identified. Keeping the plan and progress on tasks updated and available on the NEHRP web site could further enhance public and private recognition of and support for the plan as well as create opportunities for collaboration. • Across these broad but discrete activity areas there are likely to be technical, policy, communications and other activities that are applicable to each. For instance specific solutions to earthquake loss reduction will fall in the areas of research, technical guidance on design and construction, policy studies and program benefit documentation, and outreach to facilitate their application and use. For this reason programs supporting the above activities may need to be segregated into these and other relevant areas of focus.
90	General	<p>Comment: A high level outline for a possible strategic plan is suggested below, with identification and incorporation of specific tasks to be determined based on the input provided to NEHRP during this current review of the strategic plan. As noted above this may be more appropriate than trying to use the outline of the current plan as a starting point for the new plan.</p> <p><i>Goal -To reduce earthquake losses in the built environment by " X (X will need to be defined, related to some baseline, measurable and reportable and if the built environment is segregated into subsets such as buildings, utilities, transportation, etc. then the objectives below may need to be adjusted to address each subset or the entire plan separated into sector-specific sections)</i></p> <p><u>Objective 1</u> - Improve the current research basis on seismic activity, what is at risk, and how to reduce that risk to the benefit of the built environment, society and the economy (this is needed to establish a foundation of understanding upon which solutions can be identified and developed)</p> <p><u>Objective 2</u> - Create an environment of public policy recognition and acceptance of the need to address earthquake losses (this ensures a firm foundation of supportive policy and decision makers who can influence financial, regulatory, or other programs understand the issues and can act to support program activities)</p>

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		<p><u>Objective 3</u> - Create demand for earthquake loss reduction programs, policies, technologies, and incentives (such demand by the public is needed to create the market pull that will cause policy makers, manufacturers, designers, etc. to support and implement earthquake loss reduction strategies)</p> <p><u>Objective 4</u> - Support development, adoption, implementation and enforcement of codes, standards, regulations, policies, guidelines and other criteria that establish a minimum acceptable level or varying improving levels of protection against earthquake losses (this provides the necessary technical policy documents and programs that reinforce the market to augment the demand objective above)</p> <p><u>Objective 5</u> - Support development of technologies and design and construction practices that address earthquake loss reduction (an obvious need in order to address minimum criteria in codes or demand for even better buildings)</p> <p><u>Objective 6</u> - Create broad awareness of earthquake issues and the programs of NEHRP (through communications in various media to various audiences this will further ensure everyone is aware of the issues)</p> <p><u>Objective 7</u> - Report on NEHRP success and adjust program activities as warranted as they relate to achieving " X reduction in the goal above (it will be critical to have a continual assessment of progress and success/failure in order to report on the program and more importantly adjust activities along the way)</p>
91	General	<p>Comment: We are confident that the NEHRP agencies will carefully review these and other comments. Prior to finalizing the strategic plan, we suggest that any issues arising from the comments that warrant additional discussion and consideration be presented that they be further vetted through public review and/or a meeting or workshop prior to finalizing the new strategic plan. This will ensure the buy-in to the plan from the private sector that will be critical to its successful implementation.</p>
92	General	<p>Comment: Any strategic plan for NEHRP should rely primarily on the public law.</p>
93	General	<p>Comment: The NEHRP strategic plan should reflect the integrated nature of the program and should strive to achieve a truly integrated program. We believe that the strategic plan should be a concise document that focuses on the following objectives.</p> <ul style="list-style-type: none"> • Implement the provisions of Title 1 of the P. L. 108-360, "National Earthquake Hazards Reduction Reauthorization of 2004" pertaining to the leadership of the NEHRP. • Develop and conduct programs and projects in basic seismology, seismic engineering, architectural, geologic, and social sciences areas aimed at the development of improved earthquake codes and standards and other seismic risk-reduction measures. • Prepare guidance and related technical documents for the use by design professionals and of private-sector organizations engaged in the

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		<p>development of building codes and standards.</p> <ul style="list-style-type: none"> • Establish programs and projects to encourage state and local governments to adopt and enforce measures aimed at lessening the seismic risks in their respective jurisdictions, to engage in outreach and educational programs to reach the general public and to foster the efforts of private organizations engaged in complementary seismic mitigation efforts. • Establish programs and projects to lessen both the threat to life safety and the economic losses resulting from seismic damage to buildings and facilities.
94	General	<p>Comment: The NEHRP Coalition believes that the critical role of the Interagency Coordinating Committee and its leadership should be properly reflected in the strategic plan. The Coalition feels that with the reauthorization, there is a renewed opportunity to realize the full benefits of a truly integrated program. In the past, there has been a great deal of accomplishment, but it has been unnecessarily limited by the lack of full integration of the program elements.</p> <p>This problem is made worse by the lack of coordination in the budget process. Each lead agency resides in a different federal agency or department, each of which faces its own internal, competing budget priorities. For example, seismic monitoring by USGS, which provides key information to the emergency responders, has to compete with other Department of the Interior programs for funds. The research needed to support improved code provisions under development by FEMA requires strong research support from NSF. The Coalition believes that the strategic plan should address how NEHRP-authorized funds are distributed between agencies and programs that are interrelated, and that NSF should acknowledge projects funded under NEHRP.</p>
95	General	<p>Comment: The Coalition also feels strongly that the Advisory Committee on Earthquake Hazards Reduction as established by Title I of P.L. 108-360 should receive a prominent role in the new strategic plan for NEHRP. As required by the law, the advisory committee should consist of non-Federal members, including representatives of research and academic institutions, industry, and state and local government, who are qualified to provide advice on earthquake hazard reduction. The role of the Advisory Committee as defined in the Public Law is to assess: trends and developments in the science and engineering of earthquake hazard reduction, including predictive capability; the effectiveness of NEHRP in carrying out its activities; the need to revise the program; and the management, coordination, implementation, and activities of the program are all vital to enhancing the effectiveness of NEHRP.</p>
96	General	<p>Comment: In general, the Coalition believes that highlighting the roles of the Interagency Coordinating Committee and the Advisory Committee on Earthquake Hazards Reduction are the two most important overarching elements for a meaningful and effective strategic plan. However, the most important element of a NEHRP strategic plan, one that should be emphasized in every goal or objective that is set, is the importance of putting the research results into practice and getting collected data and analysis into the hands of those who need it. The ultimate goal of NEHRP is the protection of life and property during an earthquake. To achieve that, the research conducted and the data collected under NEHRP must be utilized. Successful research needs to become successful practice and the NEHRP strategic plan must make this its overriding priority.</p>

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97	General	<p>Comment: With regards to the existing strategic plan, while the goals may be strategic in outlook, the objectives degenerate into detailed tactical statements, almost definitions of projects, thus making the documents needlessly long. We believe that the first two goals are duplicative in many respects and quite diffuse, but cover what FEMA is doing, while the third and fourth are each directed specifically to NSF and USGS. Thus the strategic plan does not convey the necessary measurable goals and performance objectives that are critical for a coordinated and fully integrated program nor does it foster such a concept. The strategic plan needs to be succinct and explicit, rather than long and diffuse. An implementation plan can be developed after the completion of the strategic plan; such a plan can contain the specific programs needed to carry out the strategic plan.</p>
98	General	<p>Comment: The NEHRP Coalition also reviewed the list of comments from the NEHRP Stakeholders Input Forum at Quake '06 Conference in San Francisco. The Coalition felt that several of the comments were significant and should receive careful consideration in development of the revised NEHRP strategic plan. Specifically, the Coalition supports the following comments.</p> <ul style="list-style-type: none"> • Need to include community-wide resilience, which involves systems approach. • Need coherence and coordination between NEHRP agencies and state/local partners. • Need improved program marketing. • Education is very important aspect of any successful hazard mitigation program. NEHRP must increase efforts to educate both professional and public communities. • Need measurable goals/performance measures and they should be part of the implementation plan suggested above.
99	General: Lifelines	<p>Comment: Since 1999, ALA has assisted seven standards organizations undertaking nine different standards activities by providing supportive funding to existing standards committees and undertaking specific standards-related projects. These ALA activities are directly related to several of the goals noted in the 2003 Strategic Plan. Several ALA representatives participated in the 1999 and 2000 planning meetings for the 2003 Strategic Plan and supported goals emphasizing the need to specifically include lifelines considerations in the 2003 Strategic Plan. Given that ALA activities were essentially just beginning to materialize at that time, many of these considerations were phrased in terms of general goals and objectives that paralleled the goals and objectives of ALA without specific mention of ALA. In the spirit of full disclosure, please note that I have been the technical Principal Investigator for the ALA since its inception in FY99. Admittedly, several of my comments reflect a bias regarding the significant contributions I believe ALA has made to providing lifeline system owners guidelines and other tools that allow their specific performance objectives to be met in seismic as well as other natural hazard events. However, these comments reflect my personal opinions and not those of the ALA Project Team or the Multihazard Mitigation Council of the National Institute of Building Sciences that is currently managing the ALA project. While I believe the successes of ALA (see www.americanlifelinesalliance.org for more information) warrant consideration for specific mention of ALA in the 2006-2010 Strategic Plan, I understand this needs to be addressed by the NEHRP agencies in light of the absence of a commitment for ALA funding past the end of 2006.</p>

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100	General: Performance-Based Design	<p>Comment: While I support the efforts to develop or improve performance-based design concepts for buildings and lifeline systems, I am concerned that the plan does not adequately address confirmation of new performance-based design through actual experience. This is especially troubling considering the very limited evidence that exists that prior changes to prescriptive code changes have led to improved performance owing to the limited amount of time that has passed since jurisdictions adopted new code provisions and the lack of a significant earthquake producing ground motions sufficient to test new provisions. Verification that performance-based provisions actually produce the desired results, as measured following future earthquakes, needs to be ensured by the revised Strategic Plan.</p>
101	General: Post-Earthquake Data Management	<p>Comment: Current practices with respect to the collection, archiving, and evaluation of performance data following natural hazard events are simply inadequate for developing informed engineering assessments of performance or identifying and prioritizing areas where improved performance is needed. At best, current practices provide a partial or skewed picture. At worst, current practices amount to nothing more than the collection of disaster tourist photographs. Identifying recommendations for change is a key goal of a workshop that ALA will hold this fall and ALA is hopeful that NEHRP representatives will be key participants in this workshop.</p>
102	General	<p>Comment: NEHRP should provide greater attention to subduction zone earthquakes in general and the Cascadia Subduction Zone in particular. Since there are also areas like this along Alaska and Puerto Rico, it is necessary to invest in national research and policies that deal with the unique characteristics of these earthquakes:</p> <ul style="list-style-type: none"> - long period shaking, - long duration shaking, - coastal subsidence, - asperities of significant offshore uplift, and - better understanding of local tsunamis. <p>Of particular interest: seismic building codes only address the type of shaking from crustal earthquakes, like they have in California, which only shake for tens of seconds. Subduction zone earthquakes shake for minutes and current building codes do not have any specific treatment of this hazard.</p>
103	General	<p>Comment: As former Chair of the Western States Seismic Policy Council, I was involved in the development of the 2001-2005 plan. Although that plan contains all the key elements, I believe that some wording needs to be added to emphasize what has changed since that plan was written. I suggest adding a section on progress that has been made and opportunities that have arisen since the last plan. Some items that you may want to include are:</p> <ol style="list-style-type: none"> 1. NSF's EarthScope facility has been funded. This has direct benefits in terms of new instrumentation for earthquake and tectonic monitoring and in terms of research into how earthquakes are generated. EarthScope has provided funds for nearly completing the backbone of broadband seismometers needed for the USGS's ANSS (ones designed to detect earthquakes accurately throughout the country). The USGS budget, however, has not increased enough to cover the vision of ANSS, including its needs for long-term maintenance of existing instruments and addition of instruments in buildings and on the ground in high-hazard and high-risk urban areas.

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		<p>2. The 2006 National Research Council report on "Improved Seismic Monitoring, Improved Decision-Making, Assessing the Value of Reduced Uncertainty" makes a strong case for funding of the ANSS.</p> <p>3. Space geodesy, including the global positioning system (GPS) and interferometric synthetic aperture radar (InSAR), has provided additional observational tools for measuring tectonic stress and deformation before, during, and after earthquakes. The USGS Earthquake Hazards Program has been dominated by seismic approaches to understanding earthquakes, but these new GPS and InSAR techniques show great promise for advancing the science and ability to ultimately predict earthquakes on a shorter term basis than decades.</p> <p>4. Prediction of earthquakes in the near term (days) and mid term (months to a few years) is still elusive, but advances are being made in statistical methods and basic understanding of Earth processes. Official (USGS) probabilities that feed into model building codes are currently time independent; that is, the current probabilistic seismic hazard model used by the USGS does not take into account how long it has been since the last earthquake. Efforts are underway in California to perfect time-dependent forecasts of earthquakes a logical step in the direction of shorter term prediction.</p> <p>5. The USGS has made significant advancements in earthquake reporting, particularly with 24-hour, 7-day per week coverage at the National Earthquake Information Center. This is allowing rapid situational analysis with not only locations, depths, and magnitudes of earthquakes but also with ShakeMaps and the ability to run FEMA's HAZUS program within an hour or so after an event. The U.S. does not, however, have an early warning system, such as in Japan, for which an electronic signal is broadcast in a few seconds after a large earthquake is detected, so that distant sites can take action (slow down trains; pull emergency vehicles out of garages) before the intense ground shaking begins. An early warning system of this type is technologically possible in the U.S., but has not been implemented because of lack of funds.</p> <p>6. The great Sumatra earthquake and resulting tsunami in 2004, Hurricane Katrina in 2005, and the 100th anniversary of the great San Francisco earthquake raised the level of awareness of the public about the potential for major natural disasters, like a large urban earthquake, to be system-breaking catastrophic events, ones for which we are poorly prepared and for which we are unable to respond rapidly enough to prevent major loss of life or long-term economic disruption both locally and nationally. NEHRP has the opportunity to focus on being prepared for potentially system-breaking events from earthquakes. In such preparation, we will undoubtedly be better prepared for other potentially system-breaking events, including hurricanes, tsunamis, and terrorism.</p>
104	Pages 17-20, 50-53	<p>Comment: Organize the goals and related objectives such that each goal and related objectives are the lead responsibility of only one agency.</p> <p>Reason for Suggested Change: Each of the three implementation NEHRP agencies has a specific mission that is distinct for that agency with relatively no overlap of mission between agencies. The strategic plan should identify for each agency its own goals and related activities for which it only has the lead responsibility. If there is a supporting role for another agency in a particular objective of a goal, it may be so stated for that particular objective but each goal should be the lead responsibility of only one agency. This will help make each agency accountable to achieve each goal of the strategic plan.</p>

Comment #	Reference	Comment
		<p>Suggested Change:</p> <p>1. Suggested Assignment of Lead Responsibility of Goals Make the following reassignments of objectives so as to make</p> <ul style="list-style-type: none"> (a) FEMA the lead agency for Goals A and B, (b) USGS the lead agency for Goal C, and (c) NSF the lead agency for Goal D. <p>2. Suggested Reassignment of Objectives:</p> <ul style="list-style-type: none"> (a) Move objective C3 ["Support development and use of risk and loss assessment tools."] from Goal C to Goal B as objective B4. Revise the definitions of Goals B and C accordingly. (b) Move objective D2 ["Continue earth science studies and research related to earthquake potential and earthquake occurrence."] from Goal D to Goal C as activity C3. Revise the definition of objective D4 accordingly.
105	Pages 17-20, 50-53	<p>Comment: Use the exact language of HR 2608 agency responsibilities to define each agency's goals and activities to replace the existing language of goals and responsibilities of the present strategic plan.</p> <p>Reason for Suggested Change: The 2004 reauthorization of NRHRP identifies in HR 2608 nine bullets for FEMA responsibilities, nine bullets for USGS responsibilities, and five bullets for NSF responsibilities. They should replace the language in the present strategic plan for two goals and nine objectives for FEMA, one goal and three objectives for USGS, and one goal and five objectives for NSF.</p> <p>Suggested Change: Organize the nine FEMA bullets in 2004 reauthorizations in two goals – Goal A and Goal B. Goal A should be the development of seismic hazard mitigation information and Goal B should be implementation of seismic hazard mitigation information. Do the same for nine USGS bullets in Goal C (Earth Science) and in Goal D (Mapping) and for five NSF bullets in Goal E (all other earthquake research except Earth Science).</p>
106	Page 17	<p>Comment: Add as a fifth goal of the current Strategic Plan the key integrating objective of achieving disaster resilience of communities. This requires a framework that focuses on developing integrated multidisciplinary strategies to enhance the resilience of communities, validating these strategies and implementing them.</p> <p>Reason for Comment: The current Strategic Plan outlines 4 goals. The four stated goals are worthwhile on their own and will lead to a better understanding of the seismic risk and to some enhanced "seismic safety". However, the strategic plan is missing the cohesive overarching goal of "enhancing community resilience". Resilience needs to be understood here in its full dimension, not just as an alternate phraseology for the same</p>

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		<p>goals currently enunciated in the Strategic Plan. Resilience implies measures to quantify current and future states of resilience of communities along the technical, organization, societal and economical dimensions of resilience. It requires the development, calibration, and implementation of objective tools that can support these goals. None of the existing goals address this critical need.</p> <p>Suggestion for Revision: Add a 5th goal to the Strategic Plan that would state:</p> <p>E. Develop, validate, and implement integrated multidisciplinary measures that can enhance the disaster resilience of communities. <i>Generate the knowledge, tools and technologies necessary to measure and enhance resilience from a comprehensive multidimensional perspective.</i></p> <p>Incidentally, given the global approach and vision advocated by this goal, it probably should be the first goal of the plan (i.e. Goal A), with all other goals subsequently relabeled B-E. However, for clarity, this is not done here.</p>
107	Page 20 Last Sentence	<p>Comment: Add "Goal E" and the following objective that indicates how NEHRP agencies will achieve this new proposed goal</p> <p>Reason for Comment: The concept of resilience is routinely used in research in disciplines ranging from environmental research to materials science and engineering, psychology, sociology, and economics. The notion of resilience is commonly used to denote both strength and flexibility. The term implies both the ability to adjust to "normal" or anticipated levels of stress and to adapt to sudden shocks and extraordinary demands. In the context of hazards, the concept can be thought of as spanning both pre-event measures that seek to prevent hazard-related damage and losses and post-event strategies designed to cope with and minimize disaster impacts.</p> <p>Here, community resilience to hazards is defined as the ability of social units, e.g., organizations and communities, to mitigate hazards, contain the effects of hazard-related disasters when they occur, and carry out recovery activities in ways that minimize social disruption and mitigate the effects of future hazards. The objectives of enhancing disaster resilience are to minimize loss of life, injuries, and economic impacts – in short, to minimize any reduction in quality of life due to the effects of these hazards. Resilience can be achieved by enhancing the ability of a community's infrastructure, e.g., lifelines and structures, to perform during and after a disastrous event, as well as through emergency response and strategies that effectively cope with and contain losses, and recovery strategies that enable communities to return to levels of pre-disaster functioning (or other acceptable levels) as rapidly as possible.</p> <p>As such, the goal of enhancing the disaster resilience of communities requires that standard methods be established to measure states of resilience, define the dimensions of resilience, and thus gauge improvements in resilience.</p> <p>Suggestion for Revision: Add Goal E – Objective 1:</p> <p>1. Develop Standardized Measures of Resilience. Advance robust and quantitative methods to measure resilience, establish reference benchmarks and target resilience objectives that can serve communities in assessing their state of disaster resilience. NEHRP will foster the research necessary to develop such measures that capture all dimensions of resilience, in a manner to answer the needs of multiple stakeholders.</p>

Comment #	Reference	Comment
108	Page 20 Last Sentence	<p>Comment: Add the following objective to Goal E to indicate how NEHRP agencies will achieve this new proposed goal.</p> <p>Reason for Comment: See Comment 107.</p> <p>Suggestion for Revision: Add Goal E – Objective 2:</p> <p>2. Develop Decision Support Tools and Technologies to Identify the Relative Effectiveness of Various Measures Proposed to Enhance Disaster Resilience. NEHRP will support research to develop such tools and technologies and work with communities and key stakeholders to establish the knowledge base necessary to implement such decision support methodologies. This requires the development of a true systems approach that recognizes all system interdependencies. Note that a comprehensive assessment of system interdependencies requires the integration of multi-system and multi-hazard scenarios (see Goal F). In combining the two, it will be possible to take advantage of loss estimation procedures developed for earthquakes, and expand such mature models to provide guidance for multi-hazard applications.</p>
109	Page 17	<p>Comment: Add as a sixth goal of the current Strategic Plan the key objective of developing solutions that can simultaneously provide community resilience against more than one disaster (i.e. multi-hazard solutions). Various factors conspire against the implementation of seismic resilience when other disasters are equally (or more likely) to strike a community. The objectives of achieving resilience against multiple distinct hazards can effectively leverage each other to accelerate attainment of a broader overall and more robust resilience objective. Within such a multi-hazard framework, gains made to protect against one hazard can also be sustained over the long term, particularly in regions that are not exposed to the most severe seismic risk (e.g. it has already happened in such moderate seismic regions that codified seismic provisions have been removed from building codes).</p> <p>Reason for Comment: Recent extreme events such as the terrorist attacks of September 11, 2001 and hurricanes Katrina and Rita have tragically underscored our nation's vulnerability to a broad spectrum of hazard and its urgent need for solutions that not only limit the impact of extreme events, but do so in a manner that is cost effective.</p> <p>A critical aspect of this effort should focus on the mitigation of and response to extreme events, as part of a true multi-hazard framework. It effectively encompasses activities in earthquake engineering, terrorism-resistant construction, fire engineering, multi-hazard engineering, risk assessment, remote sensing, human performance in disaster situations, post-disaster response and recovery, exposure to chemical, biological and nuclear agents, GIS science, medicine, and many others.</p> <p>Suggestion for Revision: Add a 6th goal to the Strategic Plan that would state:</p> <p>F. Consider the spectrum of possible disasters in a holistic manner such that enhanced disaster resilience is to be achieved. <i>Generate the knowledge, tools and technology solutions necessary to simultaneously enhance resilience against a broad spectrum of possible disasters.</i></p>
110	Page 20 Last Sentence	<p>Comment:</p>

Comment #	Reference	Comment
		<p>Reason for Comment: The process to enhance the resilience of our infrastructure against extreme events (natural disasters, technological disasters, and acts of terrorism) will not be simple nor will results come quickly. The substantial challenge to meet this pressing national need will require a research endeavor equal in substance to the need. The development of innovative and integrated solutions toward this goal will require collaborative involvement of experts with a wide range of knowledge from a variety of disciplines.</p> <p>It will require the integrated multidisciplinary efforts of experts benefiting from unique state-of-the-art experimental facilities. This will also require, to a significant degree, coordinated multi-campus and multidisciplinary engineering and social science research management, and a dedication to bring research results into practice in a speedy manner.</p> <p>Suggestion for Revision: Add the following objectives to Goal F:</p> <ol style="list-style-type: none"> 1. Expand loss assessment methodologies and decision support tools to include multiple hazards, based on existing tools developed for earthquake engineering, calibrate them with ground-truthing, and automate and integrate data collection using remote sensing following disasters. 2. Develop intelligent or “smart” public buildings and lifelines that provide real-time monitoring and decision making that is useful for both regular maintenance purposes and also for occupant safety, security and health monitoring to allow for rapid evacuation in the event collapse is imminent and for locating survivors within collapsed structures. 3. Develop reliable methods to design structures to meet several specific performance levels under increasing levels of hazard intensity, providing design/retrofit concepts from a multi-hazard perspective and overcoming the shortcomings of purely “life-safety” design procedures. 4. Investigate how new materials and advanced technologies developed for seismic retrofit can be modified or adapted to provide enhanced resilience of various critical facilities and lifelines against other hazards. 5. Identify new mitigation strategies and technologies that can provide simultaneous protection against more than one hazard, for a single cost, and similarly develop new technologies that achieve the broadest possible level of protection at the least possible cost, aiming at more uniform, nationwide adoption of these technologies. 6. Build on the accomplishments of regional economic modeling for earthquake impacts, and extend these models to multi-hazard scenarios, providing the ability to quantify economic consequences of disasters as an effective basis for setting priorities, as well as the communication of these priorities for public and/or private investments. 7. Develop technologies to prevent cascading failures of complex lifeline systems that duly consider proximity of critical infrastructures, interoperability of various lifeline systems, and interactions among the institutions operating the lifeline networks, for a broad range of natural, technological and human-induced hazards.

Comment #	Reference	Comment
		<p>8. Expand the resilience framework built on the concept of robustness, rapidity, resourcefulness and redundancy, and the technical, social, economic and organizational dimensions, and provide quantification of these dimensions for critical infrastructures and lifelines exposed to various hazards.</p> <p>9. Take advantage of the body of social science research developed through the NEHRP program as a foundation to understand differences in social behavior related to various hazards, and formulate effective risk communication, detection, and warning dissemination systems across a range of hazards and timescales.</p> <p>10. Understand how societal diversity (including age, educational and income levels, race, ethnicity, language spoken at home, the “digital divide,” etc.) is likely to influence the warning dissemination and response process, and how the decline of network broadcasting and the rise of niche-based “narrowcasting” influence the ability to both disseminate and receive effective warning information, so that the nation can develop audience-appropriate, customized warning systems and technologies.</p>
111	Page 12 Bullet List	<p>Comment: Since the Strategic Plan has been written, a massive increase in the quantity and quality of remotely sensed data has emerged. Many relevant applications and tools are being developed and envisioned as a result of this remotely sensed data.</p> <p>Reason for Comment:</p> <p>Suggestion for Revision: Add bullet on:</p> <p>Developing tools using the new emerging opportunities from recently availability high resolution remote sensing data and technologies, to have a significant impact on the mitigation and response activities needed to enhance disaster resilience.</p>
112	Page 12 Bullet List	<p>Comment:</p> <p>Reason for Comment:</p> <p>Suggestion for Revision: Add bullet on:</p> <p>Developing multi-hazard strategies to leverage the effectiveness and reach of mitigation and response solutions.</p>
113	Page 12 Bullet List	<p>Comment:</p> <p>Reason for Comment:</p> <p>Suggestion for Revision: Add bullet on:</p>

Comment #	Reference	Comment
		Integrating the above activities within a coordinated quantifiable framework to enhance the disaster resilience of communities.
114	Page 15 End of Section	<p>Comment:</p> <p>Reason for Comment: Note that the text for some of the suggested revisions is similar in some ways to text that was used above to support material in the "reason for comments" sections, but it hereunder is first proposed for inclusion in the body of the Strategic Plan.</p> <p>Suggestion for Revision: Add sections to complement the bullets added above:</p> <p><u>Emerging opportunities from high resolution remote sensing data and technologies</u> Data and information associated with condition assessment for complex systems needs to be visualized relative to network configurations and their relationships with interdependent networks. An effective way to accomplish this is to use remote sensing technologies and GIS. Research and development needs to promote remote sensing data and automated quantification tools, web-based GIS technology, advanced visualization, and data management for critical infrastructure systems. At the same time, visualization and decision support procedures should be combined with emerging sensor and sensor networking technology to create "smart" lifelines that can monitor and report on their condition and functionality in real time.</p> <p><u>Multi-hazard strategies to leverage reach of mitigation and response solutions</u> Recent extreme events such as the terrorist attacks of September 11, 2001 and hurricanes Katrina and Rita have tragically underscored our nation's vulnerability to a broad spectrum of hazard and its urgent need for solutions that not only limit the impact of extreme events, but do so in a manner that is cost effective. The process to enhance the resilience of our infrastructure against extreme events (natural disasters, technological disasters, and acts of terrorism) will not be simple nor will results come quickly. The substantial challenge to meet this pressing national need will require a research endeavor equal in substance to the need. The development of innovative and integrated solutions toward this goal will require collaborative involvement of experts with a wide range of knowledge from a variety of disciplines. Developing solutions that can simultaneously provide community resilience against more than one disaster (i.e. multi-hazard solutions) will allow tools and solutions effective for distinct hazards to effectively leverage each other to accelerate attainment of a broader overall and more robust resilience objective, and ensure that gains made to protect against one hazard can also be sustained over the long term (particularly in regions that are not exposed to the most severe seismic risk).</p> <p><u>Coordinated quantifiable framework to enhance disaster resilience of communities</u> Community resilience to hazards is defined as the ability of social units, e.g., organizations and communities, to mitigate hazards, contain the effects of hazard-related disasters when they occur, and carry out recovery activities in ways that minimize social disruption and mitigate the effects of future hazards. The objectives of enhancing disaster resilience are to minimize loss of life, injuries, and economic impacts – in short, to minimize any reduction in quality of life due to the effects of these hazards. Resilience can be achieved by enhancing the ability of a community's infrastructure, e.g., lifelines and structures, to perform during and after a hazard, as well as through emergency response and strategies that effectively cope with and contain losses and recovery strategies that enable communities to return to levels of pre-disaster functioning (or other</p>

Comment #	Reference	Comment
		acceptable levels) as rapidly as possible. As such, the goal of enhancing the disaster resilience of communities requires that standard methods be established to measure states of resilience, define the dimensions of resilience, and thus gauge improvements in resilience. The cohesive overarching goal of “enhancing community resilience” requires that resilience be understood within its technical, organization, societal and economical dimensions. It requires the development, calibration, and implementation of objective tools that can support these goals.
115	Pages 49-53	<p>Comment: If the NEHRP agencies agree with the proposed Goals E and F, for consistency with the report, the agencies would have to spell out which specific NEHRP priorities and activities they would accordingly intent to pursue in the near term.</p> <p>Reason for Comment:</p> <p>Suggestion for Revision: Details of Goals E and F priorities and activities would have to be outlined in this section.</p>
116	General	<p>Comment: In terms of the structure of the plan, there is no high-level NEHRP “goal” that is specific to monitoring. These goals are defined in the strategic plan as “a foundation on which the program builds its mission to reduce losses.” Monitoring certainly meets this definition. Instead, monitoring appears only as an objective under Goal C, “Improve seismic hazards information.” The strategic plan needs an explicit goal for monitoring, such as “Expand and improve the Nation’s earthquake monitoring infrastructure...,” with objectives tied to providing data for emergency response, improving data on the response of structures and lifelines, and so on. Also, in several places, the monitoring-specific objectives are stated as “continue to support...” These phrases are too weak, especially given the needs for substantially improved monitoring that are expressed in the “Vision 2005” and ANSS requirements documents.</p>
117	General	<p>Comment: Although earthquake monitoring is discussed in the current NEHRP Strategic Plan, the emphasis appears to be collecting and archiving seismic and strong-motion data for later study, rather than immediate interpretation of the data for emergency management. Hurricane Katrina clearly demonstrated that appropriate measures can not be taken after an extreme natural disaster without information about the extent and severity of the damage.</p>
118	General	<p>Comment: During the past five years, many products have been developed as part of the Advanced National Seismic System (ANSS) to provide rapid dissemination of post-earthquake information to promote situational awareness. This benefits the residents of the affected area by allowing rapid mobilization of emergency response at the level appropriate for the need.</p> <p>Not only is the distribution of ground shaking known within minutes of the earthquake through ShakeMap to assist emergency managers allocate resources, public and private owners of infrastructure systems can compare databases of their facilities with the ShakeMaps to locate the likely locations of failures within these systems. In addition, states have sufficient information to run HAZUS and estimate the total cost of the damage caused by the earthquake within an hour of the event.</p> <p>The integration of earthquake monitoring and emergency management is one of the fundamental advances provided by ANSS.</p>