

**United States Geological Survey**



National Earthquake Hazards Reduction Program



Proposals for Upgrades to Existing Earthquake Monitoring Systems  
under the American Recovery and Reinvestment Act



Fiscal Years 2009-2010  
Program Announcement 09HQPA00021  
ATN: ARRA-SE0005A

Closing Date:  
July 8, 2009

**APPLICATIONS MUST BE SUBMITTED IN ACCORDANCE WITH THE INSTRUCTIONS SET FORTH IN  
SECTION 3 OF THIS ANNOUNCEMENT**

**Table of Contents**

	Page
1. Opening Statement.....	2
2. Application Submission Closing Date.....	2
3. Electronic Application Requirement.....	2
4. Funds and Start Dates .....	3
5. Application Requirements .....	3
6. Objectives and Requirements (see Attachment A) .....	3
7. Applications Considered Unsuitable.....	3
8. Application Preparation Instructions .....	4
9. Evaluation of Applications .....	6
10. Reasons for Rejecting and Application after Initial Review.....	7
11. Special Terms and Conditions .....	7
12. Paperwork Reduction Act Statement.....	7
13. Financial Assistance Payments .....	7
14. American Recovery and Reinvestment Act Notices.....	8
Attachment A, Objectives and Requirements for Seismic Monitoring Upgrades under ARRA .....	10
Attachments B1, B2, and B3, U.S. Seismic Stations Targeted for Upgrades to Meet ANSS Technical Standards: Existing and Proposed Equipment .....	12
Attachment C, Budget Summary .....	13
Attachment D, Proposal Information Summary.....	14
Attachment E, Special Terms and Conditions .....	15
Attachment F, Cost Principals, Audit, and Administrative Requirements.....	37
Attachment G, ANSS Performance Standards.....	39

Announcement 09HQPA00021  
ATN ARRA-SE0005A

**1. Opening Statement**

The U.S. Geological Survey (USGS) Earthquake Hazards Program issues this Announcement for financial assistance to support equipment replacements and upgrades to earthquake monitoring systems under the American Recovery and Reinvestment Act (ARRA). This activity is authorized by the Earthquake Hazards Reduction Act of 1977 (Public Law 95-124, 42 U.S.C. 7701 et. seq.), as amended by Public Laws 101-614, 105-47, 106-503, and 108-360.

**Applicants should note all requirements and stipulations described both in this Announcement and in the Objectives and Requirements (Attachment A) and in the Special Terms and Conditions (Attachment E). There are many specific proposal requirements as well as reporting requirements and deadlines that are different from past USGS award requirements.**

- 2. Application Submission Opening Date: June 12, 2009**  
**Application Submission Closing Date and Time: July 8, 2009**

**3. Electronic Application Requirement**

**All proposals shall be submitted electronically via Grants.gov** (<http://www.grants.gov>). Hard/paper submissions will NOT be accepted. Electronic copies submitted via e-mail will NOT be accepted under any circumstances. All proposals must be submitted electronically through Grants.gov on or before:

**July 8, 2009, 4 pm, Eastern Daylight Time**

**Please be aware that the electronic submission process requires first time users to register using an e-Authentication process. This registration process can be somewhat complex and can take up to several days to complete. Be advised that it is virtually impossible to begin the process of electronic submission for the first time if you start just a few days before the due date. If you are from a university, contact your Office of Sponsored Programs. They may already have completed the registration process and should work with you to submit the application.**

Once at the website, click “Get Registered” under the “For Applications” heading and follow the instructions provided. In order to complete the SF 424 forms, **everyone** must use the Adobe Reader version which is available for download from the grants.gov site at: [http://www.grants.gov/help/download\\_software.jsp#adobe811](http://www.grants.gov/help/download_software.jsp#adobe811). To ensure that you have the correct version of Adobe Reader, you can use the versioning test located at: <http://www.grants.gov/applicants/AdobeVersioningTestOnly.jsp>. Any and all edits made to the application package must be made with the Adobe Reader version specified on Grants.gov. Grants.gov does not guarantee to support other versions of Adobe Reader released prior to version 8.1.1. For more information on Adobe Reader, please see: [http://www.grants.gov/applicants/applicant\\_faqs.jsp#adobe-reader-error](http://www.grants.gov/applicants/applicant_faqs.jsp#adobe-reader-error). Please note that there is an underscore between “applicant” and “faqs” in the URL. If you have any questions regarding the registration process, please contact the Grants.gov help desk at 1-800-518-4726.

In the Grants.gov forms, floating your mouse over a field will provide instructions for completing that field. You can also click on the Check Package for Errors button to check the entire application for validation errors (incomplete fields, etc.)

There are several steps of the submission process that require careful attention by applicants in order to assure that the application has been fully accepted. It is suggested that applicants read the document available at <http://www.grants.gov/assets/TrackingYourApplicationPackage.pdf>

For more information on the Grants.gov registration and submission process, please see <http://www.usgs.gov/contracts/grants/grantsgov.html>

During the application period an applicant may submit a revised or corrected proposal through grants.gov. Include a cover letter as the first page of the proposal stating that the proposal is revised and indicating that the previous submittal is to be withdrawn from consideration. Such submissions must be completed by July 8, 2009 at 4:00 pm Eastern Daylight Time.

See Section 8, Application Preparation Instructions, which describes requirements for the proposal and other application components.

**Please allow sufficient time for the proposal to be submitted electronically through Grants.gov and allow time for possible computer delays. Applicants are strongly advised not to wait until the last minute for submission. A proposal received after the closing date and time will not be considered for award. If the USGS determines that a proposal will not be considered for award due to lateness, the applicant will be notified immediately.**

#### **4. Funds and Start Dates**

Up to \$5 million will be available under this Announcement in FYs 2009-2010 for support to upgrades to regional seismic networks under ARRA, as part of the Advanced National Seismic System (ANSS). These estimates do not bind the USGS to a specific number of awards or to the amount of any award. Start dates for seismic networks will be approximately August 20, 2009. All work by award recipients must be completed by and all funds must be drawn down by September 15, 2011.

#### **5. Application Requirements**

A. Only those applications that respond to and meet the criteria of this announcement will be considered for funding. Applications that do not meet the criteria of this announcement will be returned to the applicant.

B. Work under all awards must be completed no later than September 15, 2011. All ARRA funds must be drawn down no later than September 15, 2011.

C. Proposed operations and developmental activities shall be conducted by the applicant. Proposed funding for activities other than those outlined in the application will not be considered.

D. The application shall be prepared in accordance with the application preparation instructions. (See Section 8.)

#### **6. Objectives and Requirements for Seismic Monitoring Upgrades under ARRA**

See Attachment A.

#### **7. Applications Considered Unsuitable**

Applications for seismic networks not currently under cooperative agreement with the USGS and that do not address the requirements within the Objectives and Requirements (Attachment A) will not be considered for funding and will be returned to the applicant.

## 8. Application Preparation Instructions

Your electronic submission shall consist of forms SF-424, SF-424a, and SF-424b, plus the items described below. No additional documents or materials may be submitted. Failure to comply with the required application components listed below may result in the proposal being rejected. To view complete forms instructions, please visit the Grants.gov Forms Repository at [http://www.grants.gov/agencies/aapproved\\_standard\\_forms.jsp#1](http://www.grants.gov/agencies/aapproved_standard_forms.jsp#1)

Items A through F as described below shall be combined together, in the order noted below, and submitted through Grants.gov in either MS Word or PDF format. **The application shall not exceed 25 single-spaced pages** (including figures, tables, references, appendices, curriculum vitae, etc.), and the **type size shall not be smaller than 11 point**. All pages of the application shall be numbered. All text, figures, and tables shall be sized to fit on 8½" by 11" paper. The SF forms and letters of support do **not** count toward the 25-page limit. The application shall be in color as needed for review by peer review panel members. Do not submit copies of published papers with the application.

In the Grants.gov forms, floating your mouse over a field will provide instructions for completing that field. You can also click on the Check Package for Errors button to check the entire application for validation errors (incomplete fields, etc.)

The application submitted through grants.gov as the Project Narrative Attachment Form (in MS Word or PDF format) shall be **assembled in the following order**:

- A. Proposal Information Summary. This summary is mandatory in all proposals and shall follow the same format as shown in Attachment D.
- B. Table of contents.
- C. Proposed budget.

The proposed budget shall be presented in two parts, a one-page summary (in the format in Attachment C) followed by a detailed budget. **Place the budget summary, followed by the detailed budget, after the Table of Contents**. Non-federal funds available to support the project may be reflected in the detailed budget or the SF 424 in block 18, as appropriate. The detailed budget must include the amount proposed for the proposed term of the project for each of the following items, in this order:

1. Salaries and wages. Identify individuals or categories of salaries and wages, estimated hours or percent of time, and the rate of compensation proposed for each person or category. Include an explanation of the amounts included for projected increases if the rate of pay shown is higher than the current rate of pay. Identify each person with a task in the project. For students (undergraduate and graduate), requests for support must clearly identify the role of the individual in the operation and maintenance or development and expansion of the network, and the hours assigned to these tasks.
2. Fringe benefits/labor overhead. Indicate the rates/amounts in conformance with normal accounting procedures. Explain what costs are covered in this category and the basis of the rate computations. Indicate whether rates are used for proposal purposes only or whether they are also fixed or provisional rates for billing purposes. **Include a copy of the Negotiated Rate Agreement or internal memo supporting the proposed rates**.
3. Equipment. See the Objectives and Requirements (Attachment A) for details on types of equipment that can be requested and furnished by USGS as U.S. Government Furnished Equipment (GFE) and types of equipment that should be included under this section of the budget. List the type and cost of all equipment necessary for achieving the objectives of the project, including non-GFE equipment included on the required table (Attachments B1, B2, and B3) to be included in the proposal. Each piece of equipment shall be itemized and

include a full justification and a dealer or manufacturer quote, if available. If fabrication of equipment is proposed, list parts and materials required for each and show costs separately from the other items. Title to non-expendable personal property other than GFE shall be vested with the recipient. Title to GFE property shall be vested with the USGS.

4. Supplies. Enter the cost for all tangible property. Include the cost of office, laboratory, computing, and field supplies separately. Provide detail on any specific item that represents a significant portion of the proposed amount. (Note: publications costs will not be considered.)
  5. Services or consultants. Identify the tasks or problems for which such services would be used. List the contemplated sub-recipients by name (including consultants), the estimated amount of time required, and the quoted rate per day or hour. If known, state whether the consultant's rate is the same as she/he has received for similar services or under government contracts or assistance awards.
  6. Travel. Travel is allowable for station installation and related work. State the purpose of the trip and itemize the estimated travel costs to show the number of trips required, the destinations, the number of people traveling, the per diem rates, the cost of transportation, and any miscellaneous expenses for each trip. Calculations of other special transportation costs (such as charges for use of applicant-owned vehicles or vehicle rental costs) should also be shown.
  7. Other direct costs. Itemize the different types of costs not included elsewhere, such as shipping and equipment-use charges. Provide breakdowns showing how the cost was estimated (for example, equipment-use charges should show the type of equipment, estimated time of use, and the established rates).
  8. Total direct costs. Total of items 1 through 7.
  9. Indirect cost/general and administrative (G&A) cost. Show the proposed rate, cost base, and proposed amount for allowable indirect costs based on the cost principles applicable to the Applicant's organization. If the Applicant has separate rates for recovery of labor overhead and G&A costs, each charge should be shown. Explain the distinction between items included in the two cost pools. The Applicant should propose rates for evaluation purposes that they are also willing to establish as fixed or ceiling rates in any resulting award. **A copy of the negotiated indirect cost rate agreement with the Federal government shall be included with the paper original. If one is not established, a letter from a Certified Public Accountant must be included to support the cost.**
  10. Amount proposed. Total items 8 and 9.
  11. Total project cost. Total Federal and non-Federal amounts, if any.
- D. Proposal Body: The proposal body shall consist of the following parts:
1. Significance of the project. Discuss the specific problem addressed and its importance. Include a discussion of how the proposed work will support the purpose of the American Recovery and Reinvestment Act and make progress towards attaining the ANSS performance standards.
  2. Project plan. Discuss the specific operational objectives, data collection and management plans, product development and distribution plans, and other efforts. Plans should describe both how each task will be accomplished and, start and end dates should be provided.
  3. Project personnel and bibliography of directly related work. Provide a one-page curriculum vita for the professional staff, summarizing education, experience, and last five year's bibliographic information related to the proposed work. Curriculum vitae for post-doctoral researchers, who contribute significantly to the project, must also be included.
  6. Institutional qualifications. State the relevant experience and the resources available at the institution. Resources include personnel, computer and library facilities, and ties to both sources of data and potential users of the results.

7. Project management plan. The Project Management Plan must include the table from Attachments B1, B2, and/or B3. Include project milestones and related due dates for the proposed work and required progress reports.
8. Installed and purchased seismic equipment. List all seismic stations that are operated under ANSS or in cooperation with other seismic monitoring entities (e.g., USGS Volcano Hazards Program or NOAA National Tsunami Hazard Mitigation Program) that have been upgraded in the last 2 years with either a new datalogger or sensor; include the source of funds for the upgrade(s). The list of upgraded stations must include the manufacturer and model of the upgraded components. Include the numbers and types of equipment (dataloggers or sensors) that have been ordered, but not installed.

E. List of proposed equipment, both GFE and non-GFE shall be provided in the format of Attachments B1, B2, and/or B3 and as described in Attachment A.

F. Letter(s) of support from ANSS Regional Advisory Committees and/or Working Groups

Applicants are encouraged to submit such letters. ANSS regional coordinators can be obtained from:

<http://earthquake.usgs.gov/research/monitoring/anss/committees/nic/>

## 9. Evaluation of Applications

A. Evaluation of proposals is through peer review by a panel of experts who read all the proposals prior to meeting and discuss each proposal according to the evaluation criteria. The Panel members are scientists drawn from Federal and State government and academic institutions and private industry without direct interest in this announcement.

B. All proposals are considered in accordance with the criteria set forth below:

1. Responsiveness to Objectives and Requirements. This factor includes the overall responsiveness of the proposal to NEHRP public safety and loss reduction goals, and to USGS needs for improved monitoring and reporting as detailed in Attachment A. The factor includes the ability of each proposal to improve real-time earthquake information for emergency response personnel and, where appropriate, to provide improved information about building and site response for engineers.
2. Technical quality of the proposal. This factor includes the scientific and technical merit of the project plan, including responsiveness to the targeted station list provided in Appendix B, the probability of achieving positive results, and performance improvements within the designated period.
3. Performance and experience of Principal Investigator(s) (PIs) and network operations team. This factor includes the experience and competence of the PIs, key personnel, and the institution and the quality of network operations achieved with previous funding. Recent performance will be reviewed with respect to network reliability and ANSS performance standards (including metadata, catalog contributions and data archiving); integration with USGS/ANSS goals and objectives for the monitoring system; and compliance with reporting requirements from previous USGS awards.
4. Appropriateness and reasonableness of the budget. This factor includes whether the proposed budget is commensurate with the level of effort needed to accomplish the project objectives and whether the cost of the project is reasonable relative to the value of the anticipated results.
5. ARRA Criteria. This factor, for projects proposed for funding under the American Recovery and Reinvestment Act, includes each proposed project's ability to:
  - preserve and create jobs and promote economic recovery;
  - increase economic efficiency by spurring technological advances in science; and

-- invest in infrastructure that will provide long-term economic benefits.

- C. The assembled panel makes recommendations and provides advice by ranking proposals and making recommendations for funding levels. The results of the review will assist the USGS in making final award determinations under this Announcement.

#### **10. Reasons for Rejecting and Application after Initial Review**

- A. If a proposal does not substantially meet all requirements specified in the Announcement, as determined by the Contracting Officer in consultation with the Project Officer, the proposal will be promptly returned to the applicant indicating the reason for its return.
- B. Applications that are received for a network that is not currently part of the ANSS will not be considered.

#### **11. Special Terms and Conditions**

**Applicants should note all requirements and stipulations described in Special Terms and Conditions (Attachment E). There are many specific requirements that are different from past USGS award requirements.**

Award Recipients must comply with all Special Terms and Conditions (Attachment E) and Cost Principals, Audit, and Administrative Requirements (Attachment F), and the ANSS Performance Standards (Attachment G). Submittal of an application constitutes the applicant's acceptance of the terms and conditions for inclusion in any award resulting from their application. Any concerns with the requirements of the Special Terms and Conditions shall be presented in detail to the Contracting Officer at least three (3) days prior to the closing date of the Announcement. It should be noted that pre-award costs are NOT authorized.

#### **12. Paperwork Reduction Act Statement**

This information is being collected to determine the eligibility of the applicant and as a basis for approval or disapproval of the proposed work. The purpose of the program is to support research in earthquake hazards and earthquake prediction to provide earth science data and information essential to mitigate earthquake losses. Response to this request is required to obtain and retain an assistance award, under the Earthquake Hazards Reduction Act of 1977, as described in Section 1. Public report burden for this collection is estimated to average 30 hours per assistance application and 40 hours to prepare a final technical report (OMB No. 1028-0051) Direct comments regarding the burden estimate or any other aspect of this collection to: Bureau Clearance Officer, USGS, 807 National Center, Reston, VA 20192.

#### **13. Financial Assistance Payments**

- A. Department of Health and Human Services (DHHS) Payment Management System (PMS)
  - 1. The USGS requires that all financial assistance payments be made using the Department of Health and Human Services (DHHS) Payment Management System (PMS). Paper-based claims for reimbursement are not accepted. In order to receive payment, Recipients will be required to establish an account with PMS. With each assistance award, a sub-account will be set up from which the Recipient can draw down funds.
  - 2. **Award recipients must draw down all awarded funds under this Announcement on or before September 15, 2011.**
- B. Foreign Recipients

It should be noted that foreign recipients will only be permitted to draw down funds if a U.S. corresponding bank is linked to their account (i.e., the recipient must bank directly with a U.S. bank or their foreign bank must have a corresponding U.S. bank). It is the responsibility of the applicant to verify that, in the event they receive an award, they can meet this condition of the award. It is strongly recommended that foreign applicants make any necessary banking

arrangements prior to submitting their applications. Applicants who are recommended for funding who cannot meet this condition may not receive an award.

#### **14. American Recovery and Reinvestment Notices**

##### **2 CFR §176.150 Notice of Required Use of American Iron, Steel, and Manufactured Goods—Section 1605 of the American Recovery and Reinvestment Act of 2009.**

(a) Definitions. “Manufactured good,” “public building and public work,” and “steel,” as used in this notice, are defined in the 2 CFR 176.140.

(b) Requests for determinations of inapplicability. A prospective applicant requesting a determination regarding the inapplicability of section 1605 of the American Recovery and Reinvestment Act of 2009 (Pub. L. 111-5) (Recovery Act) should submit the request to the award official in time to allow a determination before submission of applications or proposals. The prospective applicant shall include the information and applicable supporting data required by paragraphs (c) and (d) of the award term and condition at 2 CFR 176.140 in the request. If an applicant has not requested a determination regarding the inapplicability of 1605 of the Recovery Act before submitting its application or proposal, or has not received a response to a previous request, the applicant shall include the information and supporting data in the application or proposal.

(c) Evaluation of project proposals.

If the Federal government determines that an exception based on unreasonable cost of domestic iron, steel, and/or manufactured goods applies, the Federal Government will evaluate a project requesting exception to the requirements of section 1605 of the Recovery Act by adding to the estimated total cost of the project 25 percent of the project cost, if foreign iron, steel, or manufactured goods are used in the project based on unreasonable cost of comparable manufactured domestic iron, steel, and/or manufactured goods.

(d) Alternate project proposals.

(1) When a project proposal includes foreign iron, steel, and/or manufactured goods not listed by the Federal Government at paragraph (b)(2) of the award term and condition at 2 CFR 176.140, the applicant also may submit an alternate proposal based on use of equivalent domestic iron, steel, and/or manufactured goods.

(2) If an alternate proposal is submitted, the applicant shall submit a separate cost comparison table prepared in accordance with paragraphs (c) and (d) of the award term and condition at 2 CFR 176.140 for the proposal that is based on the use of any foreign iron, steel, and/or manufactured goods for which the Federal Government has not yet determined an exception applies.

(3) If the Federal government determines that a particular exception requested in accordance with paragraph (b) of the award term and condition at 2 CFR 176.140 does not apply, the Federal Government will evaluate only those proposals based on use of the equivalent domestic iron, steel, and/or manufactured goods, and the applicant shall be required to furnish such domestic items.

##### **2 CFR§176.170 Notice of Required Use of American Iron, Steel, and Manufactured Goods (covered under**

##### **International Agreements)—Section 1605 of the American Recovery and Reinvestment Act of 2009.**

(a) Definitions. “Designated country iron, steel, and/or manufactured goods,” “foreign iron, steel, and/or manufactured good,” “manufactured good,” “public building and public work,” and “steel,” as used in this provision, are defined in 2 CFR 176.160(a).

(b) Requests for determinations of inapplicability. A prospective applicant requesting a determination regarding the inapplicability of section 1605 of the American Recovery and Reinvestment Act of 2009 (Pub. L. 111-5)(Recovery Act) should submit the request to the award official in time to allow a determination before submission of applications or proposals. The prospective applicant shall include the information and applicable supporting data required by paragraphs (c) and (d) of the award term and condition at 2 CFR 176.160 in the request. If an applicant has not requested a determination regarding the

inapplicability of 1605 of the Recovery Act before submitting its application or proposal, or has not received a response to a previous request, the applicant shall include the information and supporting data in the application or proposal.

(c) Evaluation of project proposals.

If the Federal government determines that an exception based on unreasonable cost of domestic iron, steel, and/or manufactured goods applies, the Federal Government will evaluate a project requesting exception to the requirements of section 1605 of the Recovery Act by adding to the estimated total cost of the project 25 percent of the project cost if foreign iron, steel, or manufactured goods are used based on unreasonable cost of comparable domestic iron, steel, or manufactured goods.

(d) Alternate project proposals.

(1) When a project proposal includes foreign iron, steel, and/or manufactured goods, other than designated country iron, steel, and/or manufactured goods, that are not listed by the Federal Government in this Buy American notice in the request for applications or proposals, the applicant may submit an alternate proposal based on use of equivalent domestic or designated country iron, steel, and/or manufactured goods.

(2) If an alternate proposal is submitted, the applicant shall submit a separate cost comparison table prepared in accordance with paragraphs (c) and (d) of the award term and condition at 2 CFR 176.160 for the proposal that is based on the use of any foreign iron, steel, and/or manufactured goods for which the Federal Government has not yet determined an exception applies.

(3) If the Federal government determines that a particular exception requested in accordance with paragraph (b) of the award term and condition at 2 CFR 176.160 does not apply, the Federal Government will evaluate only those proposals based on use of the equivalent domestic or designated country iron, steel, and/or manufactured goods, and the applicant shall be required to furnish such domestic or designated country items.

**2 CFR§176.190 Award term- Wage Rate Requirements under Section 1606 of the Recovery Act**

a) Section 1606 of the Recovery Act requires that all laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government pursuant to the Recovery Act shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code. Pursuant to Reorganization Plan No. 14 and the Copeland Act, 40 U.S.C. 3145, the Department of Labor has issued regulations at 29 CFR Parts 1, 3, and 5 to implement the Davis-Bacon and related Acts. Regulations in 29 CFR 5.5 instruct agencies concerning application of the standard Davis-Bacon contract clauses set forth in that section. Federal agencies providing grants, cooperative agreements, and loans under the Recovery Act shall ensure that the standard Davis-Bacon contract clauses found in 29 CFR 5.5(a) are incorporated in any resultant covered contracts that are in excess of \$2,000 for construction, alteration or repair (including painting and decorating).

(b) For additional guidance on the wage rate requirements of section 1606, contact your awarding agency. Recipients of grants, cooperative agreements and loans should direct their initial inquiries concerning the application of Davis-Bacon requirements to a particular federally assisted project to the Federal agency funding the project. The Secretary of Labor retains final coverage authority under Reorganization Plan Number 14.

SPECIAL NOTICE: Full or partial funding for requirements to be completed by resultant financial assistance award(s) may utilize funds provided by the American Recovery and Reinvestment Act of 2009. Inclusion of unique provisions required implementing the Act, including those for significant reporting and transparency requirements by the successful recipient(s), will be required in any resultant financial assistance award.

### **Objectives and Requirements for Seismic Monitoring Upgrades under ARRA**

The USGS is accepting proposals to modernize and improve the capabilities of currently contributing networks of the Advanced National Seismic System. Upgrades to outdated seismic instrumentation, communications, and analysis systems will increase the reliability and monitoring capabilities of ANSS. Additionally, improvements to instrumentation, communications, and data processing are necessary for the ANSS to meet its target performance standards.

The proposed work will be funded under the American Recovery and Reinvestment Act (ARRA) and must be consistent with the stated purposes and principles of the Act, pertinently:

1. To preserve and create jobs and promote economic recovery.
2. To provide investments needed to increase economic efficiency by spurring technological advances in science.
3. To invest in infrastructure that will provide long-term economic benefits.

In support of these principles, the USGS will replace outdated equipment used to monitor and report on earthquake activity in the U.S. and worldwide and improve the data centers and processing capabilities that generate earthquake information products and manage seismic data. Upgrades or modifications that create additional ongoing operations and maintenance are discouraged. Funding salaries for students and people who would otherwise be laid off supports the goals of the ARRA. Processing system improvements should apply to one or more of the following categories:

- Improvements to routine station and data center operations;
- Exchange and integration, in real time, of data and information generated by networks;
- Distribution and dissemination of earthquake notifications, data, and information via USGS-specified interfaces, protocols, and procedures;
- Implementation of improved earthquake location methods into ANSS endorsed earthquake monitoring software;
- Coordination of monitoring activities to ensure seamless distribution of earthquake data products for public notification, awareness, and emergency response applications; and
- Compilation and distribution of earthquake data and information products in support of National Earthquake Hazards Reduction Program (NEHRP) goals and objectives (see [www.nehrp.gov](http://www.nehrp.gov)).

The shared ANSS goal is to maximize the performance of the system under the available resources and to provide useful and effective earthquake information and data to the many and diverse users of ANSS products. To attain these goals, the ANSS implemented a set of performance standards (Attachment G) to ensure efficient, effective, and reliable operations of this critical monitoring system. The standards, developed under the guidance of the ANSS Technical Implementation Committee, consist of a set of metrics spanning five areas:

- seismic monitoring;
- automatic product generation;
- reviewed product generation;
- data exchange; and
- data archiving.

The submitted proposal should directly address how the work will progress the network towards attaining these performance standards in a cost effective way without increasing long-term operational costs (see ANSS Performance Standards, Attachment G).

The USGS seeks proposals to install equipment that is being purchased by the USGS or currently held at

the ANSS equipment depot. Such equipment includes but is not limited to seismometers, digitizers, radios, and computer hardware. The choice of equipment and scope of the proposal must consider the availability and acquisition time in order to satisfy the September 15, 2011 deadline for completion of work and draw down of all funds. For example, the long delivery time for orders of broadband sensors should be taken into consideration. Networks should consider solutions that include more easily available short-period and strong-motion sensors if these instruments will assist the network in achieving ANSS performance goals.

Equipment upgrades include: installation of modern digitizers, microwave, and fiber optic communication infrastructure, vault improvements, and sensors, although other justified modernization will be considered. Proposers should review the “Buy American” and ARRA sections of the Special Terms and Conditions (Attachment E). To assist in proposal preparation, USGS has compiled lists of seismic stations nationwide that do not meet ANSS technical standards (for hardware, communications, and/or data quality) and their basic characteristics. These lists are included as Attachments B1, B2, and B3. Any institution may propose to upgrade any station (including those listed under network code NP), and must list the specific station codes in the proposal.

Requests for U.S. Government Furnished Equipment (GFE) may include computers, seismic sensors, dataloggers, and sensor-datalogger instruments. ~~Investigators are encouraged to contact the ANSS equipment depot manager, or ANSS Technical Manager, to inquire as to the specific types of equipment expected to be available as GFE.~~ **At this time, the USGS does not know what specific equipment will be available for use in the upgrades. The USGS recommends that applicants submit general requests for equipment, such as: 3 channel data acquisition unit, such as the RefTek 130-01/3; 6 channel data acquisition unit, such as the Quanterra Q330S; 3 channel data acquisition system (data acquisition unit plus built-in accelerometer) such as the RefTek 130-SMHR; 4 or 6 channel data acquisition system (data acquisition unit plus built-in accelerometer), such as a Kinometrics Basalt; Station processor, such as a Kinometrics Slate; and Broadband seismometer, such as a Nanometrics Trillium 120. The use of specific brand names is for clarification only and does not imply that this equipment will be available.**

Please list the requested GFE in the proposal but do not include these costs. Requests for high-resolution digitizers require station-by-station technical justifications that include documentation on the sensor(s) self-similar noise characteristics, site noise characteristics and scientific justification for high resolution digitizers. Likewise, requests for broadband sensors not available thru GFE must include technical documentation of on-site noise characteristics and scientific justification on a station-by-station basis for the need of non-GFE furnished broadband sensors.

USGS encourages upgrades that improve sharing of technical expertise and solutions among ANSS networks. Network managers are likewise encouraged by USGS to make use of the existing coordinating groups to find needed expertise and solutions and to maintain an active communication with the ANSS Coordinator and Technical Manager.

It should be noted that awardees will be required to return all pre-existing U.S. Government Furnished Equipment (GFE) being replaced during the upgrade project term. Details are provided in Attachment E.

Supporting information on the Advanced National Seismic System can be found at <http://earthquake.usgs.gov/research/monitoring/anss>. At the tab, “Publications and Documents” are the key documents supporting the implementation of ANSS, as well as a number of fact sheets providing information on ANSS products, accomplishments, and structure. Proposers are strongly encouraged to review carefully all documents specifically cited in these documents.

The primary Earthquake Hazards Program contact for seismic network upgrades for purposes of this

announcement is Harley Benz ([benz@usgs.gov](mailto:benz@usgs.gov)).

Each Proposal shall include the completed tables, Attachments B1, B2, and B3, as described in Section 8 of the Announcement, within the 25-page limit.

See separate Excel files (15 pages total) of:

Attachments B1, B2, and B3, U.S. Seismic Stations Targeted for Upgrades to Meet ANSS Technical Standards: Existing and Proposed Equipment

## Budget Summary \*

Project Title:

Principal Investigator(s):

Cost Category	Federal Funding Requested	Non-Federal/Matching Funds Identified	TOTAL
1. Salaries and Wages	\$	\$	\$
2. Fringe Benefits/ Labor Overhead	\$	\$	\$
3. Equipment	\$	\$	\$
4. Supplies	\$	\$	\$
5. Services or Consultants	\$	\$	\$
6. Travel	\$	\$	\$
7. Other Direct Costs	\$	\$	\$
8. Total Direct Costs (sum of 1-7)	\$	\$	\$
9. Indirect cost/G&A	\$	\$	\$
10. Amount Proposed (8 + 9)	\$	\$	\$
11. Total Project Cost (Federal + non-Federal amounts)			\$

\* Use this sheet for the Budget Summary that precedes the detailed budget.

Proposal Information Summary

You must submit this summary with your proposal. Use the format below to provide the information in the order requested.

1. Project Title:

2. Principal Investigator(s): (Institute/Organization Name)  
(Street Address/P.O. Box)  
(City, State, Zip Code)  
(Telephone Number)  
(FAX Number)  
(E-mail Address)

3. Authorized Institutional Representative: (Name) (Institution)  
(Organizational Unit)  
(Street Address/P.O. Box)  
(City, State, Zip Code)  
(Telephone Number)  
(FAX Number)  
(E-mail Address)

4. Amount Requested: (List amount of Federal funds requested)

5. Proposed Duration: (Number of months proposed for project completion\*)

- All work and fund drawdowns must be completed on or before September 15, 2011

## Special Terms and Conditions

### 1. Method of Payment

The U.S. Geological Survey (USGS) is using the Department of Health and Human Services (DHHS) Payment Management System (PMS) to provide electronic invoicing and payment for assistance award recipients. The Recipient has established or will establish an account with PMS. With the award of each grant/cooperative agreement, a sub-account will be set up from which the Recipient can draw down funds. The sub-account number will be shown in block 4 of the face page of each award or modification.

Payments will be made available through the PMS. The PMS is administered by the DHHS, Division of Payment Management of the Financial Management Service, Program Support Center. The DHHS will forward instructions for obtaining payments to the recipients. Inquiries regarding payment should be directed to:

Division of Payment Management  
Department of Health and Human Services  
P.O. Box 6021  
Rockville, MD 20852

The Division of Payment Management web address is [www.dpm.psc.gov](http://www.dpm.psc.gov). Problems or questions with electronic drawdown procedures should be directed to Raynette Robinson at (301) 443-9180 or the help desk at (877) 614-5533 or email to [PMSSupport@psc.gov](mailto:PMSSupport@psc.gov).

Payments may be drawn in advance only as needed to meet immediate cash disbursement needs. All draw downs must be completed by September 15, 2011.

### 2. Definitions

#### A. Grant Agreement

A grant agreement is the legal instrument reflecting a relationship between the Federal Government and a State or local government or other recipient whenever:

- (1) the principal purpose of the relationship is the transfer of money, property, services, or anything of value to the State or local government or other recipient in order to accomplish a public purpose of support or stimulation authorized by Federal statute, rather than acquisition, by purchase, lease, or barter, of property or services for the direct benefit or use of the Federal Government; and
- (2) no substantial involvement is anticipated between the executive agency, acting for the Federal Government, and the State or local government or other recipient during performance of the contemplated activity.

#### B. Cooperative Agreement

A cooperative agreement is the legal instrument reflecting a relationship between the Federal Government and a State or local government or other recipient whenever:

- (1) the principal purpose of the relationship is the transfer of money, property, services, or anything of value to the State or local government or other recipient to accomplish a public purpose of support, or stimulation authorized by Federal statute, rather than acquisition, by purchase, lease, or barter, of property or services for the direct benefit or use of the Federal

- Government; and
- (2) substantial involvement is anticipated between the executive agency, acting for the Federal Government, and State or local government or other recipient during performance of the activity.

C. Grantee / Cooperator

Grantee or cooperator means the nonprofit corporation or other legal entity to which a grant or cooperative agreement is awarded and which is accountable to the Federal Government for the use of the funds provided. The grantee or cooperator is the entire legal entity even if only a particular component of the entity is designated in the award document. For example, a grant or cooperative agreement award document may name as the grantee one school or campus of a university. In this case, the granting agency usually intends, or actually requires, that the named component assume primary or sole responsibility for administering the grant-assisted project or program. Nevertheless, the naming of a component of a legal entity as the grantee or cooperator in a grant or cooperative agreement award document shall not be construed as relieving the whole legal entity from accountability to the Federal Government for the use of the funds provided. The term “grantee” or “cooperator” does not include secondary recipients such as sub grantees, contractors, etc., who may receive funds from a grantee pursuant to a grant.

D. Recipient

Recipient means grantee or cooperator.

E. Principal Investigator

The Principal Investigator is the individual designated by the Recipient (and approved by the USGS) who is responsible for the technical direction of the research project. The Principal Investigator cannot be changed or become substantially less involved than was indicated in the Recipient's proposal, without the prior written approval of the Contracting Officer.

F. Grants Program Manager

- (1) The Grants Program Manager will work closely with the Principal Investigator to ensure that all technical requirements are being met. The Grants Program Manager's responsibilities include, but are not limited to, providing technical advice on the accomplishment of the proposal's objectives; reviewing the technical content of reports and the other information delivered to the USGS; determining the adequacy of technical reports; and conducting site visits, in coordination with the Regional Coordinator and the Contracting Officer, as frequently as practicable.
- (2) The Grants Program Manager is Elizabeth Lemersal, External Research Support Manager, U.S. Geological Survey, 905 National Center, 12201 Sunrise Valley Drive, Reston, VA 20192. The Grants Program Manager does not have the authority to issue any technical direction which constitutes an assignment of additional work outside the scope of the award; in any manner causes a change in the total cost or the time required for performance of the award; or change any of the terms, conditions, or general provisions of the award.

G. Regional/Topical Coordinator

- (1) Regional Coordinators are in charge of conducting the peer review panels to evaluate both internal USGS and external research proposals in their region or area of expertise. A Regional Coordinator will work closely with the Grants Program Manager and the Principal Investigator to ensure coordination with other appropriate Principal Investigators and appropriate USGS project scientists working in the same region for overall conformance with USGS program goals and objectives within that region. The Regional Coordinator's

responsibilities include, but are not limited to, providing technical advice on the accomplishment of the proposal's objectives; reviewing the technical content of reports and other information delivered to the USGS; determining the adequacy of the technical reports; and conducting site visits, in coordination with the Grants Program Manager and contract personnel, as frequently as practicable.

- (2) The Regional Coordinator does not have the authority to issue any technical direction which constitutes an assignment of additional work outside the scope of the award; in any manner causes a change in the total cost or the time required for performance of the award; or changes any of the terms, conditions, or general provisions of the award.

#### H. Contracting Officer (CO)

Contracting officers are individuals who have been delegated in writing by the USGS Office of Acquisition and Grants as the sole authority designated to obligate Federal funds and create terms and conditions of awards. They are the only individuals who have authority to negotiate, enter into, and administer awards resulting for this program. Contracting officers have responsibility to ensure the effective use of Federal funds.

Functions of the contracting officer include but are not limited to:

- (1) Issuing the grant program announcement in coordination with the grants program manager.
- (2) Receiving grant proposals and related documents in response to a grant program announcement. The contracting officer as receiving official shall mark all proposals with a control number and the date officially received. He shall notify each applicant of the receipt of its proposal.
- (3) Approving the grant program manager's Technical Evaluation Plan, which describes in detail the evaluation process for a competitive grant/cooperative agreement program. The contracting officer shall ensure the openness and fairness of the evaluation and selection process.
- (4) Serving in an advisory capacity at peer review panel meetings. He shall interpret grant management policies to panel members.
- (5) Notifying grant program applicants whether or not they were selected for funding or of any other disposition of their application.
- (6) Negotiating, as necessary, the final grant/cooperative agreement budget.
- (7) Issuing grant/cooperative agreement awards and revisions to awards.
- (8) Approving invoice payments.
- (9) Receiving all requests for changes to an award. The contracting officer shall serve as the mandatory control point for all official communications with the grantee which may result in changing the amount of the grant/cooperative agreement, the grant/cooperative agreement budget, or any other terms and conditions of the grant.
- (10) Receiving financial reports required by the terms and conditions of the award.
- (11) Closing out grant/cooperative agreement awards when all applicable award requirements have been complied with.

### 3. Reporting Requirements and Dissemination of Results

~~The Principal Investigator is strongly encouraged to disseminate project results promptly to the scientific community and appropriate professional organizations; local, state, regional and federal agencies; and the general public. It is the expectation of the USGS that Principal Investigators will publish the results of funded efforts in peer-reviewed scientific or technical journals. In addition, all~~

~~data products and computer codes must be made readily available within the public domain. The Government may publish, reproduce, and use all technical data developed as a result of this award in any manner and for any purpose, without limitation, and may authorize others to do the same.~~

Data generated as a part of work funded under this program must be made readily available; there is no provision for PIs to have exclusive access to data for a proprietary period of time. The USGS reserves a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, the data for Government purposes. Any project funded under Earthquake Hazards Program External Research Support shall fall under this clause. Should any questions arise, both the USGS Contracting Officer and the Recipient will determine which data fall in this category.

For cooperative agreements under the American Recovery and Reinvestment Act for upgrades to existing earthquake monitoring systems, **U.S. Geological Survey (USGS) will be substantially involved with the Principal Investigators (PIs)** and other institution staff as upgrades are accomplished. Specifically, project chiefs and staff within the USGS Earthquake Hazards Program seismic monitoring projects will provide awardees with administrative and technical assistance in identifying, ordering and configuring appropriate seismic systems that meet ANSS goals and standards.

USGS personnel will provide oversight on the types and numbers of U.S. Government Furnished Equipment (GFE) broadband and strong motion systems deployed within each of the regional networks during the award terms in order to ensure comprehensive seismic monitoring across the country in support of NEHRP objectives for earthquake hazards reduction.

Dr. Lind Gee and staff at the Albuquerque Seismological Laboratory (ASL) will provide performance specifications and technical details on acquisition and sensor systems. In addition, ASL can provide recommendations on procedures for installation, configuration, and maintenance of upgraded seismograph stations. Dr. Harley Benz and staff at the National Earthquake Information Center (NEIC) in Golden, Colorado will provide assistance on the setup of real-time data exchange between NEIC and the regional networks, which includes exchange of regional network data and data from the Advanced National Seismic System (ANSS) backbone network. Dr. Doug Given (USGS, Pasadena) and Dr. David Oppenheimer (USGS, Menlo Park) will provide technical advice regarding upgrades in California and will assist in assessing both hardware and software needs for implement of CISN processing software within the regional networks.

A. Required reports/documents. The Principal Investigator or Director, Sponsored Research Office is required to submit the following reports or documents:

<b>Report/ Document</b>	<b>No. of Copies and Method of Transmittal</b>	<b>Submit To</b>	<b>When Due</b>
(1) ARRA* Reporting	See Section B(1)	See Section B(1)	See Section B(1)
(2) Reporting of new or upgraded seismic station	Electronic submission	USGS Website	10 working days following completion of the upgrade or installation of a seismic station. See Section B(2)
(3) Publication*	Adobe Acrobat PDF file as an email attachment (or 1 reprint if PDF not possible)	Grants Program Manager	Immediately following publication. See Section B(3)
(4) Final Technical Report	Send Adobe Acrobat PDF file as an email attachment; Maximum size: 10 MB	Grants Program Manager	Within 90 calendar days after the end of each 12-month budget period. See Section B(4)
(5) SF 272 Federal Cash Transactions Report	Electronic submission	USGS via PMS Electronic 272 System See Section B(5)	See Section B(5)
(6) SF 269 Financial Status Report	See Section B(6)	See Section B(6)	See Section B(6)
(7) Final SF 269 Financial Status Report	See Section B(7)	See Section B(7)	See Section B(7)

\*ARRA – American Recovery and Reinvestment Act

\*\* Publication means any book, report, photograph, map, chart, or recording published or disseminated to the scientific community. Preprints of articles submitted for publications will be accepted as final reports.

B. Report preparation instructions. The Recipient shall prepare the reports/documents in accordance with the following instructions:

**(1) American Recovery and Reinvestment Act (ARRA) Recipient Reporting**

Recipients of Federal awards from funds authorized under Division A of the ARRA must comply

with all requirements specified in Division A of the ARRA (Public Law 111-005), including reporting requirements outlined in Section 1512 of the Act. For purposes of reporting, recipients of ARRA funds from Department of the Interior must report on sub-recipient activities as specified below. Not later than ten (10) days after the end of each calendar quarter, starting with the quarter ending June 30, 2009 and reporting by July 10, 2009, the recipient must submit a report to the Department of the Interior that will be posted to Recovery.gov, containing the following information:

(a) The total amount of ARRA funds under this award;  
(b) The amount of ARRA funds received under this award that were obligated and expended to projects or activities;  
(c) The amount of unobligated award balances;  
(d) A detailed list of all projects or activities for which ARRA funds under this award were obligated and expended, including:

- (1) The name of the project or activity;
- (2) Description of the project or activity;
- (3) An evaluation of the completion status of the project or activity;
- (4) An estimate of the number of jobs created and the number of jobs retained by the project or activity; and
- (5) For infrastructure investments made by State and local governments, the purpose, total cost, and rationale of the agency for funding the infrastructure investment with funds made available under this Act, and the name of the person to contact at the agency if there are concerns with the infrastructure investment.

(e) Detailed information on any subcontracts or sub-agreements awarded by the recipient to include the data elements required to comply with the Federal Funding Accountability and Transparency Act of 2006 (Public Law 109-282). For any sub-award equal to or larger than \$25,000, the following information:

- The name of the entity receiving the sub-award;
- The amount of the sub-award;
- The transaction type;
- The North American Industry Classification System code or Catalog of Federal Domestic Assistance (CFDA) number;
- Program source;
- An award title descriptive of the purpose of each funding action;
- The location of the entity receiving the award;
- The primary location of performance under the award, including the city, State, congressional district, and country; and
- A unique identifier of the entity receiving the award and of the parent entity of the recipient, should the entity be owned by another entity.

(f) All sub-awards less than \$25,000 or to individuals may be reported in the aggregate, as prescribed by the Department of the Interior.

(g) Recipients must account for each ARRA award and sub-award separately. Recipients will draw down funds on an ARRA award by ARRA award basis. Pooling or commingling of ARRA award funds with other funds for drawdown or other purposes is not permitted.

(h) Recipients must account for each ARRA award by referencing the assigned CFDA number for each award.

The definition of terms and data elements, as well as any specific instructions for reporting, including required formats, will be provided in subsequent guidance issued by Department of the Interior.

(2) Reporting of New or Upgraded Seismic Station.

(a) Within 10 business days of the completion of a seismic station upgrade or installation of a new seismic station, the recipient is required to submit certification of completeness documentation on a USGS website. Procedures for accessing and reporting upgrade or installation of new seismic stations will be provided to awardee by USGS ANSS staff.

(b) Certification information that will be required, but not limited to the following:

- (1) Station SCNL (station, component, network, location)
- (2) Station coordinates
- (3) Equipment Installed
- (4) Landowner information (private, state and/or federal)
- (5) Activation Date

(c) Within 30 business days of the completion of a seismic station upgrade or installation of a new seismic station, the recipient is also required to provide on the same USGS website the following:

- (1) URL of station dataless SEED volume
- (2) For stations generating continuous seismic data, the URL of noisePDF plot confirming reasonableness of station response information (Noise PDF plots can be done either by the recipient institution or by real-time data exchange with NEIC)

(3) Publication. All publications that contain work performed during the project period shall include the following statement:

“Work supported by the U.S. Geological Survey (USGS), Department of the Interior, under USGS award number (Recipient, insert award number). The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.”

Submit an Adobe Acrobat PDF file of publications to:

[gd-erp-coordinator@usgs.gov](mailto:gd-erp-coordinator@usgs.gov)

If PDF is not possible, send one (1) reprint to:

External Research Support  
U.S. Geological Survey  
905 National Center  
12201 Sunrise Valley Drive  
Reston, VA 20192

(4) Final Technical Report. Final Technical Reports shall describe in detail the work performed and results obtained during the grant period. Final Technical Reports are due 90 days after the conclusion of the project period. Any information contained in a previously submitted progress report shall be repeated or restated in the Final Technical Report. Please note that one Final Technical Report is to be submitted for each set of collaborative research grants. Reports will be posted at <http://earthquake.usgs.gov/research/external>.

(a) Submit the Final Technical Report as an Adobe Acrobat PDF file with all figures, photographs, maps, and illustrations embedded, and all pages numbered. Submit the report as an e-mail attachment in PDF format to:

[gd-erp-coordinator@usgs.gov](mailto:gd-erp-coordinator@usgs.gov)

Maximum size; 10 MB

- (b) Final Technical reports shall consist of the following sections:
  - (1) Cover page with the following information:
    - Award Number
    - Title. For collaborative projects the title should be in the form "Title: Collaborative Research with First Institution name, and Second Institution name."
    - Author(s) and Affiliation(s) with Address and zip code
    - Author's Telephone numbers, fax numbers and E-mail address
    - Term covered by the award (start and end dates)
  - (2) Abstract
  - (3) Main body of the report. The main body of the report and all illustrations and figures shall be single-spaced on 8 ½" x 11" paper.
  - (1) Bibliography of all publications resulting from the work performed under the award. One copy of each publication is required if the Recipient has not previously submitted them to the Grants Program Manager.

- (5) SF 272, Federal Cast Transactions Report is required quarterly for each PMS sub-account. Quarterly reports are due 45 working days after the end of each fiscal quarter until Financial Status Report is submitted. Instructions for submitting the SF272 can be found at the following website:

[http://www.dpm.psc.gov/grant\\_recipient/psc\\_272\\_reports/psc\\_272\\_reports.aspx?explorer.event=true](http://www.dpm.psc.gov/grant_recipient/psc_272_reports/psc_272_reports.aspx?explorer.event=true)

If after 45 days, recipient has not submitted a report, the account will be placed in a manual review status.

Funds may be withheld for accounts with delinquent reports.

- (6) SF 269, Financial Status Report (original) is required annually and is due 90 calendar days after the end of the annual budget period. Reports will be submitted to the Contracting Officer at the address shown in Block 5 of the award form.
- (7) Final SF 269, Financial Status Report.
  - (a) **The recipient will liquidate all obligations incurred under the award on or before September 15, 2011 by drawing down all funds by this date** and submit a final SF 269 Financial Status Report due no later than 90 calendar days after the grant completion date. Recipient will promptly return any unexpended federal cash advances or will complete a final draw from PMS to obtain any remaining amounts due. Once 120 days has passed since the grant completion date, the PMS subaccount for this award may be closed by USGS at any time.
  - (b) Subsequent revision to the final SF269, Financial Report, will be considered only as follows:
    - (1) When the revision results in a balance due to the Government, the recipient must submit a revised SF 269 and refund the excess payment whenever the overcharge is discovered, no matter how long the lapse of time since the original due date of the report.
    - (2) When the revision represents additional reimbursement costs claimed by the recipient, a revised SF 269 may be submitted to the Contracting Officer with an explanation. If approved, the USGS will either request and pay a final invoice or re-establish the PMS subaccount to permit the recipient to make a revised final draw. Any revised final report representing additional reimbursable amounts must be submitted no later than 1 year from the due date of the original report, i.e., 15 months following the agreement completion date. USGS will not accept any

revised SF 269 report covering additional expenditures after that date and will return any late request for additional payment to the recipient.

- C. Adherence to reporting requirements. A Recipient's failure to submit the required Final Technical Report and final financial report, generally within 6 months of the end date of the award, will likely result in delay or non-issuance of new awards. Failure to submit a Progress Report for multi-year awards will likely result in delayed renewal of funds.

4. **Adherence to Original Research Objective and Budget Estimate**

- A. Any commitments or expenditures incurred by the Recipient in excess of the funds provided by this award shall be the responsibility of the Recipient. Expenditures incurred prior to the effective date of this award cannot be charged against award funds.
- B. The following requests for change require advance written approval by the Contracting Officer shown on your award. Your request must be submitted to the Contracting Officer at least 45 calendar days prior to the requested effective date of the change:

- (1) Changes in the scope, objective, or key personnel referenced in the Recipient's proposal.
- (2) Request for supplemental funds.
- (3) Transfer of funds between direct cost categories when the cumulative amount of transfers during the project period exceeds 10 percent of the total award.
- (4) Foreign travel not approved at time of award.
- (5) Acquisition of nonexpendable personal property (equipment) not approved at time of award.
- (6) Creation of any direct cost line item not approved at time of award.
- (7) Any other significant change to the award.
- (8) No-cost Extensions to the Project Period. No cost extensions will not be granted. The Earthquake Hazards Program (EHP) awards grants and cooperative agreements for projects that extends or supplement ongoing work within the USGS. The timely conduct of funded projects is of great importance to the achievement of EHP and ARRA goals. Applicants should consider their time commitments at the time of application for an award. Requests for no cost extensions will NOT be considered for projects funded under ARRA.

- C. The Contracting Officer will notify the Recipient in writing within 30 calendar days after receipt of the request for revision or adjustment whether the request has been approved.

5. **Station upgrades: disposal of obsolete equipment**

For stations that are upgraded under this award, all U.S. Government Furnished Equipment (GFE) being replaced during the upgrade shall be shipped to the ANSS Regional Depot at the Albuquerque Seismological Laboratory.

ANSS Regional Depot  
USGS Albuquerque Seismological Laboratory  
10002 Isleta Rd SE  
Kirtland AFB, NM 87117 USA

USGS-supported networks are also strongly encouraged to ship non-GFE of the following types to the ANSS Regional Depot.

Quanterra Q680s  
Guralp CMG-40T  
Guralp CMG-3NSN

Geotech GS-13  
Kinometrics FBA-23  
Kinometrics K2

6. **Nonexpendable Personal Property**

The recipient shall comply with 2 CFR Part 215, Section 215.34. Title to nonexpendable personal property acquired wholly or in part with Federal funds shall be vested in the Recipient unless otherwise specified in the award document. The Recipient shall retain control and maintain a property inventory of such property as long as there is a need for such property to accomplish the purpose of the project, whether or not the project continues to be supported by Federal funds. When there is no longer a need for such property to accomplish the purpose of the project, the Recipient shall use the property in connection with other Federal awards the Recipient has received. Under no circumstances shall title to such property be vested in a sub-tier recipient. Disposal of nonexpendable personal property shall be in accordance with the applicable OMB circular.

The following equipment shall be vested: To be determined at time of award

7. **Record Retention Period**

Unless a longer period is requested by the award, a Recipient shall retain all records for 3 years after the end of the project period for which it uses USGS award funds.

8. **Pre-agreement Costs**

Pre-agreement costs are not authorized under this program. Costs must be obligated during the project period.

9. **Site Visits**

Site visits may be made by USGS representatives to review program accomplishments and management control systems and to provide technical assistance, as required.

10. **Metric Conversion (43CFR Sec 12.915)**

All progress and final reports, other reports, or publications produced under this award shall employ the metric system of measurements to the maximum extent practicable. Both metric and inch-pound unit (dual units) may be used if necessary during any transition period(s). However, the recipient may use non-metric measurements to the extent the recipient has supporting documentation that the use of metric measurements is impracticable or is likely to cause significant inefficiencies or loss of markets to the recipient, such as when foreign competitors are producing competing products in non-metric units.

11. **Violation of Award Terms**

If a Recipient materially fails to comply with the terms of the award, the Contracting Officer may suspend, terminate, or take such other remedies as may be legally available and appropriate in the circumstances.

12. **Award Closeout**

Awards will be closed out once all requirements have been met. Technical and financial reports must be submitted on time as specified in section 3, above. Failure to adhere to the reporting requirements may result in no future awards.

13. **Partnership with Grantees/Cooperators**

The USGS, through its federal grant/cooperative agreement awards, will collaborate with universities, federal state, local and tribal governments, and private organizations and businesses to provide relevant, timely, objective knowledge and information on natural resources, hazards, and the environment.

14. **Buy American Act Notice (43 CFR Sec. 12.710(c))**

Pursuant to Section 307(b) of the Department of the Interior (DOI) and Related Agencies Appropriations Act, FY 2000, Public Law 106-113, please be advised on the following:

“In the case of any equipment or product that may be authorized to be purchased with financial assistance provided using funds made available in this Act, it is the sense of the Congress that entities receiving the assistance should, in expending the assistance, purchase only American-made equipment and products.”

15. **Buy American: Use of American Iron, Steel, and Manufactured Goods (ARRA Term)**

Recipients may not use any funds obligated under this award for the construction, alteration, maintenance, or repair of a public building or public work unless all of the iron, steel, and manufactured goods used in the project are produced in the United States unless the Department of the Interior waives the application of this provision. (ARRA Sec. 1605)

16. **Anti-Lobbying (43 CFR Part 18)**

The Recipient shall not use any part of the appropriated funds from the Department of the Interior for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete.

17. **Seat Belt Provision (43 CFR Sec. 12.2(e))**

Recipients of grants/cooperative agreements and/or sub-awards are encouraged to adopt and enforce on-the-job seat belt use policies and programs for their employees when operating company-owned, rented, or personally owned vehicles. These measures include, but are not limited to, conducting education, awareness, and other appropriated programs for their employees about the importance of wearing seat belts and the consequences of not wearing them.

18. **Whistleblower Protection (ARRA Term)**

Each recipient or sub-recipient awarded funds made available under the ARRA shall promptly refer to the Department of the Interior, Office of Inspector General any credible evidence that a principal, employee, agent, contractor, sub-recipient, subcontractor, or other person has submitted a false claim under the False Claims Act or has committed a criminal or civil violation of laws pertaining to fraud, conflict of interest, bribery, gratuity, or similar misconduct involving those funds. (ARRA Sec. 1553)

The Department of the Interior, Office of Inspector General can be reached at 1-800-424-5081 or via e-mail at <http://www.oig.Department.gov/fraud/hotline/>

19. **No Endorsement Provision (43 CFR 12.2(d))**

[Paragraph (B) applies to all awards. The remainder of this provision applies only when:

(1) the principal purpose of the agreement is a partnership where the recipient/partner contributes resources to promote agency programs or publicize agency activities, assists in fundraising, or provides assistance to the agency; and

(2) the agreement authorizes joint dissemination of information and promotion of activities being supported; and

(3) the recipient is not a State government, a local government, or a Federally-recognized Indian tribal government. ]

(A) Recipient shall not publicize or otherwise circulate, promotional material (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts or other publications) which states or implies governmental, Departmental, bureau, or government employee endorsement of a product, service, or position which the recipient represents. No release of information relating to this award may state or imply that the Government approves of the recipient's work products, or considers the recipient's work product to be superior to other products or services.

(B) All information submitted for publication or other public releases of information regarding this project shall carry the following disclaimer:

The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.

(C) Recipient must obtain prior Government approval for any public information releases concerning this award which refer to the Department of the Interior or any bureau or employee (by name or title). The specific text, layout photographs, etc. of the proposed release must be submitted with the request for approval.

(D) A recipient further agrees to include this provision in a sub-award to any sub-recipient, except for a sub-award to a State government, a local government, or to a Federally-recognized Indian tribal government.

20. **Use of U.S. Flag Air Carriers**

Any air transportation to, from, between or within a country other than the U.S. of persons or property, the expense of which will be paid in whole or in part by U.S. Government funding, must be performed by, or under a code-sharing arrangement with, a U.S. flag air carrier if service provided by such a carrier is "available" (49 U.S.C. 40118, commonly referred to as the Fly America Act). Tickets (or documentation for electronic tickets) must identify the U.S. flag air carrier's designator code and flight number. See the Federal Travel Regulation §301-10.131 - §301-10.143 for definitions, exceptions, and documentation requirements. (See also Comp. Gen. Decision B-240956, dated September 25, 1991.)

21. **DUNS/CCR (ARRA Term)**

Recipients must require that first tier sub-recipients begin planning activities, including obtaining a DUNS number (or updating the existing DUNS record), and registering with the Central Contractor Registration (CCR) no later than the first time ARRA data requirements are due.

22. **Activities on Private and Other Non-Federal Lands**

[Paragraph B applies to all awards. The remainder of this provision applies only when the award involves funds appropriated to the biological research activity of the USGS.]

A. Funds provided for the biological research activity in USGS annual appropriations may not be used to conduct surveys on private property, unless specifically authorized in writing by the property owner.

(i) Accordingly, the recipient shall not enter non-Federal real property for the purpose of collecting information regarding the property, unless the owner of the property has –

- consented in writing to the entry;
- been provided notice of that entry; and
- been notified that any raw data collected from the property must be made available at no costs, if requested by the land owner.

(ii) In this provision, the term “recipient” includes any person that is an officer, employee, or agent of the recipient, including a person acting pursuant to a contract or sub-agreement.

B. The recipient shall comply with applicable State, local, and Tribal government laws, including laws relating to private property rights.

The Recipient shall comply with applicable State, local, and Tribal government laws, including laws relating to private property rights.

**23. Access to Research Data**

A. By regulation (43 CFR 12.936), recipients that are institutions of higher education, hospitals, or non-profit organizations are required to release research data first produced in a project supported with Federal funds that are cited publicly and officially by a Federal agency in support of an action that has the force and effect of law (e.g., regulations and administrative orders). “Research data” is defined as the recorded factual material commonly accepted in the scientific community as necessary to validate research findings. It does not include preliminary analyses; drafts of scientific papers; plans for future research; peer reviews; communications with colleagues; physical objects (e.g., laboratory samples, audio or video tapes); trade secrets; commercial information; materials necessary to be held confidential by a researcher until publication in a peer-reviewed journal; information that is protected under the law (e.g., intellectual property); personnel and medical files and similar files, the disclosure of which would constitute an unwarranted invasion of personal privacy; or information that could be used to identify a particular person in a research study.

B. These requirements do not apply to commercial organizations or to research data produced by State or local governments. However, if a State or local governmental grantee contracts with an educational institution, hospital, or non-profit organization, and the contract results in covered research data, those data are subject to these disclosure requirements.

C. Requests for the release of research data subject to this policy are required to be made to USGS, which will handle them as FOIA requests under 43 CFR 2.25. If the data are publicly available, the requestor will be directed to the public source. Otherwise, the USGS Contracting Officer/Grants Officer, in consultation with the affected recipient and the PI, will handle the request. This policy also provides for assessment of a reasonable fee to cover recipient costs as well as (separately) the USGS costs of responding.

**24. Trafficking in Persons (22 U.S.C. § 7104(g))**

A. Provisions applicable to a recipient that is a private entity.

(i) You as the recipient, your employees, sub-recipients under this award, and sub-recipients’ employees may not--

- (a) Engage in severe forms of trafficking in persons during the period of time that the award is in effect;
- (b) Procure a commercial sex act during the period of time that the award is in effect; or
- (c) Use forced labor in the performance of the award or sub-awards under the award.
- (ii) We as the Federal awarding agency may unilaterally terminate this award, without penalty, if you or a sub-recipient that is a private entity --
  - (a) Is determined to have violated a prohibition in paragraph a.1 of this award term; or
  - (b) Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either—
    - 1. Associated with performance under this award; or
    - 2. Imputed to you or the sub-recipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, “OMB Guidelines to Agencies on Government-wide Debarment and Suspension (Non-procurement),” as implemented by our agency at 43 CFR Part 42.
- B. Provisions applicable to a recipient other than a private entity. We as the Federal awarding agency may unilaterally terminate this award, without penalty, if a sub-recipient that is a private entity --
  - (i) Is determined to have violated a prohibition in paragraph a.1 of this award term; or
  - (ii) Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either—
    - (a) Associated with performance under this award; or
    - (b) Imputed to you or the sub-recipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, “OMB Guidelines to Agencies on Government-wide Debarment and Suspension (Non-procurement),” as implemented by our agency at 43 CFR Part 42.
- C. Provisions applicable to any recipient.
  - (i) You must inform us immediately of any information you receive from any source alleging a violation of a prohibition in paragraph a.1 of this award term.
  - (ii) Our right to terminate unilaterally that is described in paragraph a.2 or b of this section:
    - (a) Implements section 106(g) of the Trafficking Victims Protection Act of 2000 (TVPA), as amended (22 U.S.C. 7104(g)), and
    - (b) Is in addition to all other remedies for noncompliance that are available to us under this award.
    - (iii) You must include the requirements of paragraph a.1 of this award term in any sub-award you make to a private entity.
- D. Definitions. For purposes of this award term:
  - (i) “Employee” means either:
    - (a) An individual employed by you or a sub-recipient who is engaged in the performance of the project or program under this award; or
    - (b) Another person engaged in the performance of the project or program under this award and not compensated by you including, but not limited to, a volunteer or individual whose services are contributed by a third party as an in-kind contribution toward cost sharing or matching requirements.
  - (ii) “Forced labor” means labor obtained by any of the following methods: the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery.
  - (iii) “Private entity”:
    - (a) Means any entity other than a State, local government, Indian tribe, or foreign public entity, as those terms are defined in 2 CFR 175.25.
    - (b) Includes:
      - 1. A nonprofit organization, including any nonprofit institution of higher education, hospital, or tribal organization other than one included in the definition of Indian tribe at 2 CFR 175.25(b).

2. A for-profit organization.
- (iv) Severe forms of trafficking in persons,” “commercial sex act,” and “coercion” have the meanings given at section 103 of the TVPA, as amended (22 U.S.C. 7102).

25. **Research Integrity**

A. USGS requires that all grant or cooperative agreement recipient organizations adhere to the Federal Policy on Research Misconduct, Office of Science and Technology Policy, December 6, 2001, 65 Federal Register (FR) 76260, [http://www.ostp.gov/html/001207\\_3.html](http://www.ostp.gov/html/001207_3.html). The Federal Policy on Research Misconduct outlines requirements for addressing allegations of research misconduct, including the investigation, adjudication, and appeal of allegations of research misconduct and the implementation of appropriate administrative actions.

B. The recipient must promptly notify the USGS Project Office when research misconduct that warrants an investigation pursuant to the Federal Policy on Research Misconduct is alleged.

26. **Fiscal Integrity**

The recipient will notify the USGS Contracting Officer/Grants officer of any significant problems relating to the administrative or financial aspects of the award, such as misappropriation of Federal funds.

27. **Program Income**

A. The recipient will have no obligation to the Federal Government for program income earned from license fees and royalties for copyrighted material, in accordance with 43 CFR 12.924(h) (for A-110 recipients) or 43 CFR 12.65(e) (for A-102 recipients).

B. If a purpose of this award is to support a conference, symposium, or similar event, income related to that event will be deducted from total allowable costs to determine the net allowable costs before calculating the Government's share of reimbursable costs, as provided in 3 CFR 12.65(g)(1) (for A-102 recipients) or 43 CFR 12.924(b)(3) (for A-110 recipients).

C. If the recipient is an educational institution or nonprofit research organization, any other program income will be added to funds committed to the project by the Federal awarding agency and recipient and be used to further eligible project or program objectives, as described in 43 CFR 12.924(b)(1).

D. For all other types of recipients, any other program income will be deducted from total allowable costs to determine the net allowable costs before calculating the Government's share of reimbursable costs, as provided in 3 CFR 12.65(g)(1) (for A-102 recipients) or 43 CFR 12.924(b)(3) (for A-110 recipients).

28. **Wage Rate Requirements (ARRA Term)**

Subject to further clarification issued by the Office of Management and Budget and notwithstanding any other provision of law and in a manner consistent with other provisions of ARRA, all laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government pursuant to this award shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code. With respect to the labor standards specified in this section, the Secretary of Labor shall have the authority and functions set forth in Reorganization Plan Numbered 14 of 1950 (64 Stat. 1267; 5 U.S.C. App.) and section 3145 of title 40, United States Code. (ARRA Sec. 1606)

29. **Schedule of Expenditures of Federal Awards (ARRA Term)**

Recipients agree to separately identify the expenditures for each grant award funded under ARRA on the Schedule of Expenditures of Federal Awards (SEFA) and the Data Collection Form (SF-SAC)

required by Office of Management and Budget Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations." This identification on the SEFA and SF-SAC shall include the Federal award number, the Catalog of Federal Domestic Assistance (CFDA) number, and amount such

that separate accountability and disclosure is provided for ARRA funds by Federal award number consistent with the recipient reports required by ARRA Section 1512(c).

30. **Responsibilities for Informing Sub-recipients (ARRA Term)**

Recipients agree to separately identify to each sub-recipient, and document at the time of sub-award and at the time of disbursement of funds, the Federal award number, CFDA number, and amount of ARRA funds.

31. **2 CFR §176.50 Award term--Reporting and Registration Requirements under Section 1512 of the American Recovery and Reinvestment Act, Public Law 111-5**

(a) This award requires the recipient to complete projects or activities which are funded under the American Recovery and Reinvestment Act of 2009 ("Recovery Act") and to report on use of Recovery Act funds provided through this award. Information from these reports will be made available to the public.

(b) The reports are due no later than ten calendar days after each calendar quarter in which the recipient receives the assistance award funded in whole or in part by the Recovery Act.

(c) Recipients and their first-tier recipients must maintain current registrations in the Central Contractor Registration ([www.ccr.gov](http://www.ccr.gov)) at all times during which they have active federal awards funded with Recovery Act funds. A Dun and Bradstreet Data Universal Numbering System (DUNS) Number ([www.dnb.com](http://www.dnb.com)) is one of the requirements for registration in the Central Contractor Registration.

(d) The recipient shall report the information described in section 1512(c) using the reporting instructions and data elements that will be provided online at [www.FederalReporting.gov](http://www.FederalReporting.gov) and ensure that any information that is pre-filled is corrected or updated as needed.

32. **2 CFR §176.140 Award term- Required Use of American Iron, Steel, and Manufactured Goods—Section 1605 of the American Recovery and Reinvestment Act of 2009**

(a) Definitions. As used in this award term and condition—

"Manufactured good" means a good brought to the construction site for incorporation into the building or work that has been--

(1) Processed into a specific form and shape; or

(2) Combined with other raw material to create a material that has different properties than the properties of the individual raw materials.

"Public building" and "public work" means a public building of, and a public work of, a governmental entity (the United States; the District of Columbia; commonwealths, territories, and minor outlying

islands of the United States; State and local governments; and multi-State, regional, or interstate entities which have governmental functions). These buildings and works may include, without limitation, bridges, dams, plants, highways, parkways, streets, subways, tunnels, sewers, mains, power lines, pumping stations, heavy generators, railways, airports, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, and canals, and the construction, alteration, maintenance, or repair of such buildings and works.

“Steel” means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements.

(b) Domestic preference.

(1) This award term and condition implements Section 1605 of the American Recovery and Reinvestment Act of 2009 (Recovery Act)(Pub. L. 111-5), by requiring that all iron, steel, and manufactured goods used in the project are produced in the United States except as provided in paragraph (b)(3) and (b)(4) of this term and condition.

(2) This requirement does not apply to the material listed by the Federal Government as follows: none.

(3) The award official may add other iron, steel, and/or manufactured goods to the list in paragraph (b)(2) of this term and condition if the Federal government determines that—

(i) The cost of the domestic iron, steel, and/or manufactured goods would be unreasonable. The cost of domestic iron, steel, or manufactured goods used in the project is unreasonable when the cumulative cost of such material will increase the cost of the overall project by more than 25 percent;

(ii) The iron, steel, and/or manufactured good is not produced, or manufactured in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(iii) The application of the restriction of section 1605 of the Recovery Act would be inconsistent with the public interest.

(c) Request for determination of inapplicability of Section 1605 of the Recovery Act.

(1)(i) Any recipient request to use foreign iron, steel, and/or manufactured goods in accordance with paragraph (b)(3) of this term and condition shall include adequate information for Federal Government evaluation of the request, including—

(A) A description of the foreign and domestic iron, steel, and/or manufactured goods;

(B) Unit of measure;

(C) Quantity;

(D) Cost;

(E) Time of delivery or availability;

(F) Location of the project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign iron, steel, and/or manufactured goods cited in accordance with paragraph (b)(3) of this term and condition.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed cost comparison table in the format in paragraph (d) of this term and condition.

(iii) The cost of iron, steel, and/or manufactured goods material shall include all delivery costs to the construction site and any applicable duty.

(iv) Any recipient request for a determination submitted after Recovery Act funds have been obligated for a project for construction, alteration, maintenance, or repair shall explain why the recipient could not reasonably foresee the need for such determination and could not have requested the

determination before the funds were obligated. If the recipient does not submit a satisfactory explanation, the award official need not make a determination.

(2) If the Federal government determines after funds have been obligated for a project for construction, alteration, maintenance, or repair that an exception to section 1605 of the Recovery Act applies, the award official will amend the award to allow use of the foreign iron, steel, and/or relevant manufactured goods. When the basis for the exception is nonavailability or public interest, the amended award shall reflect adjustment of the award amount, redistribution of budgeted funds, and/or other actions taken to cover costs associated with acquiring or using the foreign iron, steel, and/or relevant manufactured goods. When the basis for the exception is the unreasonable cost of the domestic iron, steel, or manufactured goods, the award official shall adjust the award amount or redistribute budgeted funds by at least the differential established in 2 CFR 176.110(a).

(3) Unless the Federal Government determines that an exception to section 1605 of the Recovery Act applies, use of foreign iron, steel, and/or manufactured goods is noncompliant with section 1605 of the American Recovery and Reinvestment Act.

(d) Data. To permit evaluation of requests under paragraph (b) of this term and condition based on unreasonable cost, the Recipient shall include the following information and any applicable supporting data based on the survey of suppliers: FOREIGN AND DOMESTIC ITEMS COST COMPARISON			
Description	Unit of Measure	Quantity	Cost (Dollars)*
Item 1:			
Foreign steel, iron, or manufactured good	_____	_____	_____

**33. 2 CFR §176.160 Award term- Required Use of American Iron, Steel, and Manufactured Goods (covered under International Agreements)—Section 1605 of the American Recovery and Reinvestment Act of 2009**

(a) Definitions. As used in this award term and condition—

“Designated country” --

(1) A World Trade Organization Government Procurement Agreement country (Aruba, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and United Kingdom;

(2) A Free Trade Agreement (FTA) country (Australia, Bahrain, Canada, Chile, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Israel, Mexico, Morocco, Nicaragua, Oman, Peru, or Singapore); or

(3) A United States-European Communities Exchange of Letters (May 15, 1995) country: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, and United Kingdom.

“Designated country iron, steel, and/or manufactured goods” --

- (1) Is wholly the growth, product, or manufacture of a designated country; or
- (2) In the case of a manufactured good that consist in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different manufactured good distinct from the materials from which it was transformed.

"Domestic iron, steel, and/or manufactured good" --

- (1) Is wholly the growth, product, or manufacture of the United States; or
- (2) In the case of a manufactured good that consists in whole or in part of materials from another country, has been substantially transformed in the United States into a new and different manufactured good distinct from the materials from which it was transformed. There is no requirement with regard to the origin of components or subcomponents in manufactured goods or products, as long as the manufacture of the goods occurs in the United States.

“Foreign iron, steel, and/or manufactured good” means iron, steel and/or manufactured good that is not domestic or designated country iron, steel, and/or manufactured good.

“Manufactured good” means a good brought to the construction site for incorporation into the building or work that has been--

- (1) Processed into a specific form and shape; or
- (2) Combined with other raw material to create a material that has different properties than the properties of the individual raw materials.

“Public building” and "public work" means a public building of, and a public work of, a governmental entity (the United States; the District of Columbia; commonwealths, territories, and minor outlying islands of the United States; State and local governments; and multi-State, regional, or interstate entities which have governmental functions). These buildings and works may include, without limitation, bridges, dams, plants, highways, parkways, streets, subways, tunnels, sewers, mains, power lines, pumping stations, heavy generators, railways, airports, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, and canals, and the construction, alteration, maintenance, or repair of such buildings and works.

“Steel” means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements.

(b) Iron, steel, and manufactured goods.

(1) This award term and condition implements

(i) Section 1605(a) of the American Recovery and Reinvestment Act of 2009 (Pub. L. 111-5) (Recovery Act), by requiring that all iron, steel, and manufactured goods used in the project are produced in the United States; and

(ii) Section 1605(d), which requires application of the Buy American requirement in a manner consistent with U.S. obligations under international agreements. The restrictions of section 1605 of the Recovery Act do not apply to designated country iron, steel, and/or manufactured goods. The Buy American requirement in section 1605 shall not be applied where the iron, steel or manufactured goods used in the project are from a Party to an international agreement that obligates the recipient to treat the goods and services of that Party the same as domestic goods and services. This obligation shall only apply to projects with an estimated value of \$7,443,000 or more.

(2) The recipient shall use only domestic or designated country iron, steel, and manufactured goods in performing the work funded in whole or part with this award, except as provided in paragraphs (b)(3) and (b)(4) of this term and condition.

(3) The requirement in paragraph (b)(2) of this term and condition does not apply to the iron, steel, and manufactured goods listed by the Federal Government as follows: none.

(4) The award official may add other iron, steel, and manufactured goods to the list in paragraph (b)(3) of this award term and condition if the Federal government determines that—

(i) The cost of domestic iron, steel, and/or manufactured goods would be unreasonable. The cost of domestic iron, steel, and/or manufactured goods used in the project is unreasonable when the cumulative cost of such material will increase the overall cost of the project by more than 25 percent;

(ii) The iron, steel, and/or manufactured goods is not produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality; or

(iii) The application of the restriction of section 1605 of the Recovery Act would be inconsistent with the public interest.

(c) Request for determination of inapplicability of section 1605 of the Recovery Act or the Buy American Act.

(1)(i) Any recipient request to use foreign iron, steel, and/or manufactured goods in accordance with paragraph(b)(4) of this term and condition shall include adequate information for Federal Government evaluation of the request, including—

(A) A description of the foreign and domestic iron, steel, and/or manufactured goods;

(B) Unit of measure;

(C) Quantity;

(D) Cost;

(E) Time of delivery or availability;

(F) Location of the project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign iron, steel, and/or manufactured goods cited in accordance with paragraph (b)(4) of this term and condition.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed cost comparison table in the format in paragraph (d) of this term and condition.

(iii) The cost of iron, steel, or manufactured goods shall include all delivery costs to the construction site and any applicable duty.

(iv) Any recipient request for a determination submitted after Recovery Act funds have been obligated for a project for construction, alteration, maintenance, or repair shall explain why the recipient could not reasonably foresee the need for such determination and could not have requested the

determination before the funds were obligated. If the recipient does not submit a satisfactory explanation, the award official need not make a determination.

(2) If the Federal government determines after funds have been obligated for a project for construction, alteration, maintenance, or repair that an exception to section 1605 of the Recovery Act applies, the award official will amend the award to allow use of the foreign iron, steel, and/or relevant manufactured goods. When the basis for the exception is nonavailability or public interest, the amended award shall reflect adjustment of the award amount, redistribution of budgeted funds, and/or other appropriate actions taken to cover costs associated with acquiring or using the foreign iron, steel, and/or relevant manufactured goods.. When the basis for the exception is the unreasonable cost of the domestic iron, steel, or manufactured goods, the award official shall adjust the award amount or redistribute budgeted funds, as appropriate, by at least the differential established in 2 CFR 176.110(a).

(3) Unless the Federal Government determines that an exception to the section 1605 of the Recovery Act applies, use of foreign iron, steel, and/or manufactured goods other than designated country iron, steel, and/or manufactured goods is noncompliant with the applicable Act.

(d) Data. To permit evaluation of requests under paragraph (b) of this term and condition based on unreasonable cost, the applicant shall include the following information and any applicable supporting data based on the survey of suppliers: FOREIGN AND DOMESTIC ITEMS COST COMPARISON			
Description	Unit of Measure	Quantity	Cost (Dollars)*
Item 1:			
Foreign steel, iron, or manufactured good			
Domestic steel, iron, or manufactured good			
Item 2:			
Foreign steel, iron, or manufactured good			
Domestic steel, iron, or manufactured good			
[List name, address, telephone number, email address, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.]			
[Include other applicable supporting information.]			
[* Include all delivery costs to the construction site.]			

**34. 2 CFR §176.190 Award term- Wage Rate Requirements under Section 1606 of the Recovery Act**

(a) Section 1606 of the Recovery Act requires that all laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government pursuant to the Recovery Act shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code.

Pursuant to Reorganization Plan No. 14 and the Copeland Act, 40 U.S.C. 3145, the Department of Labor has issued regulations at 29 CFR Parts 1, 3, and 5 to implement the Davis-Bacon and related Acts. Regulations in 29 CFR 5.5 instruct agencies concerning application of the standard Davis-Bacon contract clauses set forth in that section. Federal agencies providing grants, cooperative agreements, and loans under the Recovery Act shall ensure that the standard Davis-Bacon contract clauses found in 29 CFR 5.5(a) are incorporated in any resultant covered contracts that are in excess of \$2,000 for construction, alteration or repair (including painting and decorating).

(b) For additional guidance on the wage rate requirements of section 1606, contact your awarding agency. Recipients of grants, cooperative agreements and loans should direct their initial inquiries concerning the application of Davis-Bacon requirements to a particular federally assisted project to the Federal agency funding the project. The Secretary of Labor retains final coverage authority under Reorganization Plan Number 14.

**35. 2 CFR §176.210 Award term- Recovery Act Transactions listed in Schedule of Expenditures of Federal Awards and Recipient Responsibilities for Informing Sub-recipients**

(a) To maximize the transparency and accountability of funds authorized under the American Recovery and Reinvestment Act of 2009 (Public Law 111-5)(Recovery Act) as required by Congress and in accordance with 2 CFR 215, subpart \_\_. 21 “Uniform Administrative Requirements for Grants and Agreements” and OMB A-102 Common Rules provisions, recipients agree to maintain records that identify adequately the source and application of Recovery Act funds.

(b) For recipients covered by the Single Audit Act Amendments of 1996 and OMB Circular A-133, “Audits of States, Local Governments, and Non-Profit Organizations,” recipients agree to separately identify the expenditures for Federal awards under the Recovery Act on the Schedule of Expenditures of Federal Awards (SEFA) and the Data Collection Form (SF-SAC) required by OMB Circular A-133. This shall be accomplished by identifying expenditures for Federal awards made under Recovery Act separately on the SEFA, and as separate rows under Item 9 of Part III on the SF-SAC by CFDA number, and inclusion of the prefix “ARRA-” in identifying the name of the Federal program on the SEFA and as the first characters in Item 9d of Part III on the SF-SAC.

(c) Recipients agree to separately identify to each sub-recipient, and document at the time of sub-award and at the time of disbursement of funds, the Federal award number, CFDA number, and amount of Recovery Act funds. When a recipient awards Recovery Act funds for an existing program, the information furnished to sub-recipients shall distinguish the sub-awards of incremental Recovery Act funds from regular sub-awards under the existing program.

(d) Recipients agree to require their sub-recipients to include on their SEFA information to specifically identify Recovery Act funding similar to the requirements for the recipient SEFA described above. This information is needed to allow the recipient to properly monitor sub-recipient expenditure of ARRA funds as well as oversight by the Federal awarding agencies, Offices of Inspector General and the Government Accountability Office.

**36. Other Standard Terms and Conditions**

All other assistance policy terms and conditions contained in applicable Department of the Interior Grant Policy Statements apply unless they conflict or are superseded by the following terms and conditions implementing the American Recovery and Reinvestment Act of 2009 (ARRA) requirements below. Recipients are responsible for contacting their grant managers for any needed clarifications. Sub-awards include sub-grants and sub-contracts issued from this award.

## Cost Principles, Audit, and Administrative Requirements

The Recipient shall be subject to the following OMB circulars and regulations, which are incorporated herein by reference. Copies of these Circulars can be obtained from the Internet at: <http://www.whitehouse.gov/omb/circulars/index.html>.

### I. OMB Circulars and Regulations

#### A. Educational Institutions

- 2 CFR 220, Cost Principles for Educational Institutions (OMB Circular No. A-21)
- OMB Circular No. A-110, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-profit Organizations, as implemented in 2 CFR 215 and 43 CFR Part 12, Subpart F.
- OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

#### B. State and Local Governments

- 2 CFR 225, Cost Principles for State, Local, and Indian Tribal Governments (OMB Circular A-87)
- OMB Circular A-102, Grants and Cooperative Agreements with State and Local Governments; as implemented in 43 CFR Part 12, Subpart C
- OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

#### C. Non-Profit Organizations

- 2 CFR Part 230, Cost Principles for Non-Profit Organizations (OMB Circular A-122), except recipients listed in Appendix C to Part 230 are subject to Federal Acquisition Regulation (FAR) Subpart 31.2, Contracts with Commercial Organizations (Contract Cost Principles and Procedures)
- OMB Circular No. A-110, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-profit Organizations, as implemented in 2 CFR 215 and 43 CFR Part 12, Subpart F.
- OMB Circular No. A-133, Audits of States, Local Governments and Non-Profit Organizations, as implemented in 43 CFR Part 12, Subpart A: Administrative and Audit Requirements and Cost Principles for Assistance Programs

#### D. Organizations for Profit, Individuals, and Others Not Covered Above

- Federal Acquisition Regulation (FAR) Subpart 31.2, Contracts with Commercial Organizations (Contract Cost Principles and Procedures)
- OMB Circular No. A-110, Uniform Administrative Requirements for Grants and Other Agreements with Institutions of Higher Education, hospitals, and Other Non-Profit Organizations, as implemented in 2 CFR 215 and 43 CFR Part 12, Subpart F,

- FAR Subpart 42.1, Contract Audit Services; FAR Subpart 42.7, Indirect Cost Rates; FAR Subpart 42.8, Disallowance of Costs

## II. ADDITIONAL REGULATIONS

This award is subject to the following additional Government-wide regulations:

- (1) 2 CFR 180, Government Debarment and Suspension (Non-procurement)
- (2) 2 CFR 1400, Department of the Interior Non-procurement Debarment and Suspension

This award is subject to the following additional regulations of the U.S. Department of the Interior:

- (3) 43 CFR Part 12, Subpart E: Buy American Requirements for Assistance Programs
- (4) 43 CFR Part 17, Subpart A: Nondiscrimination on the Basis of Race, Color, or National Origin
- (5) 43 CFR Part 17, Subpart B: Nondiscrimination on the Basis of Handicap
- (6) 43 CFR Part 17, Subpart C: Nondiscrimination on the Basis of Age
- (7) 43 CFR Part 17, Subpart E: Enforcement of Nondiscrimination on the Basis of Handicap in Programs or Activities Conducted by the Department of the Interior
- (8) 43 CFR Part 18, New Restrictions on Lobbying
- (9) 43 CFR Part 41, Nondiscrimination on the basis of sex in education programs or activities receiving Federal financial assistance [Applies only if this award provides assistance to an education program or student(s).]
- (10) 43 CFR Part 43, Government-wide Requirements for Drug Free Workplace

## ANSS Performance Standards

**I. Background**

Within the National Earthquake Hazards Reduction Program, a key objective of the USGS Earthquake Hazards Program is to operate, maintain and improve comprehensive earthquake monitoring in the United States. To achieve that objective, the USGS is implementing the Advanced National Seismic System (ANSS), designed to improve all aspects of earthquake monitoring and reporting in the US. ANSS technical and management documents are available at:

<http://earthquake.usgs.gov/research/monitoring/anss/documents.php>.

This document sets minimum targets for the operation of the ANSS system as a whole, including cooperating seismic networks. These standards are intended to improve the performance of the system upon the occurrence of significant earthquakes nationwide. The standards imply that current infrastructure and data processing capabilities need to be improved for many of the networks that compose the ANSS. The generation and distribution of key products also need to be more uniform across the ANSS constituent networks. As the system improves, the performance metrics set out in our report will be reevaluated and updated to further develop system capabilities.

Our report is based heavily on the draft report of Working Group A (Performance Standards) of the ANSS Technical Implementation Committee, chaired by Mitch Withers of the Center for Earthquake Information of the University of Memphis, which compiled its report in 2004-2005. That report is available on the ANSS/internal web site (<http://www.anss.org/internal/a>).

**II. Performance Areas**

Performance standards are established for the following ANSS performance areas:

- **Seismic Monitoring/Strong Earthquake Shaking.** Collect accurate information on the occurrence of earthquakes and archive the appropriate data for seismic hazards and earthquake research. Accurately record large-amplitude earthquake ground motions that may cause damage to engineered structures or affect land use by causing liquefaction or other type of ground deformation.
- **Real-Time/Automated Product Generation.** When an earthquake occurs, rapidly and authoritatively compute earthquake source parameters and ground shaking maps (where appropriate), and distribute this information to emergency responders, the media, and the public.
- **Preparation of Seismologist-Reviewed Products for Significant Earthquakes.** Conduct seismologist review of earthquakes that may have seismic hazards or other societal implications. Provide useful, accurate, and timely release of products to communities most at risk from earthquakes likely to cause damage.
- **Data Exchange Between ANSS Networks.** Exchange real-time waveforms, amplitudes, picks and other raw data products between network centers, to improve quality and timeliness of data products.
- **Data Archiving and Public Distribution.** Archive all relevant data and data products generated by ANSS, including the regional and global seismic networks, at designated datacenter(s).

### III. Geographic Divisions Based on Hazard, Risk and USGS Mission

Based on ANSS requirements and USGS mission responsibilities, different standards are provided for the following geographic areas:

- **High-risk urban areas.** Twenty-six metropolitan areas listed in Table 3 (p. 42) of USGS Circular 1188, *Requirement for an Advanced National Seismic System*. (Current detailed maps of earthquake hazard in the U.S., including Alaska, Hawaii and Puerto Rico, are available at: [http://earthquake.usgs.gov/research/hazmaps-/products-\\_data/index.php](http://earthquake.usgs.gov/research/hazmaps-/products-_data/index.php).)
- **Moderate-to-high hazard regions.** Areas of the 50 U.S. States and Puerto Rico having an earthquake hazard probability of 10% in 50 years for an acceleration  $\geq 8\%$  *g* (yellow and higher hazard areas on the map, below). This acceleration level is justified as the approximate threshold of damage to older dwellings or structures not made to resist earthquakes.
- **National.** Areas of the 50 States and Puerto Rico not included in the moderate-to-high hazard regions.
- **Global.** All areas outside the 50 States and Puerto Rico.

### IV. Performance Standards

The following table sets minimum performance targets for the ANSS, for each of the performance areas and geographic divisions described above. Some standards are listed as “to be determined”, reflecting that more work needs to be done to establish either a technical basis for measuring and comparing values across the system, or the minimum user requirements.

### V. Explanations of Metrics

#### Seismic Monitoring/Strong Earthquake Shaking

- 1.1 Magnitude Completeness Level – Minimum magnitude above which 90% of earthquakes can be routinely located. Level will be estimated by a standard procedure such as the departure from the linear frequency-magnitude relation or probabilistic determination based on existing station distribution (to be determined).
- 1.2 Epicenter Uncertainty – Distance of calculated epicenter from true epicenter. For purposes of evaluating the performance of the ANSS, the uncertainty is estimated as the length of the largest projection of the three principal errors on a horizontal plane, where the one-standard deviation principal errors are the major axes of the error ellipsoid, and are mutually perpendicular. The metric does not account for location biases due to incorrectly modeled structure of the earth, which will be a subject for research with the ANSS observations.
- 1.3 Depth Uncertainty – Difference between calculated focal depth and true focal depth. For purposes of evaluating the performance of the ANSS, the uncertainty is estimated as the length of the largest projection of the three principal errors (as above) on a vertical line. The metric does not account for depth biases due to incorrectly modeled structure of the earth, which will be a subject for research with the ANSS observations.
- 1.4 Magnitude Uncertainty – Error in magnitude arising from inaccuracies in instrumental measurements of amplitude, amplitude and period, or velocity of ground motion. The magnitude uncertainty should be estimated from calibration of ANSS seismographs. The metric does not

account for errors arising from inadequate knowledge of the velocity and attenuation structure of the earth, which will be a subject for research with ANSS observations and which, if incorrectly accounted for, may lead to calculated magnitudes being in error by several tenths of a magnitude unit.

- 1.5 Magnitude Estimation Accuracy (Md, MI, Mo, Mb) for  $M < 4.5$  – Documented (preferably published) methodology that demonstrates accuracy of magnitude estimates.
- 1.6 Network average station uptime – In percent over the past year for every station utilizing continuous telemetry. Also to be reported as a network average of all stations (algorithm to be determined).
- 1.7 Waveform Data Return Rate for Triggered data – in percent over the past year for every station without continuous telemetry and utilizing event detection for waveform recovery. Based on either earthquakes of engineering interest [to be determined] or exceeding a trigger threshold [to be determined]. Also reported as a network average of all stations.

### **Real-Time/Automated Product Generation**

- 2.1 Hypocenter Post Time – time interval between computed origin time and first submission of hypocenter into EIDS.<sup>1</sup>
- 2.2 Magnitude Post Time – time interval between computed origin time and first submission of first magnitude into EIDS.
- 2.3 Moment Tensor Post Time,  $M \geq 4.5$  ( $M \geq 5.5$  non-US) – time interval between computed origin time and first submission of first moment tensor into EIDS.
- 2.4 Initial Internet Quick Report Post time – First report of peak acceleration, velocity and displacement, and time histories and spectra for records with  $PGA > 0.01 g$ . Targeted times should be commensurate with those for ShakeMap by early 2007, as part of implementation of National Center for Engineering Strong-Motion Data.
- 2.5 ShakeMap Post Time – time interval between computed origin time and first submission of ShakeMap to public webpage and URL to EIDS.

### **Preparation of Seismologist-Reviewed Products for Significant Earthquakes**

- 3.1 Reviewed Hypocenter Post Time – time interval between computed origin time and submission of first human reviewed hypocenter into EIDS.
- 3.2 Reviewed Magnitude Post Time – time interval between computed origin time and submission of first human reviewed magnitude into EIDS.
- 3.3 Reviewed Moment Tensor Post Time,  $M \geq 4.5$  ( $M \geq 5.5$  non-US) – time interval between computed origin time and submission of first human reviewed moment tensor into EIDS

---

<sup>1</sup> EIDS is the acronym for the *Earthquake Information Distribution System*, which is to replace QDDS, the Quake Data Distribution System, in 2006.

- 3.4 Initial Reviewed Internet Quick Report – peak acceleration, velocity and displacement, time histories and spectra. Implement by early 2007, as part of implementation of National Center for Engineering Strong-Motion Data. The Reviewed Internet Quick Report may continue to improve in the days following the event, and include all records over 0.005 g.
- 3.5 Reviewed ShakeMap Post Time – time interval between computed origin time and first submission of reviewed ShakeMap to public webpage and to URL EIDS.

#### **Data Exchange Between ANSS Networks**

- 4.1 Waveform Availability Timeliness – delay between time-stamp when data sample is acquired by an operating network and when it is exported from the network (owner and operator may be different.)
- 4.2 Amplitude Availability Timeliness – delay between time-stamp when data sample is determined by an operating network and when it is exported from the network.
- 4.3 Phase Picks Availability Timeliness – delay between time-stamp when data sample is determined by an operating network and when it is exported from the network.

#### **Data Archiving and Public Distribution**

- 5.1 Availability of Waveforms to External Users – delay between time-stamp when data sample is acquired by network and when it is available to external (public) users (e.g., from a searchable web page like SeismiQuery or via a request mechanism like AutoDRM or *BREQ\_FAST*).
- 5.2 Availability of Event Bulletin (parametric data) – delay between when data products are computed by network and when it is available to external (public) users either from a public datacenter or via a request mechanism (e.g., from a searchable web page or via a request mechanism).
- 5.3 Metadata availability (current data) – delay between when station comes on line and waveforms are available for export to seismic networks or to external (public) users and when metadata (*Dataless SEED*) are available either from a public datacenter or via a request mechanism (e.g., from a searchable web page using SeismiQuery or via a request mechanism like *BREQ\_FAST*).
- 5.4 Data import into archive – delay between when data products and waveforms are created or acquired, respectively, and when they are sent to a facility for permanent archival.

### **VI. Seismological Contexts of Performance Areas and Justifications of Specific Metrics**

#### **Seismic Monitoring – Metrics 1.2, 1.3, 1.4, 1.6, 1.7**

Earthquakes occur throughout the US with varying frequency and are recorded by network operations centers throughout the country. In addition, US seismic networks record other seismic events, including explosions, quarry blasts, volcanic tremors, and teleseisms.

Goal: To monitor seismic activity throughout the US to catalog the occurrence of earthquakes and archive the appropriate data for seismic hazards and earthquake research.

Key Components: The standard for seismic activity involves both operations of seismic networks and

generation of data products. Seismic networks continuously (24/7) operate remote seismic stations with dedicated telemetry and data acquisition systems. The data are initially processed using automated algorithms. Most networks also reprocess the data with human input to refine data quality before archiving.

The completeness level measures the minimum earthquake magnitude above which the network detects essentially all earthquakes. The standard applies to the average across the network's authoritative region. If significant equipment failures occur, it may not be possible to meet this standard for a few days or, possibly, weeks. The average location and magnitude uncertainties capture the overall network performance in terms of being able to produce a high quality catalog. The "magnitude "capability" describes the uncertainties of magnitudes which the ANSS should be able to routinely calculate. The standard for "waveform data return rate for triggered data," tracks sensor reliability and communication reliability issues that could result in loss of seismic waveform data.

#### Comments:

The completeness level is difficult to determine and varies across the network's authoritative region; most networks have not carried out rigorous analysis of their catalog to determine the spatial and temporal variability of M. The ANSS National Implementation Committee must establish procedures for determining M and request that network operators do basic analysis of M spatial-temporal variability within their network.

The uncertainties in location and magnitude may be method dependent. The ANSS National Implementation Committee must adopt a standard for determining these parameters.

#### Justification

1. Completeness levels and location uncertainty are determined to provide sufficient data for identification and characterization of active faults, improved hazard estimates, recurrence intervals, etc. A threshold lower than the "felt limit" is necessary, particularly in less seismically active areas of the country and where station density permits, in order to build sufficiently large catalogs in a reasonable amount of time. The stated thresholds are reasonable estimates that can be met by the ANSS as outlined in USGS Circular 1188.
2. Magnitude capability includes types and errors that balance best practice for the CISN with a reasonable estimate of the capability of a completed ANSS.
3. The "Waveform Data Return Rate for Triggered data" balances the desire to have 100% availability with an experienced-based estimate of network performance.

#### **Strong Earthquake Shaking – Metrics 1.5, 1.6, 1.7**

Significant earthquakes of magnitude about 5 and greater have finite source dimensions that may extend from a few kilometers to 100s of kilometers. When such earthquakes occur, strong-motion acceleration recorders placed at free-field or reference sites record the felt to potentially violent and damaging shaking of the ground. Such data are used for many scientific, engineering, and emergency response purposes, including inferring the finite properties of the earthquake source, improving attenuation relationships and site effects models, compiling corrected time histories for use in code development and engineering design and analysis, and preparing ShakeMaps.

Goal: To capture on-scale moderate- to large-amplitude ground-motion recordings from earthquakes, particularly in locations near the causative fault or near buildings and other structures that may sustain damage.

Key Components: The standard for recording strong earthquake shaking involves operation of dense as well as sparse networks of strong-motion stations. Some stations may not have communications, but most will use dial-up or continuous communications. Stations are located in urban areas or near critical facilities and lifelines as well as along active fault and in active seismic zones. Urgently needed data include those recorded within 20 km of the earthquake rupture or adjacent to engineered structures that sustained damage due to shaking or that were strongly shaken but did not sustain damage.

Strong motion data are essential for applications such as ShakeMap, and the value of the information can be enhanced through higher station density. Table 3 in USGS Circular 1188 provides recommendations on the regional distribution of stations.

Comments:

As of the date of this report, the ANSS has deployed ~600 new strong motion sensors in urban areas, augmenting existing deployments, in order to make ShakeMap generation more widely possible and accurate. The ANSS National Implementation Committee must evaluate if the new and existing stations provide an adequate coverage of urban areas at highest risk for the needs of ShakeMap and structural response monitoring. Urban areas in Anchorage, Los Angeles, and the San Francisco Bay area currently target station spacing of about 4 km.

Strong motion records from sensors placed in the near-field of fault zones (20 km or less, preferably within 10 km) are important for seismological and engineering research. The ANSS National Implementation Committee must establish goals and minimum standards for active fault zone strong motion monitoring to ensure that those valuable data will be collected.

Maintenance of metadata is a resource-consuming task for most seismic networks. The ANSS National Implementation Committee must ANSS evaluate procedures and tools for this task.

Justification

1. Sensor spacing is primarily designed to provide sufficient resolution for the purposes of generating accurate ShakeMaps in areas with moderate to high risk. For the purposes of emergency response, there may be a greater tolerance for lower resolution maps in non-urban areas with high hazard. See comments above.
2. The network average station uptime reflects the operational goal of maximizing the recording of all earthquakes, while maintaining flexibility if the operation and maintenance of any single station. See comments above

### **Real-time Automated Product Generation (Metrics 2.1 – 2.5) and Preparation of Seismologists-Reviewed Products for Significant Earthquakes (Metrics 3.1 – 3.5)**

When a significant earthquake occurs, there is need for immediate information to facilitate emergency response and to provide information to decision makers, the media and the public. Federal, state, and local governments are responsible for responding to a significant earthquake. To facilitate efficient response, the seismic networks must provide rapid, consistent, high quality information about the earthquake.

Goal: Automatically and rapidly broadcast accurate information to emergency responders, the media, and the public when a significant earthquake occurs.

Key Components: Seismic networks process earthquake data continuously (24/7) to automatically generate and distribute a variety of products. In general, the products are less accurate just after the earthquake, but their accuracy improves as more data are included and models are refined. Human review, reprocessing, and updating of information follow the automated distribution of information. The products are distributed via short messages (pager and cell phone), email, and the Web.

The performance standards for rapid notification involve timeliness and consistency of initial product delivery. The time delays that contribute to late delivery of products are, for instance, the time it takes seismic waves to traverse the whole seismic network, packetizing delays for waveform data, processing delays, and product delivery delays. Seismic networks may have unforeseen outages and product delivery will not be possible during that time.

In the future, ANSS will consider adding fault modeling specification for  $M > 6.5$  continental U.S. earthquakes and  $M > 7.0$  global earthquakes.

Justification:

1. In order to meet the needs of the emergency response community and others, automated products should be produced as quickly as possible while maintaining a reasonable level of product quality.
2. The increased accuracy normally contained in reviewed products reduces uncertainty in decisions based on the information, and increases the value and accuracy of derived products (e.g., hazard assessments) and research results (e.g., tectonic studies).

#### **Data Exchange Between ANSS Networks – Metrics 4.1, 4.2, 4.3.**

The operational efficiency of seismic networks can be greatly improved through real-time data exchange. Data recorded at stations operated by a neighboring network can provide important information about significant earthquakes, particularly for shocks occurring near the border region of the two networks or where the spatial extents of network operations overlap.

Goal: Share real-time waveforms, amplitudes, picks and other raw data products among regional and national networks to improve quality and timeliness of data products.

Key Components: Unprocessed waveforms are the most basic seismic data that can be continuously exchanged and provide the ability for networks to compute all seismological products. However, the bandwidth required for rapid exchange of waveform data can be considerable, so it may be necessary to exchange derived products such as amplitudes (acceleration, velocity, displacement, spectral ordinates, etc.) for calculation of magnitude and ShakeMaps, arrival times and polarity of seismic waves for computing locations, origin times, and first-motion mechanisms, or “snippets” of waveforms when earthquakes occur for computing moment tensors and analyst review.

Justification

1. Exchange standards for timeliness represent for the most rigorous standards consistent with automated product generation, likely packet size, and anticipated communications bandwidth and availability.
2. Standards are based on existing experience with data exchange throughout the U.S.
3. The current ANSS Backbone packet size is about 50 s of data, sufficient to meet the 60s standard. A higher sampling rate and wider VSAT bandwidth may be required to meet the 30 second timeliness standard for waveform distribution in high-risk urban areas and moderate – high hazard areas..

## **Data Archiving and Public Distribution – Metrics 5.1, 5.2, 5.3.**

Seismic networks generate data continuously as they monitor seismicity. When an event is detected, the respective window of waveforms is typically stored for later archiving. Similarly, at the onset of detection, products such as phase arrival times, amplitudes, hypocenters, magnitudes, mechanisms, ShakeMaps, and slip distributions may be generated. In some cases, seismic networks record continuous data from broadband data.

Goal: Archive all relevant data and data products generated by ANSS, including the regional and global seismic networks at public datacenters.

Key Components: The datacenter(s) must balance the archiving of data from the seismic networks against the speed at which they serve data to the users. Data archiving occurs on a regular basis, whereas user requests for data may be episodic. Consequently, during a major earthquake sequence a data archive will need to be able to deal with increased data volume (input) as well as an exponential increase in user requests (output). Some data archives presently provide data to users via command-line scripts, while most use Web pages and ftp as transfer mechanisms. In the future all data archives should provide data via the mechanisms just cited, as well as via simple subroutine calls. Similarly, data formats are evolving from legacy binary or ASCII formats to XML. One of the challenges facing datacenters is to import decades of legacy data into modern database structures to be able to serve up the data in a variety of ways as dictated by user needs.

The data archiving performance standards address several aspects of the datacenter operations. First, the datacenter needs to import data in a timely fashion. Products such as waveforms and parametric data should automatically be made available to users with minimal delay. The datacenters need to be able to serve a large number of users during periods of high demand. Metadata must be provided to describe station characteristics and instrument responses; thus the “metadata availability” ensures the availability of station instrumentation responses needed for all products based on amplitude information.

### Justification

1. Standards for data import into the archive provide a reasonable balance between the desires of key users and the abilities of the system.
2. Availability of the data should provide sufficient time for archive construction and processing.
3. “Dataless SEED” and “V0” are standard formats that contain necessary sensor calibration for seismic waveform data exchanged between networks.

### **A Note on Education and Outreach**

The end users of products from ANSS seismic network include large communities of emergency responders, earthquake engineers, decision makers, education community, media, and public. While the ANSS initiative does not include a focus on ‘Education and Outreach’ *per se*, in order to provide reliable, useful, accurate, and timely release of products to these and other target communities, education will need to be provided either directly or through partnerships with organizations that do E&O. The principal goals of this education are to minimize product misuse, to maximize the use of monitoring products, and to generate feedback for long-term product improvement. Specific minimum standards on dissemination goals and product/data use are difficult, if not impossible, to quantify. Determination and implementation

of appropriate metrics will require expertise external to existing ANSS operations and management.

## **VII. Revision History**

This document shall be reviewed triennially by the ANSS National Implementation Committee, or more frequently at the discretion of the ANSS Coordinator.

Initial Release Version 2.6                      date: 16 January 2007

Revision 1, Version 2.7                      date: 5 October 2008