



Universidad de Puerto Rico

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Red Sísmica de Puerto Rico

Departamento de Geología

Puerto Rico Seismic Network, University of Puerto Rico, Mayagüez Campus

Geology Department

# Puerto Rico Seismic Network Response Guide for Puerto Rico and the Virgin Islands Region

## **LANTEX 12 EXERCISE**

### Tsunami Warning Exercise

March 28<sup>th</sup>, 2012

#### **Puerto Rico Seismic Network**

Geology Department

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## Introduction

The LANTEX exercise is a tsunami exercise that is performed every year along the USA and Canada, the Gulf of Mexico, Puerto Rico and the Virgin Islands. Its main objective is the tsunami preparation of emergency management agencies in the mentioned areas. The occurrence of destructive historic tsunamis along the Atlantic coast of USA and Canada are rare; nonetheless there are areas in the Atlantic Basin and the Gulf of Mexico where earthquakes occur with the potential to create destructive tsunamis which could impact the USA and its territories in the Caribbean. These areas include the coast of Puerto Rico, US Virgin Islands, the east region of the Azores Islands and areas in the continental shelf off the US and Canada coast due to submarine landslides.

Annually, the Puerto Rico Seismic Network (PRSN), joins efforts with the National Tsunami Hazard and Mitigation Program (NTHMP), the National Oceanic and Atmospheric Administration (NOAA) Warning Coordination Subcommittee (from which Puerto Rico is a member), in order to carry out the LANTEX Tsunami Exercise. Like in previous years, the LANTEX exercise will be done together with the West Coast Alaska Tsunami Warning Center with the objective of helping in tsunami preparation all over the coasts of USA and Canada, the Gulf of Mexico, Puerto Rico and the Virgin Islands.

Year after year, for earthquake and tsunami operational response, the PRSN and the Emergency Management Offices in the region of Puerto Rico as well as in the Virgin Islands determine the type of involvement these agencies will have. Agencies within the PRSN area of responsibility are: Puerto Rico Emergency Management Agency (PREMA, Puerto Rico), National Weather Service in San Juan (NWS), Department of Disaster Management (DDM, British Virgin Islands), Virgin Islands Territorial Emergency Management Agency (VITEMA, US Virgin Islands), “Oficina Nacional de Meteorología” (ONAMET, Dominican Republic) and “Instituto Sismológico Universitario” (ISU, Dominican Republic). Although the LANTEX exercise was designed for the US states and its territories, agencies in the Dominican Republic ONAMET and ISU participate in communication tests emitted by the PRSN during the exercise.

The tsunami LANTEX12 exercise consists of two different scenarios. The first scenario simulates an earthquake in the Gulf of Mexico (west of Florida, United States), causing a tsunami generated by an underwater landslide on the continental slope. The second scenario is an earthquake located east of South Carolina (USA), which also causes a tsunami generated by an underwater landslide along the continental slope. Both earthquakes will occur on

March 28, 2012 at 1300 UTC (9:00 am local time in Puerto Rico) and initial warnings will start at 13:04 UTC (9:04 am local time in Puerto Rico).

**In Puerto Rico and in the Virgin Islands, the scenario to be applied is the SECOND, an earthquake located East of South Carolina, United States.**

The West Coast and Alaska Tsunami Warning Center (WCATWC) prepared the Official LANTEX12 Exercise Handbook in English for participants in the same. The Official Participant's Handbook of the exercise, as other related material, are available in our web page: <http://redsismica.uprm.edu>. The manual includes the WCATWC procedures for the Atlantic and Caribbean US Territories. The official messages were kept in English since WCATWC will only emit official messages in said languages.

In addition, this guide has been prepared specifically with the procedures of the PRSN for the Region of Puerto Rico and Virgin Islands. With this, we want to support the participation of emergency agencies within our area of responsibility in the joint exercise LANTEX12. This guide contains the schedule of the products that the PRSN will emit, official messages (SEISMIC EVENT bulletins/ TSUNAMI) to be issued by the PRSN, the model of the press release and evaluation of the PRSN. This guide does not replace the Participant's Exercise Manual LANTEX12.

**Note:** Information regarding the LANTEX12 Exercise in order to prepare this guide was taken from the LANTEX12 Exercise Official Participant Handbook prepared by WCATWC and published in its final version on February 15, 2012.

## **Purpose**

The purpose of the exercise in the Puerto Rico and Virgin Island Region (PR/VI) is to improve the efficiency of the tsunami alert system. The exercise provides an opportunity for the emergency management organizations in PR/VI to test their operational lines of communication, their procedures for tsunami response and promote the preparation prior to a tsunami. Each emergency management organization inside of PR/VI (OME) is welcome to participate

## **Information sequence for a Tsunami Alert in Puerto Rico**

There are four tsunami alert levels that the Puerto Rico Seismic Network (PRSN) and the West Coast and Alaska Tsunami Warning Center (WCATWC) release: Warning, Advisory, Watch and Information Statement. In this exercise the ones that apply are Warning and Information Statement (Appendix A). In addition to these messages, as soon as the tsunami warning ends, the cancelation message is released. The corresponding local and state authorities are the ones that give the evacuation order, as well as the notice of safe return to coastal areas (“all clear”- safe to return).

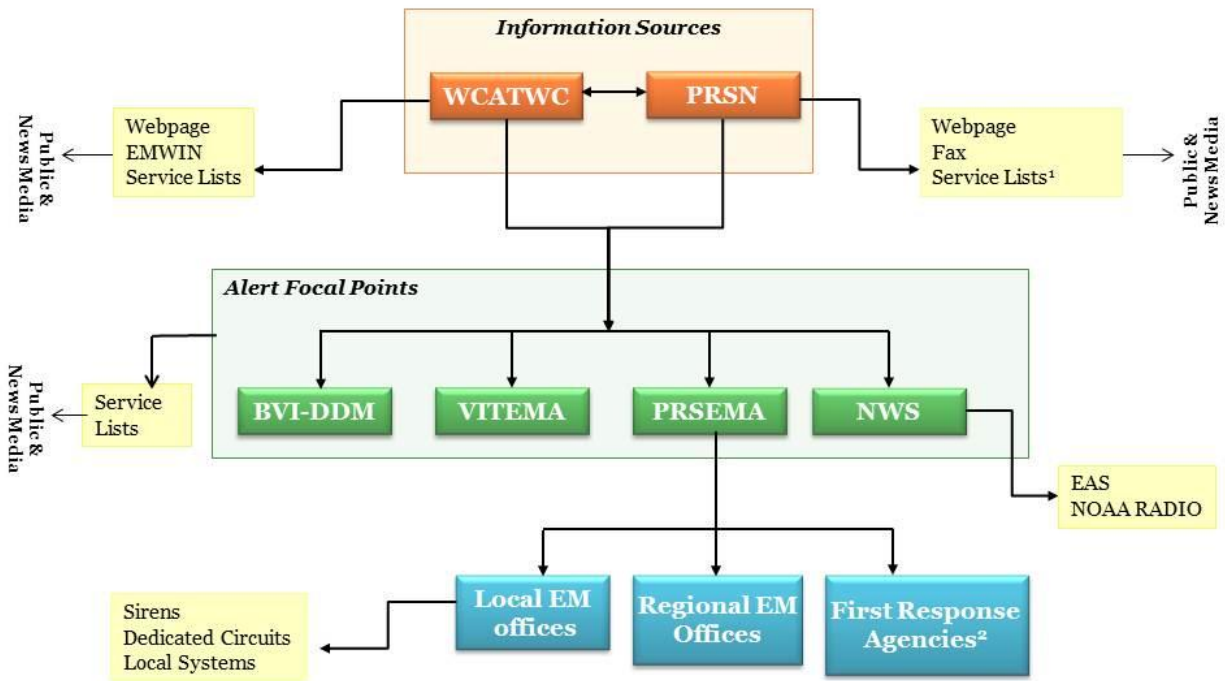
The PRSN and the WCATWC are responsible of releasing information and tsunami warnings for Puerto Rico and the Virgin Islands. The PTWC is the agency responsible for releasing information for the Dominican Republic. However, this guide is only for messages emitted by the PRSN. In case of the event simulated for this exercise LANTEX12, the initial message will be an Information Statement. Figure 1 shows the information sequence for this type of event.

The PRSN has multiple ways of communication with emergency management agencies of our area of responsibility: broadcast system (Information Dissemination System for Earthquakes and Tsunamis), direct telephone lines, satellite telephones, PREMA radio, RSS, text message, email, fax and social networks. All earthquake and tsunami information is available in our webpage: <http://redsismica.uprm.edu>.

It is the responsibility of the state and territorial agencies to guarantee the message’s widespread to the community in risk. In Puerto Rico, the tsunami protocol establishes that PREMA Control alerts the radio operators of their zones and each of the zones gets in contact with the municipal offices of emergency management (OMME) or with a designated 24 hour focal point, who in turn will alert the citizens.

## Procedures in case of a real event

In case of a real event occurring during the exercise, both the PRSN and WCATWC will emit their regular messaging alerts for the event. Real messages will have priority. The WCATWC will decide if they emit the exercise “dummy” message and if whether they will continue providing technical support (selected emails). Small earthquakes which only generate an Information Statement will NOT interrupt the exercise. **All documentation and correspondence related to this exercise will be clearly marked as LANTEX12 and Exercise.**



1. It includes email, text message, etc.
2. Police, Fire Department, Medical Emergency Personnel and National Guard. PRSEMA will determine which response agencies will be activated based on the Tsunami Alert Level in place.

Figure 1: PRSN Tsunami Protocol for the PR/VI Region, in case of a Tsunami Warning

## **EAS (Emergency Alert System) activation system**

For this exercise the EAS system will be activated in coordination with the Broadcasters Association through radio, television and NOAA radios. The real alert tsunami code, TSW, will be used during the exercise. **This message will be transmitted on March 28, 2012 around 9:05 AM by National Weather Service Forecast Office in San Juan announcing the start of the exercise.** The EAS activation is a way to verify that in a critical situation information can be transmitted to the public. The RSPR does not have the facilities to broadcast this product; therefore, it is coordinated through the National Weather Service Forecast office in San Juan.

In case of a real event, the EAS is activated with the first WARNING/ADVISORY/WATCH tsunami message for Puerto Rico and the Virgin Islands. For example, if the LANTEX12 Exercise were a real one, the EAS would have been activated with the first Tsunami WARNING for Puerto Rico and the Virgin Islands at 10:36 am.

**We urge the general community to be well aware of the activation of the EAS system on March 28, 2012 as part of LANTEX12 Exercise.**

## PRSN Messaging Schedule

Table 1 presents the schedule and the channels through which the alert messages will be emitted for the LANTEX12 Exercise. The messages' content can be found in Appendix B. The PRSN will transmit the SEISMIC/Tsunami EVENT Bulletins via FAX and other electronic channels. All tsunami messages can be placed in envelopes or be managed the way suggested in the Official handbook for the LANTEX12 exercise.

**Table 1. Schedule for PRSN and WCATWC products for the LANTEX12 Exercise**

| Date       | Local time | WCATWC    | PRSN Message or Action |                       |                      |  | Comments  |
|------------|------------|-----------|------------------------|-----------------------|----------------------|--|---|
|            |            | Message # | PRSN Bulletin #        | PRSN Message type     | Fax, RSS, Email, SMS | Ring Down, SAT Tel., Frequency Radio, Private Tel. |   |
| 03/28/2012 | 9:00 am    | ---       | ---                    | ---                   | ---                  | ---  | Earthquake origin time  |
| 03/28/2012 | 9:01 am    | ---       | ---                    | ---                   | ---                  | ---  | PRSN Tsunami protocol starts  |
| 03/28/2012 | 9:04 am    | Dummy     | 01                     | Information Statement | Yes                  | Yes  | Information Statement<br>EMWIN activation (WCATWC)  |
|            |            | 01        |                        |                       |                      |  |   |
| 03/28/2012 | 9:05 am    | ---       | ---                    | ---                   | ---                  | ---  | EAS Puerto Rico and NOAA radio (NWS-San Juan) activation  |
| 03/28/2012 | 9:31 am    | 02        | 02                     | Information Statement | Yes                  | Yes  | Information Statement   |
| 03/28/2012 | 10:08 am   | 03        | 03                     | Information Statement | Yes                  | Yes  | Information Statement   |
| 03/28/2012 | 10:36 am   | 04        | 04                     | Warning               | Yes                  | Yes  | <b>Tsunami Warning</b><br><b>Estimated Arrival Times</b><br>SAN JUAN, PR – 11:40 AST<br>MAYAGUEZ, PR – 11:45 AST<br>CHISTIANSTED, VI – 11:57 AST<br>CHARLOTTE AMALIE, IV – 12:18 AST                  |
| 03/28/2012 | 11:06 am   | 05        | 05                     | Warning               | Yes                  | Yes  | <b>Tsunami Warning</b><br><b>Estimated Arrival Times</b><br>SAN JUAN, PR – 11:40 AST<br>MAYAGUEZ, PR – 11:45 AST<br>CHISTIANSTED, VI – 11:57 AST<br>CHARLOTTE AMALIE, VI – 12:18 AST                  |
| 03/28/2012 | 11:36 am   | 06        | 06                     | Warning               | Yes                  | Yes  | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>SAN JUAN, PR – 11:29 AST   |
| 03/28/2012 | 12:04 pm   | 07        | 07                     | Warning               | Yes                  | Yes  | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>AGUADILLA, PR – 11:35 AST<br>SAN JUAN, PR – 11:40 AST<br>ISLA DE MONA, PR – 11:43 AST<br>MAYAGUEZ, PR – 11:45 AST<br>CULEBRA, PR – 11:53 AST |

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|            |          |    |    |                |     |     |   |
|------------|----------|----|----|----------------|-----|-----|---|
|            |          |    |    |                |     |     | VIRGIN GORDA, VI – 11:56 AST<br>CHRISTIANSTED, VI – 11:57 AST   |
| 03/28/2012 | 12:33 pm | 08 | 08 | <b>Warning</b> | Yes | Yes | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>AGUADILLA, PR – 11:35 AST<br>SAN JUAN, PR – 11:40 AST<br>ISLA DE MONA, PR – 11:43 AST<br>MAYAGUEZ, PR – 11:45 AST<br>CULEBRA, PR – 11:53 AST<br>VIRGIN GORDA, VI – 11:56 AST<br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI– 12:03 AST<br>LAMESHUR BAY, VI– 12:05 AST<br>CHRISTIANSTED, VI – 12:28 AST   |
| 03/28/2012 | 1:05 pm  | 09 | 09 | <b>Warning</b> | Yes | Yes | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>AGUADILLA, PR – 11:35 AST<br>SAN JUAN, PR – 11:40 AST<br>ISLA DE MONA, PR – 11:43 AST<br>CULEBRA, PR – 11:53 AST<br>VIRGIN GORDA, VI – 11:56 AST<br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI – 12:28 AST<br>MAYAGUEZ, PR – 12:58 AST |
| 03/28/2012 | 1:33 pm  | 10 | 10 | <b>Warning</b> | Yes | Yes | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>AGUADILLA PR – 11:35 AST<br>SAN JUAN PR – 11:40 AST<br>MONA ISLAND, PR – 11:43 AST<br>CULEBRA, PR- 11:53 AST<br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI – 12:28 AST<br>MAYAGUEZ PR – 12:58 AST                                      |
| 03/28/2012 | 2:02 pm  | 11 | 11 | <b>Warning</b> | Yes | Yes | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>AGUADILLA PR – 11:35 AST<br>SAN JUAN PR – 11:40 AST<br>MONA ISLAND, PR – 11:43 AST<br>CULEBRA, PR- 11:53 AST<br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI – 12:28 AST<br>MAYAGUEZ PR – 12:58 AST                                      |
| 03/28/2012 | 2:32 pm  | 12 | 12 | <b>Warning</b> | Yes | Yes | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>AGUADILLA PR – 11:35 AST<br>SAN JUAN PR – 11:40 AST<br>MONA ISLAND, PR – 11:43 AST   |



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|                   |                |           |           |                    |            |            |   |
|-------------------|----------------|-----------|-----------|--------------------|------------|------------|---|
|                   |                |           |           |                    |            |            | CULEBRA, PR- 11:53 AST<br>VIEQUES, PR – 12:01 AST<br>CHRISTIANSTED, VI– 12:28 AST<br>MAYAGUEZ PR – 12:58 AST  |
| 03/28/2012        | 3:03 pm        | 13        | 13        | <b>Warning</b>     | Yes        | Yes        | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI– 12:28 AST<br>MAYAGUEZ PR – 12:58 AST |
| 03/28/2012        | 3:33 pm        | 14        | 14        | <b>Warning</b>     | Yes        | Yes        | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI– 12:28 AST<br>MAYAGUEZ PR – 12:58 AST |
| 03/28/2012        | 4:03 pm        | 15        | 15        | <b>Warning</b>     | Yes        | Yes        | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI– 12:28 AST<br>MAYAGUEZ PR – 12:58 AST |
| 03/28/2012        | 4:32 pm        | 16        | 16        | <b>Warning</b>     | Yes        | Yes        | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI– 12:28 AST<br>MAYAGUEZ PR – 12:58 AST |
| 03/28/2012        | 5:03 pm        | 17        | 17        | <b>Warning</b>     | Yes        | Yes        | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI– 12:28 AST<br>MAYAGUEZ PR – 12:58 AST |
| 03/28/2012        | 5:31 pm        | 18        | 18        | <b>Warning</b>     | Yes        | Yes        | <b>Tsunami Warning</b><br><b>Tsunami confirmed in</b><br>VIEQUES, PR – 12:01 AST<br>LIMETREE BAY, VI – 12:03 AST<br>LAMESHUR BAY, VI – 12:05 AST<br>CHRISTIANSTED, VI– 12:28 AST<br>MAYAGUEZ PR – 12:58 AST |
| <b>03/28/2012</b> | <b>6:01 pm</b> | <b>19</b> | <b>19</b> | <b>Cancelation</b> | <b>Yes</b> | <b>Yes</b> | <b>Tsunami Warning Cancelation</b>  |

## Exercises and Participation

Depending on the level of preparation and resources, every agency will be able to design their participation in the LANTEX12 exercise. As mentioned in the Participant Handbook for the LANTEX12 exercise, activities during the day can vary from communication tests, tabletop exercises to large scale exercises. PREMA participation at the state, regional and municipal level is very important when evaluating the final communication with the coastal municipalities. In Puerto Rico there are 44 coastal municipalities that are at risk of being impacted by a tsunami, 20 of which are TsunamiReady (Aguada, Aguadilla, Añasco, Cabo Rojo, Carolina, Dorado, Lajas, Mayagüez, Rincón, Manatí, Toa Baja, Quebradillas, Isabela, Yauco, Guayanilla, Peñuelas, Ponce, Juana Díaz, Guayama and Arroyo), other municipalities that will be recognized as TsunamiReady (Guánica, Patillas, Salinas, Santa Isabel, Maunabo, Yabucoa, Humacao, Naguabo, Ceiba, Fajardo, Luquillo, Vieques and Culebra). This exercise will allow these municipalities to check their preparation in response to a tsunami. Different ways to participate in the LANTEX12 Exercise are described in the Participant Handbook: drill, tabletop, functional exercise and full-scale exercise. It is important that all participants register through the official website of the PRSN for the exercise <http://www.prsn.uprm.edu/lantex/> or through the Municipal Emergency Management Office (MEMO) or PREMA office closest to them.

Beyond the exercises described in the Participant's Manual of the LANTEX12 Exercise, the PRSN suggests the following ways to participate:

1. Execute one of the following 5 exercises (for more details please refer to the Official Manual):
  - a. Orientation Seminar Exercise
  - b. Drill
  - c. Tabletop Exercise
  - d. Functional Exercise
  - e. Full-scale Exercise
  
2. Execute at least one of the communication tests
  - a. Monitor NOAA Radio activation
  - b. Monitor EAS activation (in radio and TV)
  - c. Monitor messages emitted by PRSN in the webpage <http://redsismica.uprm.edu> or through our service lists.
  - d. Monitor official WCATWC messaging for the exercise. Send an email to Christa von Hillebrant ([christa.vonh@noaa.gov](mailto:christa.vonh@noaa.gov)). You must indicate your name, the

agency which you represent and email address. The deadline for registering is March 26, 2012.

3. For Emergency Management Agencies of Puerto Rico, monitor the PRSN messaging by email, text messaging and radio frequency.
4. Complete the Exercise's Evaluations.

The PRSN promotes participation in the Region of Puerto Rico and the Virgin Islands from various government agencies, private companies, communities, emergency management agencies, among others. It encourages the participation of:

1. "Tsunami Warning Focal Points" in PR
2. State and Federal Agencies in PR/VI region
3. Local communities (especially TsunamiReady municipalities)
4. Private companies
5. Public and Private schools

In this type of exercise, special priority is given to the communication tests in order to determine their effectiveness in response timing as well as information dissemination. **The Puerto Rico Emergency Management Agency, PREMA zones or PREMA Regional Offices and the Municipal Emergency Management Offices (MEMO)**, must participate in the LANTEX12 Exercise as follows:

1. Make at least one of the communication tests, thus testing the timing of communications (for the various channels available)
  - a. Monitor messaging issued by the PRSN through radio frequency
  - b. Monitor messaging issued by the PRSN by email (only for PREMA official emails and PREMA zones)
  - c. Monitor NOAA Radio Activation (if available)
  - d. Monitor EMWIN activation for Dummy message (Initial), for those MEMO's that have this tool.
  - e. Monitor text messaging, fax or radio (from PREMA), for those offices that already have it available
2. Relate to official messages issued by the PRSN and WCATWC
  - a. Monitoring messaging issued by the PRSN on its website <http://redsismica.uprm.edu>.

- b. Monitor official WCATWC messaging for the exercise. Send an email to Christa von Hillebrant (christa.vonh@noaa.gov). You must indicate your name, the agency which you represent and email address. The deadline for registering is March 26, 2012.
3. Test emergency response plans
4. Test emergency response timing (if drills are completed)
5. Coordinate the implementation of one of the 5 types of exercise in your area, region or municipality:
  - a. Orientation Seminar Exercise
  - b. Drill
  - c. Tabletop Exercise
  - d. Functional Exercise
  - e. Full-scale Exercise
6. Complete the exercise's final assessment and improve response timing in our local area.

Parting from the premise that the TsunamiReady program is one created by the NWS-NOAA to help communities become better prepared to save lives and reduce property damage caused by a tsunami event, we urge local emergency managers of said municipalities to participate in the following manner:

1. Communications systems test. This is to ensure that the flow of information from the focal points of tsunami alert is easy and the methods of receiving information are effective: radio frequency, EMWIN, NOAA radio, internet, commercial radio, TV, etc.
2. Practice evacuation drills for tsunami in the most vulnerable communities in their areas/sectors so as to evaluate access and track evacuation routes, as well as the estimated time of evacuation of buildings and the arrival to the secure area.
3. Verify that the tsunami evacuation plan of the municipality is a viable one and meets the needs during and after the emergency: effectiveness of the call tree and different systems of information dissemination to the community (mobile or fixed sirens, use of radio supporters, etc..) availability and activation of primary staff response, fulfilling in different roles in care and emergency recovery, etc.

4. Any other kind of initiative participation appropriate for the LANTEX12 exercise which you would like to inform to the Puerto Rico Seismic Network.

## Resources

While emergency management organizations will be notified of the exercise in advance, the use of realistic levels in the utilization of resource during the exercise is requested. This will allow the assessment of problems that could arise during an actual event. You may establish a special duty to enable the uninterrupted continuation of regular work.

You can ask questions about the exercise to the following contacts:

| Personal   | Telephone         | Email  |
|--|-------------------|--|
| <b>Christa von Hillebrandt, NWS CTWP Manager</b> | 787-833-8433      | christa.vonh@noaa.gov  |
| Melinda Bailey, NWS SR                           | 817-978-1100 x107 | melinda.bailey@noaa.gov  |
| <b>Wilfredo Ramos, PREMA Rep.</b>                | 787-724-0124      | wramos@PREMA.gobierno.pr                                       |
| Paul Whitmore, WCATWC Director                   | 907-745-4212      | paul.whitmore@noaa.gov   |
| Paul Huang, WCATWC TWSO                          | 907-745-4212      | paul.huang@noaa.gov  |
| James Waddell, WCATWC Rep.                       | 907-745-4212      | james.waddell@noaa.gov   |
| <b>Victor Huerfano, RSPR Director</b>            | 787-833-8433      | <a href="mailto:victor@prsn.uprm.edu">victor@prsn.uprm.edu</a> |
| John Koch, NWS ER                                | 631-244-0104      | john.koch@noaa.gov   |
| Charles Williams, NTHMP S. Region                | 205-280-2222      | charles.williams@ema.alabama.gov                               |
| Rainer Dombrowsky, NTHMP E. Region               | 410-517-3628      | rdombrowsky@mema.state.md.us                                   |
| John Koch, NWS ER                                | 631-244-0104      | john.koch@noaa.gov   |

In addition to the resources set forth in the Exercise’s Official Manual, you can ask questions on exercise in the Puerto Rico Seismic Network:

<http://redsismica.uprm.edu>

Telephone: (787)833-8433

Fax: 787-652-1154

Víctor Huérfano Moreno, PhD

Director RSPR

Email: [victor@prsn.uprm.edu](mailto:victor@prsn.uprm.edu)

Geol. Gisela Báez-Sánchez

Operational Contact

Email: [gisela@prsn.uprm.edu](mailto:gisela@prsn.uprm.edu)

Sra. Wildaomaris González

TsunamiReady Contact

Email: [wilda@prsn.uprm.edu](mailto:wilda@prsn.uprm.edu)

Sra. Carolina Hincapié

TsunamiReady Contact

Email: [carolina@prsn.uprm.edu](mailto:carolina@prsn.uprm.edu)

## **Arrangements with the media**

One advantage of conducting this type of exercise is that it promotes awareness about earthquakes and tsunamis. Communities could encourage local Medias to promote awareness about the danger of tsunamis. PRSN will issue a press release, several days before the exercise, describing the exercise and its purpose.

## **Evaluation after the exercise**

All participating agencies are asked to provide a brief feedback on the exercise. This feedback will help locally PRSN and PREMA and at a federal and international level NTHMP and NOAA in the evaluation of the LANTEX12 exercise and in the development of other exercises. Also it will help response agencies to document lessons learned. The exercise evaluation form is available electronically on the website of the PRSN (<http://www.prsn.uprm.edu/lantex/>). You may also complete official evaluations of the exercise, before April 1, 2012, through the official website of NTHMP: <http://nthmp.tsunami.gov/exercise2012.php>. Participants are encouraged to complete the evaluations as directed by them.

For the PRSN communications exercise, emergency agencies participating in the region of Puerto Rico and the Virgin Islands must complete the evaluation table that will be provided through our website (<http://www.prsn.uprm.edu/lantex/>). This table should be returned to the PRSN by fax or email on or before April 4, 2012.

The exercise evaluation forms are designed for "official use only" and will not be distributed by NOAA, NTHMP or the PRSN.

## Appendix A. Tsunami Warning Levels

**MENSAJES DE ALERTA DE TSUNAMI PARA PUERTO RICO E ISLAS VÍRGENES**  
**TSUNAMI MESSAGES FOR PUERTO RICO AND THE VIRGIN ISLANDS**






- ¡Peligro! / *Danger!*
- ¡Corra a tierras altas!  
*Run for high ground!*
- Siga las instrucciones de emergencia / *Follow emergency instructions.*

Aviso  
Warning

Advertencia  
Advisory

- Posibles corrientes locales fuertes y peligrosas / *Possible strong and dangerous local currents.*
- Esté pendiente para más información oficial / *Stay tuned for local emergency guidance.*



- Peligro potencial / *Potential danger.*
- Permanezca alerta para más información / *Stayed tuned for more information.*

Vigilancia  
wAatch





- Esté tranquilo / *Relax.*
- No hay peligro / *No danger.*
- Una cuenca oceánica distante puede estar en riesgo / *A distant ocean basin may be in danger.*

Boletín  
informativo  
Information Statement

WEST COAST & ALASKA TSUNAMI WARNING CENTER



## Appendix B: PRSN Messages for LANTEX 12 Exercise

University of Puerto Rico  
 Mayagüez Campus  
 Geology Department

**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 1**  
*SEISMIC EVENT/Tsunami*  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p> <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p> | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU<br/>                 10.0 km<br/>                 7.7<br/>                 I</p> |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p>   | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 09:04 AM AST<br/> <i>No tsunami threat for Puerto Rico and Virgin Islands.</i><br/> <i>Stay calmed and tuned for more information.</i></p>   |

The Puerto Rico Seismic Network (PRSN) has issued a bulletin for Puerto Rico and the Virgin Islands. Stay tuned to see the theoretical arrival times. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #1).



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 2**  
*SEISMIC EVENT/Tsunami*  
**LANTEX 12 Exercise**

|                                     |   |
|-------------------------------------|---|
| <b>DATE AND TIME:</b>               | <b>SEISMIC INFORMATION:</b>   |
| <b>LATITUDE – LONGITUDE:</b>        | March 28, 2012 – 13:00 UTC (9:00 AM AST)  |
| <b>LOCATION:</b>                    | 32.0 North – 78.0 West  |
|                                     | 125 mi/201 km SE of Myrtle Beach, South Carolina, EU  |
|                                     | 125 mi/201 km SE of Charleston, South Carolina, EU  |
| <b>DEPTH:</b>                       | 10.0 km   |
| <b>MAGNITUDE:</b>                   | 7.7   |
| <b>ESTIMATED MAXIMUM INTENSITY:</b> | I   |
| <b>ISSUED DATE:</b>                 | <b>TSUNAMI INFORMATION:</b>   |
| <b>TSUNAMI WARNING LEVEL:</b>       | 2012-03-28 09:31 AM AST   |
| <b>RECOMMENDED ACTION:</b>          | <i>No tsunami threat for Puerto Rico and Virgin Islands.<br/>         Stay calmed and tuned for more information.</i> |

The Puerto Rico Seismic Network (PRSN) has issued an information bulletin for Puerto Rico and the Virgin Islands. Stay tuned to see the theoretical arrival times. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #2).



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 3**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |  |
|---|--|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p> |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>   |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 10:08 AM AST<br/> <i>No tsunami threat for Puerto Rico and Virgin Islands.</i><br/> <i>Stay calmed and tuned for more information.</i></p>  |

The Puerto Rico Seismic Network (PRSN) has issued an information bulletin for Puerto Rico and the Virgin Islands. The tsunami theoretical arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #3).



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 4**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |  |
|---|--|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>                 |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>   |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 10:36 AM AST<br/> <i>A tsunami WARNING is in effect for Puerto Rico and Virgin Islands. People located in areas declared as tsunami WARNING should move to highland areas. Evacuations are only ordered by emergency response agencies.</i></p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami theoretical arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #4).



| <u>Tsunami Arrival Times</u>    |
|---------------------------------|
| THEORETICAL                     |
| SAN JUAN, PR - 11:40 AST        |
| MAYAGUEZ, PR - 11:45 AST        |
| CHRISTIANSTED, IV- 11:57 AST    |
| CHARLOTTE AMALIE IV - 12:18 AST |

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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 5**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |  |
|---|--|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>                 |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>   |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 11:06 AM AST<br/> <i>A tsunami WARNING is in effect for Puerto Rico and Virgin Islands. People located in areas declared as tsunami WARNING should move to highland areas. Evacuations are only ordered by emergency response agencies.</i></p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami theoretical arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #5).



| <u>Tsunami Arrival Times</u>    |
|---------------------------------|
| <b>THEORETICAL</b>              |
| SAN JUAN, PR - 11:40 AST        |
| MAYAGUEZ, PR - 11:45 AST        |
| CHRISTIANSTED, IV - 11:57 AST   |
| CHARLOTTE AMALIE IV - 12:18 AST |

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PUERTO RICO SEISMIC NETWORK



**BULLETIN 6**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |  |
|---|--|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>                 |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>   |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 11:36 AM AST<br/> <i>A tsunami WARNING is in effect for Puerto Rico and Virgin Islands. People located in areas declared as tsunami WARNING should move to highland areas. Evacuations are only ordered by emergency response agencies.</i></p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #6).



| <u>Tsunami Arrival Times</u> |                 |
|------------------------------|-----------------|
| OBSERVED                     |                 |
| SAN JUAN, PR - 11:29 AST     | 05.91 ft/01.80m |

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PUERTO RICO SEISMIC NETWORK



**BULLETIN 7**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |  |
|---|--|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>   |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>   |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 12:04 PM AST<br/>                 A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br/>                 People located in areas declared as tsunami <b>WARNING</b> should move to highland areas. Evacuations are only ordered by emergency response agencies.</p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. Floods have been reported along the north coast of Puerto Rico including low relief areas at Puerta de Tierra. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #7).



| <u>Tsunami Arrival Times</u> |                |
|------------------------------|----------------|
| <b>OBSERVED</b>              |                |
| AGUADILLA, PR - 11:35 AST    | 04.27ft/01.30m |
| SAN JUAN, PR - 11:40 AST     | 09.51 ft/02.9m |
| MONA ISLAND, PR - 11:43 AST  | 03.61ft/01.10m |
| MAYAGUEZ, PR - 11:45 AST     | 03.28ft/01.00m |
| CULEBRA, PR- 11:53 AST       | 06.89ft/02.10m |

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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 8**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>  |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>  |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 12:33 PM AST<br/>                 A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands. People located in areas declared as tsunami <b>WARNING</b> should move to highland areas. Evacuations are only ordered by emergency response agencies.</p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #8).



| <u>Tsunami Arrival Times</u>  |                |
|-------------------------------|----------------|
| OBSERVED                      |                |
| AGUADILLA, PR - 11:35 AST     | 04.27ft/01.30m |
| SAN JUAN, PR - 11:40 AST      | 09.51 ft/02.9m |
| MONA ISLAND, PR - 11:43 AST   | 03.61ft/01.10m |
| MAYAGUEZ, PR - 11:45 AST      | 03.28ft/01.00m |
| CULEBRA, PR - 11:53 AST       | 06.89ft/02.10m |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |

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PUERTO RICO SEISMIC NETWORK



**BULLETIN 9**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b><br/> <b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p> | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU<br/>                 10.0 km<br/>                 7.7<br/>                 I</p> |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p>   | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 1:05 PM AST<br/>                 A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br/>                 People located in areas declared as tsunami <b>WARNING</b> should move to highland areas. Evacuations are only ordered by emergency response agencies.</p>                   |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #9).



| <u>Tsunami Arrival Times</u>  |                |
|-------------------------------|----------------|
| OBSERVED                      |                |
| AGUADILLA, PR - 11:35 AST     | 04.27ft/01.30m |
| SAN JUAN, PR - 11:40 AST      | 09.51 ft/02.9m |
| MONA ISLAND, PR - 11:43 AST   | 03.61ft/01.10m |
| CULEBRA, PR- 11:53 AST        | 06.89ft/02.10m |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

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PUERTO RICO SEISMIC NETWORK



**BULLETIN 10**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>                |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>  |
| <p><b>ISSUED DATE:</b><br/> <b>Tsunami WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>Tsunami INFORMATION:</b><br/>                 2012-03-28 1:33 PM AST<br/> <i>A tsunami WARNING is in effect for Puerto Rico and Virgin Islands. People located in areas declared as tsunami WARNING should move to highland areas. Evacuations are only ordered by emergency response agencies.</i></p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. Severe damages have been reported in the Natural Reserve of Culebra, Resaca beach and Brava beach. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #10).



| <u>Tsunami Arrival Times</u>  |                |
|-------------------------------|----------------|
| OBSERVED                      |                |
| AGUADILLA, PR - 11:35 AST     | 04.27ft/01.30m |
| SAN JUAN, PR - 11:40 AST      | 09.51 ft/02.9m |
| MONA ISLAND, PR - 11:43 AST   | 03.61ft/01.10m |
| CULEBRA, PR- 11:53 AST        | 06.89ft/02.10m |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 11**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|  |  |
|--|--|
| <b>DATE AND TIME:</b><br><b>LATITUDE – LONGITUDE:</b><br><b>LOCATION:</b><br><br><b>DEPTH:</b><br><b>MAGNITUDE:</b><br><b>ESTIMATED MAXIMUM INTENSITY:</b> | <b>SEISMIC INFORMATION:</b><br>March 28, 2012 – 13:00 UTC (9:00 AM AST)<br>32.0 North – 78.0 West<br>125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br>125 mi/201 km SE of Charleston, South Carolina, EU<br>10.0 km<br>7.7<br>I   |
| <b>ISSUED DATE:</b><br><b>TSUNAMI WARNING LEVEL:</b><br><b>RECOMMENDED ACTION:</b>   | <b>TSUNAMI INFORMATION:</b><br>2012-03-28 2:02 PM AST<br>A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br>People located in areas declared as tsunami <b>WARNING</b> should<br>move to highland areas. Evacuations are only ordered by<br>emergency response agencies. |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #11).



| <u>Tsunami Arrival Times</u>  |                |
|-------------------------------|----------------|
| <b>OBSERVED</b>               |                |
| AGUADILLA, PR - 11:35 AST     | 04.27ft/01.30m |
| SAN JUAN, PR - 11:40 AST      | 09.51 ft/02.9m |
| MONA ISLAND, PR - 11:43 AST   | 03.61ft/01.10m |
| CULEBRA, PR - 11:53 AST       | 06.89ft/02.10m |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 12**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|  |  |
|--|--|
| <b>DATE AND TIME:</b><br><b>LATITUDE – LONGITUDE:</b><br><b>LOCATION:</b><br><br><b>DEPTH:</b><br><b>MAGNITUDE:</b><br><b>ESTIMATED MAXIMUM INTENSITY:</b> | <b>SEISMIC INFORMATION:</b><br>March 28, 2012 – 13:00 UTC (9:00 AM AST)<br>32.0 North – 78.0 West<br>125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br>125 mi/201 km SE of Charleston, South Carolina, EU<br>10.0 km<br>7.7<br>I   |
| <b>ISSUED DATE:</b><br><b>TSUNAMI WARNING LEVEL:</b><br><b>RECOMMENDED ACTION:</b>   | <b>TSUNAMI INFORMATION:</b><br>2012-03-28 2:32 PM AST<br>A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br>People located in areas declared as tsunami <b>WARNING</b> should move to highland areas. Evacuations are only ordered by emergency response agencies. |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami **WARNING** for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #12).



| <b>Tsunami Arrival Times</b>  |                |
|-------------------------------|----------------|
| <b>OBSERVED</b>               |                |
| AGUADILLA, PR - 11:35 AST     | 04.27ft/01.30m |
| SAN JUAN, PR - 11:40 AST      | 09.51 ft/02.9m |
| MONA ISLAND, PR - 11:43 AST   | 03.61ft/01.10m |
| CULEBRA, PR - 11:53 AST       | 06.89ft/02.10m |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

Last update 2012-03-28 2:32 PM



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 13**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|  |  |
|--|--|
| <b>DATE AND TIME:</b><br><b>LATITUDE – LONGITUDE:</b><br><b>LOCATION:</b><br><br><b>DEPTH:</b><br><b>MAGNITUDE:</b><br><b>ESTIMATED MAXIMUM INTENSITY:</b> | <b>SEISMIC INFORMATION:</b><br>March 28, 2012 – 13:00 UTC (9:00 AM AST)<br>32.0 North – 78.0 West<br>125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br>125 mi/201 km SE of Charleston, South Carolina, EU<br>10.0 km<br>7.7<br>I   |
| <b>ISSUED DATE:</b><br><b>TSUNAMI WARNING LEVEL:</b><br><b>RECOMMENDED ACTION:</b>   | <b>TSUNAMI INFORMATION:</b><br>2012-03-28 3:03 PM AST<br>A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br>People located in areas declared as tsunami <b>WARNING</b> should move to highland areas. Evacuations are only ordered by emergency response agencies. |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami **WARNING** for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #13).



| Tsunami Arrival Times         |                |
|-------------------------------|----------------|
| OBSERVED                      |                |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV - 12:05 AST  | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

Last update 2012-03-28 3:03 PM



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 14**  
*SEISMIC EVENT/Tsunami*  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>                |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>  |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 3:33 PM AST<br/> <i>A tsunami WARNING is in effect for Puerto Rico and Virgin Islands. People located in areas declared as tsunami WARNING should move to highland areas. Evacuations are only ordered by emergency response agencies.</i></p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #14).



| <u>Tsunami Arrival Times</u>  |                |
|-------------------------------|----------------|
| <b>OBSERVED</b>               |                |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

Last update 2012-03-28 3:33 PM



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PUERTO RICO SEISMIC NETWORK



**BULLETIN 15**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b><br/> <b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p> | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU<br/>                 10.0 km<br/>                 7.7<br/>                 I</p>                         |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p>   | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 4:03 PM AST<br/>                 A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br/>                 People located in areas declared as tsunami <b>WARNING</b> should<br/>                 move to highland areas. Evacuations are only ordered by<br/>                 emergency response agencies.</p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami **WARNING** for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #15).



| <u>Tsunami Arrival Times</u>  |                |
|-------------------------------|----------------|
| OBSERVED                      |                |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV - 12:05 AST  | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

Last update 2012-03-28 4:03 PM



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 16**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU</p>  |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>10.0 km<br/>                 7.7<br/>                 I</p>  |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 4:32 PM AST<br/>                 A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br/>                 People located in areas declared as tsunami <b>WARNING</b> should<br/>                 move to highland areas. Evacuations are only ordered by<br/>                 emergency response agencies.</p> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami **WARNING** for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #16).



| <b>Tsunami Arrival Times</b>  |                |
|-------------------------------|----------------|
| <b>OBSERVED</b>               |                |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

Last update 2012-03-28 4:32 PM



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 17**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|  |  |
|--|--|
| <b>DATE AND TIME:</b><br><b>LATITUDE – LONGITUDE:</b><br><b>LOCATION:</b><br><br><b>DEPTH:</b><br><b>MAGNITUDE:</b><br><b>ESTIMATED MAXIMUM INTENSITY:</b> | <b>SEISMIC INFORMATION:</b><br>March 28, 2012 – 13:00 UTC (9:00 AM AST)<br>32.0 North – 78.0 West<br>125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br>125 mi/201 km SE of Charleston, South Carolina, EU<br>10.0 km<br>7.7<br>I   |
| <b>ISSUED DATE:</b><br><b>TSUNAMI WARNING LEVEL:</b><br><b>RECOMMENDED ACTION:</b>   | <b>TSUNAMI INFORMATION:</b><br>2012-03-28 5:03 PM AST<br>A tsunami <b>WARNING</b> is in effect for Puerto Rico and Virgin Islands.<br>People located in areas declared as tsunami <b>WARNING</b> should move to highland areas. Evacuations are only ordered by emergency response agencies. |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami **WARNING** for Puerto Rico and the Virgin Islands. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #17).



| <u>Tsunami Arrival Times</u>  |                |
|-------------------------------|----------------|
| <b>OBSERVED</b>               |                |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV -12:05 AST   | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

Last update 2012-03-28 5:03 PM



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PUERTO RICO SEISMIC NETWORK



**BULLETIN 18**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|   |   |
|---|---|
| <p><b>DATE AND TIME:</b><br/> <b>LATITUDE – LONGITUDE:</b><br/> <b>LOCATION:</b></p>          | <p><b>SEISMIC INFORMATION:</b><br/>                 March 28, 2012 – 13:00 UTC (9:00 AM AST)<br/>                 32.0 North – 78.0 West<br/>                 125 mi/201 km SE of Myrtle Beach, South Carolina, EU<br/>                 125 mi/201 km SE of Charleston, South Carolina, EU<br/>                 10.0 km</p> |
| <p><b>DEPTH:</b><br/> <b>MAGNITUDE:</b><br/> <b>ESTIMATED MAXIMUM INTENSITY:</b></p>          | <p>7.7<br/>                 I</p>   |
| <p><b>ISSUED DATE:</b><br/> <b>TSUNAMI WARNING LEVEL:</b><br/> <b>RECOMMENDED ACTION:</b></p> | <p><b>TSUNAMI INFORMATION:</b><br/>                 2012-03-28 5:31 PM AST<br/> <i>A tsunami WARNING is in effect for Puerto Rico and Virgin Islands. People located in areas declared as tsunami WARNING should move to highland areas. Evacuations are only ordered by emergency response agencies.</i></p>               |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING for Puerto Rico and the Virgin Islands. Wave heights from 00.65ft/00.20m to 00.98ft/00.30m have been reported in East and West coasts. The tsunami observed arrival times are listed in the following table. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #18).



| Tsunami Arrival Times         |                |
|-------------------------------|----------------|
| OBSERVED                      |                |
| VIEQUES, PR - 12:01 AST       | 02.62ft/00.80m |
| LIMETREE BAY, IV - 12:03 AST  | 01.31ft/00.40m |
| LAMESHUR BAY, IV - 12:05 AST  | 03.94ft/01.20m |
| CHRISTIANSTED, IV - 12:28 AST | 01.64ft/00.50m |
| MAYAGUEZ PR - 12:58 AST       | 04.59ft/01.40m |

Last update 2012-03-28 5:31 PM



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**PUERTO RICO SEISMIC NETWORK**



**BULLETIN 19**  
**SEISMIC EVENT/Tsunami**  
**LANTEX 12 Exercise**

|                                     |  |
|-------------------------------------|--|
| <b>DATE AND TIME:</b>               | <b>SEISMIC INFORMATION:</b>  |
| <b>LATITUDE – LONGITUDE:</b>        | March 28, 2012 – 13:00 UTC (9:00 AM AST)   |
| <b>LOCATION:</b>                    | 32.0 North – 78.0 West   |
| <b>DEPTH:</b>                       | 125 mi/201 km SE of Myrtle Beach, South Carolina, EU   |
| <b>MAGNITUDE:</b>                   | 125 mi/201 km SE of Charleston, South Carolina, EU   |
| <b>ESTIMATED MAXIMUM INTENSITY:</b> | 10.0 km  |
|                                     | 7.7  |
|                                     | I  |
| <b>ISSUED DATE:</b>                 | <b>TSUNAMI INFORMATION:</b>  |
| <b>TSUNAMI WARNING LEVEL:</b>       | 2012-03-28 6:01 PM AST   |
| <b>RECOMMENDED ACTION:</b>          | <i>A tsunami WARNING CANCELLATION is in effect for Puerto Rico and Virgin Islands.</i>                                     |
|                                     | <i>Local emergency officials will provide the green light (“all clear”) for these regions based on local observations.</i> |

The Puerto Rico Seismic Network (PRSN) has issued a tsunami WARNING CANCELLATION for Puerto Rico and the Virgin Islands. Wave heights in the East coast are expected to be lower than 00.98ft/00.30m. The preliminary cost of damages caused reaches \$483 million, 167 dead persons or disappeared. For more information about tsunami message levels refer to the messages emitted by the PRSN as part of the LANTEX 12 exercise. (see Tsunami Message #19).



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