

***NATIONAL WEATHER SERVICE SOUTHERN REGION SUPPLEMENT 05-2007
APPLICABLE TO NWSI 10-701***

September 18, 2007

Operations and Services

Tsunami Warning Services, NWSPD 10-7

Tsunami Warning Center Operations, NWSI 10-701

***SOUTHERN REGION TSUNAMI WARNING OPERATIONS FOR WFO SAN JUAN
AND THE SOUTHEAST RIVER FORECAST CENTER***

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Certified by: W/SR1 (J. Ladd)

Type of Issuance: Initial

SUMMARY OF REVISIONS: First issuance. Replaces Policy Memo issued November 18, 2005, entitled “Tsunami Warning Dissemination Procedures for the Atlantic Basin and Gulf of Mexico.”

<signed>

September 4, 2007

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Date

Acting Regional Director, Southern Region

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1. Introduction

This Regional Supplement describes responsibilities and provides guidance to the National Weather Service (NWS) San Juan Weather Forecast Office (WFO) (SJU) and the Southeast River Forecast Center (SERFC) related to tsunami events. Detailed procedures regarding the Southern Region (SR) continental United States (CONUS) coastal WFOs and River Forecast Centers (RFCs) with coastal responsibility along the Gulf of Mexico and Atlantic Ocean are contained in a separate Supplement.

WFO San Juan is responsible for taking appropriate action when there is a threat of a tsunami, including relaying Tsunami Watches and Warnings on NOAA Weather Radio All Hazards from the West Coast / Alaska Tsunami Warning Center (WC/ATWC). They are also responsible for ensuring the readiness of office staff and systems through routine operational drills, coordinating community outreach activities that increase tsunami hazard awareness, and assisting in emergency preparedness for tsunami events (e.g. promotion of the TsunamiReady program). Emergency Management Agencies in Puerto Rico (PR) and the United State Virgin Islands (USVI) have the responsibility for developing warning procedures, plans and evacuations for local communities, in conjunction with WFO SJU and the SERFC. Specific local procedures will be included in the WFO Station Duty Manual (SDM). The Southeast River Forecast Center is responsible for preparing flood forecast guidance for appropriate locations near the coastal areas that may be affected by tsunamis.

2. Tsunami Program Procedures for SJU and the SERFC

The West Coast / Alaska Tsunami Warning Center monitors the Atlantic and Caribbean (hereafter referred to as Atlantic) for seismic events. If a seismic event occurs in the Atlantic and meets the seismic magnitude and location criteria listed in Sections 2.4.1 and 2.4.2, WC/ATWC will issue Tsunami Warnings, Watches or informational products for PR and the USVI. WFO SJU broadcasts this information on NOAA Weather Radio All Hazards (NWR). Updates are provided to local customers and partners throughout and after events by WFO SJU and the SERFC.

2.1. Communications

a. Advanced Weather Interactive Processing System (AWIPS)

Both the SERFC and WFO SJU *will* ensure all of the products listed in Sections 2.3.a, 2.3.b and 2.3.c are *alarmed* in AWIPS. In addition, both the SERFC and WFO SJU will ensure after each AWIPS build (or outage) that the products are reconfigured to be alarmed.

b. Contact logs

WFO SJU will likely receive numerous calls from the media, public, emergency managers, etc. during earthquake and tsunami events. Ensure that all calls initiated or received, as well as subsequent actions, are logged.

c. Emergency Phones

Emergency office cellular and/or satellite phones should be charged and easily

accessible to all staff. In addition, staff must know exactly where emergency cellular and/or satellite phones are and how to use them.

2.2 Procedures

The WC/ATWC and the Puerto Rico Seismic Network (PRSN) monitor the Atlantic for seismic events. As listed in Section 2.4, if a seismic event occurs in the Atlantic, WC/ATWC will issue the product corresponding to the specific seismic magnitude and location criteria. In addition, PRSN, following the same criteria, will contact WFO San Juan and emergency officials of PR and the USVI concerning the seismic event. The Pacific Tsunami Warning Center (PTWC) is the backup for WC/ATWC.

2.2.1 Puerto Rico Seismic Network

PRSN contacts WFO San Juan and Emergency Officials of PR and the USVI and relays tsunami/earthquake information for seismic events per the criteria in Section 2.3 via phone calls to WFO San Juan, British Virgin Islands (BVI) and the United States Virgin Islands police departments, and Puerto Rico Emergency Management Agency (PREMA).

2.3 West Coast / Alaska Tsunami Warning Center Products

The products that WC/ATWC issues are detailed below.

a. Warnings, Watches and Cancellation Messages

WC/ATWC issues Tsunami Watches, Tsunami Warnings, updates and cancellation messages under the following World Meteorological Organization (WMO) headings and AWIPS identifiers:

WEXX20 PAAQ ANCTSUAT1 – Standard format product

WEXX30 PAAQ ANCTSUATE – Public friendly product

Where, TSU = Tsunami Watch, Warning or Cancellation product

(See Table 1 and Table 2 in Section 2.4 for the criteria of Tsunami Warnings and Watches).

The TSUATE product is narrative and referred to as “public friendly”, whereas the TSUAT1 product is tabular in format and referred to as the “standard format.” Both the “public friendly” and “standard format” TSU products are issued during watch/warning events. See Appendix E for examples.

WC/ATWC will collect, review, and diagnose data and issue follow-up statements every 30 minutes under TSUAT1 and TSUATE. If a tsunami is no longer expected, the WC/ATWC will issue a cancellation message under the same product IDs (TSUAT1 and TSUATE).

b. Tsunami Information Statements

A Tsunami Information Statement (TIB) usually is issued when the magnitude of

a seismic event is above 6.0 but below watch/warning criteria. Issuance of a TIB is also based on location of a seismic event – see Sections 2.4.1 and 2.4.2 for specifics. It provides pertinent information about earthquakes in the region (particularly those which may have been felt near the coast or were strong enough to attract media attention). The WMO headings and AWIPS identifiers for the Tsunami Information Statements are:

WEXX22 PAAQ ANCT**TIB**AT1 – Standard format product
WEXX32 PAAQ ANCT**TIB**ATE – Public friendly product

Where TIB = Tsunami Information Statement

The TIBATE product is narrative and referred to as “public friendly”, whereas the TIBAT1 product is tabular in format and referred to as the “standard format.” Both TIB products are issued during seismic events where the Magnitude \geq 6.0 but below watch/warning criteria.

There are no mandatory follow-up messages for the TIB products.

c. Tsunami Seismic Information Statement

A Tsunami Seismic Information Statement (EQI) is issued to provide pertinent information about earthquakes in the region usually when the magnitude of a seismic event is below 6.0 but above 4.0 (location dependent – See Sections 2.4.1 and 2.4.2). The WMO heading and AWIPS identifier for the Tsunami Seismic Information Statement is:

SEX60 PAAQ ANCE**EQI**AT1 – Issued when $M < 6.0$ and > 4.0

Where EQI = Tsunami Seismic Information Statement

There are no mandatory follow up messages for the EQI product.

2.4 Dissemination

WC/ATWC will relay the TSU, TIB and EQI tsunami products for the Atlantic via all of the following avenues:

- broadcast over National Warning System (NAWAS),
- dissemination via:
 - National Airspace Data Interchange Network (NADIN2),
 - NOAA Weather Wire Service (NWWS),
 - Line225 (NWS Circuit and AWIPS feed),
 - email,
 - digital pagers,

- Quake Data Distribution System (QDDS), and
- WC/ATWC web site.
- Telephone contact is made with the:
 - Naval Meteorological and Oceanographic Center (NMOC),
 - Pacific Tsunami Warning Center (PTWC),
 - Puerto Rico Seismic Network (PRSN),
 - National Earthquake Information Center (NEIC), and
 - U. S. State Department Operations Center.

2.5 Procedural Thresholds

If an earthquake is detected in the Atlantic, the WC/ATWC will issue a Tsunami Warning, Tsunami Watch or Information product using the thresholds in Sections 2.4.1 and 2.4.2. Table 1 and Table 2 depict the criteria for the issuance of tsunami-related products.

2.5.1 Criteria for Events Near Puerto Rico and the US Virgin Islands

See Appendix F for a graphical representation of the criteria and also flowcharts of the criteria.

**Table 1:
Determination of Product to be Issued by Earthquake Magnitude and Area of Occurrence**

Magnitude	Area	Product	Product ID
4.0 - 4.9	Within 50km of PR or USVI coast	Tsunami Seismic Information Statement	ANCEQIAT1
5.0 - 5.9	PR and USVI area	Tsunami Seismic Information Statement	ANCEQIAT1
6.0 - 6.4	PR and USVI area	Tsunami Information Statement	ANCTIBAT1 and ANCTIBATE
> 6.0 and deeper than 100km	PR and USVI area	Tsunami Information Statement	ANCTIBAT1 and ANCTIBATE
>= 6.5	PR and USVI area	Tsunami Warning	ANCTSUAT1 and ANCTSUATE

Note: 'PR and USVI Area' is defined as the area from 17N to 20N and from 63.5W to 69W.

2.5.2 Criteria for the Caribbean Region

Table 2:

Determination of Product to be Issued by Earthquake Magnitude and Area of Occurrence

Magnitude	Area	Product	Product
5.0 – 5.9	Caribbean	Tsunami Seismic Information Statement	ANCEQIAT1
6.0-7.5 >= 6.0 and deeper than 100 km or inland	Caribbean	Tsunami Information Statement	ANCTIBAT1 and ANCTIBATE
7.6 – 7.8	Eastern Caribbean	Tsunami Warning	ANCTSUAT1 and ANCTSUATE
7.6 – 7.8	Western Caribbean	Tsunami Information Statement	ANCTIBAT1 and ANCTIBATE or
> 7.9	Caribbean	Tsunami Warning	ANCTSUAT1 and ANCTSUATE

Note: 'Eastern Caribbean' and 'Western Caribbean' are separated at 75W.

2.6 Break Points

In the Tsunami Watch/Warning product, breakpoints along the CONUS coasts are used to define the areal extent of the watch and/or warning. For Puerto Rico and the USVI, the tsunami products will not contain break points for the islands. Instead, the products will list the islands that will be contained in a Watch or Warning.

3. WFO Procedures

WFO San Juan will follow the procedures below if they are in the affected area of a Tsunami Watch or Warning. Critical actions by WFO SJU are necessary for public and partner notification. A checklist to be utilized during a tsunami event is provided in Appendix A.

3.1 NOAA Weather Radio All Hazards (NWR) Activation

a. When a Tsunami Watch or Tsunami Warning is issued for the SJU County Warning Area:

1) NWR Activation

When a Tsunami Watch or Tsunami Warning (TSU product) has been issued by WC/ATWC for the area, WFO SJU will *immediately* activate the Emergency Alert System (EAS), tone alert (both 1050HZ and SAME

[Specific Area Message Encoding]) the NWR Console Replacement System (CRS) for all affected NWR coastal transmitters, and broadcast the tsunami information on NWR. Sample broadcast templates are provided

in Appendix B (for a Tsunami Watch) or Appendix C (for a Tsunami Warning). Information in the TSUAT1 product can be inserted into the appropriate template, then used as a broadcast script.

Note: *Do not* issue a TSW or TSA product from AWIPS. *Only* tone alert and activate the proper TSW or TSA EAS codes on NWR and read from the broadcast template script (located in Appendix B and C).

2) EAS Codes

Use the following EAS codes for tsunami EAS dissemination on CRS:

Tsunami Warning message (TSW) / Tsunami Watch message (TSA).

These codes should be noted in the Station Duty Manual (SDM), as well as the proper transmitters for tsunami activation.

3) Issue Special Weather Statements for Updates

If a Tsunami Warning and/or Tsunami Watch is issued from WC/ATWC for any part of the County Warning Area (CWA), WFO San Juan should issue Special Weather Statements (SPS) every 30 minutes. Similar to Hurricane Local Statements, these SPSs provide timely updates for customers and partners while the Tsunami Warning/Watch is in effect and WC/ATWC collects, reviews, and diagnoses data. In most cases, the SPS will reemphasize the information in the WC/ATWC products while adding local impact information (such as flooding), and/or any messages relayed by emergency managers. When a Tsunami Warning or Watch is cancelled, use the SPS to relay this information. SPSs will be broadcast on NWR.

b. When a Tsunami Information Statement (TIB) or Tsunami Seismic Information Statement (EQI) is Issued for the Area

If the WC/ATWC issues a TIB or EQI product for the area, a tsunami is unlikely. TIBs or EQIs should not be disseminated over NWR. However, an earthquake that is felt may increase the number of phone calls or activities at an office. Therefore, at forecaster discretion, either a Public Information Statement (PNS) product or a Special Weather Statement (SPS) product may be issued from AWIPS and/or disseminated on NWR to help minimize media/public concerns. A PNS may be more appropriate for earthquakes that are not felt by many in the CWA, but for widespread felt earthquakes across a CWA, the number of calls in the office will increase to where an SPS may be more appropriate. The PNS or SPS will reemphasize the information in the TIB or EQI product.

c. When the Tsunami Watch or Tsunami Warning is Cancelled

If the WC/ATWC cancels the Tsunami Watch or Warning for the area, broadcast the information on NWR using the template in Appendix D. Additionally, a Cancellation Checklist is provided on page A-2 that lists tasks to be completed

when a Tsunami Watch or Warning has been cancelled.

WFO SJU's local policy to tone alert NWR cancellation messages must be collaborated with its partners. It should be noted in the Station Duty Manual if WFO SJU will tone alert NWR for cancelled Tsunami Watches or Warnings.

3.2 Felt Earthquakes

Anytime an earthquake is felt, WFO SJU may issue an Earthquake Report (EQR) product to inform surrounding offices and the public (see Directive 10-518, Section 4 for details on the EQR).

WFOs (and the public) may inform the National Earthquake Information Center (NEIC) and the United State Geological Survey (USGS) of a felt earthquake by filling out an Earthquake Report online at the USGS website:

http://pasadena.wr.usgs.gov/shake/cus/STORE/Xvral_06/ciim_form.html

A felt earthquake may increase the amount of calls and activity at WFO San Juan. Therefore, at forecaster discretion, if the earthquake is felt at the WFO and is greater than or equal to VII on the Modified Mercalli scale, WFO SJU may also broadcast an SPS product on NWR. Unlike the EQR, an SPS can include information and call-to-action statements about a "potential tsunami" which will help address questions from the public until a product is issued from WC/ATWC, or a call is received from PRSN. However, it will NOT state a Tsunami Warning is in effect.

4. Dissemination Tests for WFO SJU and the SERFC

Monthly dissemination tests will be conducted for tsunami products by WC/ATWC to ensure products are received by the NWS and its partners. WC/ATWC will disseminate a test TIB and/or test TSU product approximately once a month to WFOs, RFCs, the FAA and federal and state emergency managers.

4.1 Tsunami Acknowledgement Message

After receipt of the WC/ATWC tsunami test product(s) [normally the TSUAT1 product], WFO SJU and the SERFC will respond immediately by disseminating a Tsunami Acknowledgement Message (TMA) from AWIPS, as specified below. The TMA product is received back at WC/ATWC to validate operation of the communication system.

Because some customers can receive the TMA, it is important to add "**THIS IS A TEST**" to the body of the product.

Example of a TMA message sent to WC/ATWC:

SECA42 TJSJ 231410
TMASJU

This is only a test.

(add)

WEXX20 PAAQ RCVD AT **231305**

(this is the time you received the product, not the time this test message is transmitted)

\$\$

Important Note: The TMA product is NOT to be sent during actual events

5. Procedures Used to Notify Southern Region Headquarters and the SERFC

- a. To Southern Region Headquarters (SRH) from WFO San Juan
Anytime WC/ATWC issues a Watch or Warning for the area, WFO San Juan will notify SRH by calling the Southern Region Regional Operations Center (ROC) at 817-978-1100, ext 147. Leave a message if no one answers and an SRH employee will be paged.

If WFO San Juan communications are inoperative, WFO Miami will call SRH.

- b. To Southeast River Forecast Center (SERFC) from WFO San Juan
WFO San Juan will notify the SERFC when a Tsunami Warning or Tsunami Watch has been issued for Puerto Rico and/or the U.S. Virgin Islands. If it is after normal business hours, the Hydrologist-In-Charge (HIC) or Development and Operations Hydrologist (DOH) should be contacted at home. If they cannot be contacted, the after-hours contact list should be used until someone is contacted.

If WFO San Juan communications are inoperative, WFO Miami will call the SERFC.

6. Drills

Because earthquakes do not occur regularly, drills are critical to maintaining operational proficiency. WFO SJU should conduct at least one drill a year covering the tsunami program procedures, and will notify the SRH Tsunami Program Leader when the drill is completed by the staff.

Appendix A:

Sample WFO Checklist to use when a Tsunami Watch or Warning is issued by WC/ATWC for Your Area.

TSUNAMI WARNING / WATCH

(circle one)

Criteria: By direction of the West Coast / Alaska Tsunami Warning Center.

Issued: Date _____ Time _____

Valid until: Date _____ Time _____

Initials of Warning Coordinator _____

Area Affected _____

Time
Completed/Initials

WATCH / WARNING CHECKLIST

_____/_____

Put the watch or warning information immediately on NWR as follows:

- Get a CRS/NWR Broadcast Template from Appendix B for a Tsunami Watch or Appendix C for a Tsunami Warning.
- Fill in the blanks. This is what you will read on CRS.
- Use the following EAS code _____ (defined locally in your SDM)
- Follow the proper procedures to broadcast the message for CRS.
- Write on the template the time your message was initially broadcast on NWR.

_____/_____

If other weather warnings are in effect during the tsunami event, after a short period of time that the tsunami message has played alone, play the additional warning messages in the interest of protecting lives and property. Keep CRS programming at an absolute minimum. This should all be programmed to happen automatically if you recorded the message correctly on CRS.

_____/_____

Issue an SPS product every 30 minutes and broadcast on NWR. The SPS product should provide updates and/or local information (see Section 3.1.a.3 for details).

_____/_____

Consider any additional actions that may enhance community response to this watch/warning. These may include additional phone calls to local emergency managers, law enforcement, fire departments, etc, where impact may be particularly damaging. Record all of these actions.

_____/_____

Continue to record updates from WC/ATWC to CRS and also SPSs issued from your local office.

- _____/_____
Log all additional incidents or actions that pertain to this event. Any verification information received should be recorded as well.
- _____/_____
Contact the MIC and WCM if they are not on station.
- _____/_____
Also contact the RFC.
- _____/_____
Gather pertinent documents and review evacuation/safety procedures if the office is threatened by the tsunami.

**Time
Completed**

CANCELLATION CHECKLIST

- _____/_____
Put the cancellation on NWR as follows:
- Get a Cancellation Broadcast Template from Appendix D.
 - Fill in the blanks. This is what you will read on CRS.
 - Follow the proper procedures to broadcast the message for CRS.
 - Write the time your cancellation message was initially broadcast on the template.
 - Remove the message after about 1 hour.
- _____/_____
Retain all records of this event and place on the WCM's desk.
- _____/_____
Notify the MIC or the WCM if they are not on station.

Appendix B:

CRS/NWR Broadcast Template for Tsunami Watch

Upon receipt of a **tsunami watch** product (TSUAT1) from the WC/ATWC that includes all or a portion of your area, print this form and fill it out based on information included in the tsunami watch product. Use the proper procedures to get the message below disseminated via CRS/NWR. Be sure to select the appropriate coastal transmitters that the tsunami watch will play on. Attach this form to the tsunami watch checklist. Here is the message to fill out and read:

"The National Weather Service has issued a **TSUNAMI WATCH** for coastal areas in _____ (specify area), from _____ to _____, at _____ AM / PM _____ (time zone). A large earthquake, with a preliminary magnitude of _____, has been detected approximately _____ miles _____ (direction) of _____ (location).

Though it remains uncertain if a tsunami will impact the **TSUNAMI WATCH** area, the arrival times for the initial tsunami wave are estimated for the following locations:

- _____ (LOCATION) _____ AM / PM _____ (time zone).
- _____ (LOCATION) _____ AM / PM _____ (time zone).
- _____ (LOCATION) _____ AM / PM _____ (time zone).
- _____ (LOCATION) _____ AM / PM _____ (time zone).

Include the following italicized section if this information appears in the watch product:

A tsunami has been generated which could impact coastal areas of (list your area here). Observed tsunami wave heights from this earthquake have been

_____ (FEET) at _____ (LOCATION) and _____ (FEET) at _____ (LOCATION) around _____ (AM / PM _____ (time zone).

Once again, a **TSUNAMI WATCH** is in effect from _____ (location) to _____ in _____ (specify area) at _____ AM / PM _____ (time zone).

A TSUNAMI WATCH means that the risk of a tsunami has increased, but its occurrence and timing are still uncertain.

If you are in the TSUNAMI WATCH area, stay posted on this potential hazard and be alert for instructions from local emergency officials. Your National Weather Service Office in (your location) will continue to monitor the situation, and will provide updates on NOAA Weather Radio every hour or sooner as conditions warrant."

Apéndice B-2 (Español):

Formato en español para WFO San Juan CRS/NWR cuando se recomiende una Vigilancia de Tsunami o Maremoto

Cuando se reciba la **recomendación de emitir una vigilancia de tsunami** (TIBCAX) del Centro de Avisos de Tsunami del Pacífico (PTWC) o de la Red Sísmica de Puerto Rico (PRSN) para Puerto Rico y/o las Islas Vírgenes Americanas, imprima esta forma y llene los blancos basado en la información recibida. Seguir el procedimiento apropiado para diseminar el siguiente mensaje a través de CRS/NWR. Verificar que se hayan seleccionado los transmisores apropiados para diseminar la vigilancia de tsunami. Grapar esta forma a la lista de cotejo para vigilancias de tsunami. Completar los blancos del siguiente mensaje y leerlos.

"El Servicio Nacional de Meteorología en San Juan ha emitido una VIGILANCIA DE TSUNAMI para las áreas costeras de Puerto Rico e Islas Vírgenes a las _____ AM / PM _____ (AST).

Un fuerte terremoto, con una magnitud preliminar de _____, ha sido detectado aproximadamente a _____ millas _____ al (dirección) de _____ (localización).

Aunque es un tanto incierto si el tsunami impactara el área bajo VIGILANCIA DE TSUNAMI, la llegada de la primera ola del tsunami ha sido estimada para los siguientes lugares:

_____ LOCALIZACION) _____ AM / PM _____ (AST).
_____ LOCALIZACION) _____ AM / PM _____ (AST).
_____ LOCALIZACION) _____ AM / PM _____ (AST).
_____ LOCALIZACION) _____ AM / PM _____ (AST).

Incluir la siguiente sección italizada si esta información se recibió del PRSN y/o PTWC:

Se ha generado un tsunami el cual puede impactar la zona costera (mencionar el área). La altura de las olas de tsunami observadas con este terremoto han sido _____ (pies) en _____ (LOCALIZACION) Y _____ (pies) en _____ (LOCALIZACION) alrededor _____ (AM / PM _____ (AST).

Una vez mas, una VIGILANCIA DE TSUNAMI esta en efecto desde _____ (localización) hasta _____ en _____ (especificar el área) a las _____ AM / PM _____ (AST).

Una VIGILANCIA DE TSUNAMIS significa que el riesgo de un tsunami ha incrementado, pero su ocurrencia y hora de llegada es incierta.

Si se encuentra en el área de VIGILANCIA DE TSUNAMI, manténgase informado de esta amenaza potencial y esté alerta a las instrucciones de los oficiales locales de manejo de emergencias. Su Servicio Nacional de Meteorología en San Juan va seguir al tanto de la situación la situación y proveerá actualizaciones cada hora o antes, según las condiciones ameriten.

Appendix C:

CRS/NWR Broadcast Template for Tsunami Warning

Upon receipt of a **tsunami warning** product (TSUAT1) from the WC/ATWC that includes all or a portion of your area, print this form and fill it out based on information included in the tsunami warning product. Use the proper procedures to get the message below disseminated via CRS/NWR. Be sure to select the appropriate coastal transmitters that the tsunami warning will play on. Attach this form to the tsunami warning checklist. Here is the message to fill out and read:

"The National Weather Service has issued a TSUNAMI WARNING for coastal areas in _____ (specify area), from _____ to _____, at _____ AM / PM _____ (time zone). A large earthquake, with a preliminary magnitude of _____, has been detected approximately _____ miles _____ (direction) of _____ (location).

The arrival times for the initial tsunami waves are estimated for the following locations:

_____(LOCATION) _____ AM / PM _____ (time zone).
_____(LOCATION) _____ AM / PM _____ (time zone).
_____(LOCATION) _____ AM / PM _____ (time zone).
_____(LOCATION) _____ AM / PM _____ (time zone).

Include the following italicized section if this information appears in the warning product:

A tsunami has been generated which could impact coastal areas of (list your area here). Observed tsunami wave heights from this earthquake have been

_____ (FEET) at _____(LOCATION) and _____ (FEET) at _____ (LOCATION) around _____ (AM / PM _____ (time zone).

Once again, a TSUNAMI WARNING is in effect from _____ (location) to _____ in _____ (specify area) at _____ AM / PM _____ (time zone).

A TSUNAMI WARNING means that a tsunami is (circle one): occurring, imminent or highly likely.

Tsunamis are a series of waves generated by an undersea earthquake. This series of waves could be dangerous for several hours after the initial tsunami flood wave arrives.

If you are in the TSUNAMI WARNING area, stay alert for instructions from local emergency officials. Anyone on or near the beach in the TSUNAMI WARNING area should move to higher ground. Your National Weather Service Office in (your location) will continue to monitor the situation and will provide updates on NOAA Weather Radio every hour or sooner as conditions warrant."

Note: The warning coordinator can add information (call to action statements, etc...) to the last paragraph above, from the "EVALUATION" portion of WC/ATWC's tsunami warning product if he/she deems it appropriate.

Apéndice C (Español):

Formato en español para WFO San Juan CRS/NWR cuando se recomiende un Aviso de Tsunami o Maremoto

Cuando se reciba la **recomendación de emitir un aviso de tsunami** (TIBCAX) del Centro de Avisos de Tsunami del Pacifico (PTWC) o de la Red Sísmica de Puerto Rico (PRSN) para Puerto Rico y/o las Islas Vírgenes Americanas, imprima esta forma y llene los blancos basado en la información recibida. Seguir el procedimiento apropiado para diseminar el siguiente mensaje a través de CRS/NWR. Verificar que se hayan seleccionado los transmisores apropiados para diseminar la vigilancia de tsunami. Grapar esta forma a la lista de cotejo para avisos de tsunami. Completar los blancos del siguiente mensaje y leerlos.

"El Servicio Nacional de Meteorología en San Juan ha emitido un AVISO DE TSUNAMI para las áreas costeras de Puerto Rico e Islas Vírgenes a las _____ AM / PM _____ (AST).

Un fuerte terremoto, con una magnitud preliminar de _____, ha sido detectado aproximadamente a _____ millas _____ al (dirección) de _____ (localización).

Aunque es un tanto incierto si el tsunami impactara el área bajo AVISO DE TSUNAMI, la llegada de la primera ola del tsunami ha sido estimada para los siguientes lugares:

_____ LOCALIZACION) _____ AM / PM _____ (AST).
_____ LOCALIZACION) _____ AM / PM _____ (AST).
_____ LOCALIZACION) _____ AM / PM _____ (AST).
_____ LOCALIZACION) _____ AM / PM _____ (AST).

Incluir la siguiente sección italizada si esta información se recibió del PRSN y/o PTWC:

Se ha generado un tsunami el cual puede impactar la zona costera (mencionar el área). La altura de las olas de tsunami observadas con este terremoto han sido _____ (pies) en _____ (LOCALIZACION) Y _____ (pies) en _____ (LOCALIZACION) alrededor _____ (AM / PM _____ (AST).

Una vez mas, un AVISO DE TSUNAMI esta en efecto desde _____ (localización) hasta _____ en _____ (especificar el área) a las _____ AM / PM _____ (AST).

Un AVISO DE TSUNAMI quiere decir que (escoger una): está ocurriendo, es inminente o es altamente probable.

Los tsunamis son una serie de olas generadas por un terremoto submarino. Esta serie de olas pueden ser peligrosas por varias horas después de que haya llegado la ola inicial del tsunami.

Si usted se encuentra en una zona bajo AVISO DE TSUNAMI, manténgase atento a las instrucciones de los oficiales de manejo de emergencias. Toda persona en o cerca de la playa en la zona bajo AVISO DE TSUNAMI debe moverse a un lugar alto o alejarse de la costa. El Servicio Nacional de Meteorología en San Juan continuará al tanto de la situación y emitirá información actualizada cada hora vía Radio NOAA o antes si las condiciones lo ameritan."

Nota: El coordinador de avisos puede añadir información (medidas de precaución, etc.) al último párrafo arriba, del contenido del boletín de tsunami emitido por el PTWC o RSPR si es apropiado o esta disponible.

Appendix D:

CRS/NWR Broadcast Template for Tsunami Cancellation

Upon receipt of a tsunami watch/warning **cancellation** product (TSUAT1) from the WC/ATWC for all or portions of your area, print this form and fill it out based on information included in the cancellation product. Use the proper procedures to get the message below disseminated via CRS/NWR. Be sure to select the appropriate coastal transmitters that the tsunami cancellation information will play on. Attach this form to the tsunami watch/warning checklist. Here is the message to fill out and read:

"The National Weather Service has canceled the TSUNAMI (WATCH / WARNING) for coastal areas in _____(specify area), from _____(location) to _____, at _____ AM / PM _____ time zone. The Tsunami Warning Center has determined that the tsunami danger for _____(specify area) no longer exists.

Include the following italicized section if this information appears in the cancellation product :

A regional tsunami was generated from a magnitude _____ earthquake, approximately _____ miles _____ (direction) of _____. Observed tsunami wave heights from this earthquake were _____ (FEET) at _____ (LOCATION) and _____ (FEET) at _____ (LOCATION).

Once again, the TSUNAMI (WATCH / WARNING) has been canceled for coastal areas in _____ (specify area), from _____ (location) to _____, at _____ AM / PM _____ time zone. The Tsunami Warning Center has determined that no tsunami danger exists for _____ (specify area). Some coastal areas may experience small sea level changes. As local surf conditions can vary widely, the all clear determination must be made by local authorities. This is the final statement on this situation that will be broadcast by your National Weather Service Office in _____ (specify location). Our normal NOAA Weather Radio broadcast cycle will resume shortly."

Apéndice D (Español):

Modelo de Diseminación en CRS/NWR para la cancelación de Tsunami

Una vez recibido el producto de **cancelación** de la vigilancia/aviso de tsunami (TSUAT1) desde el WC/ATWC para todas las partes de su área, imprima esta forma y llénela basado en la información incluida en el producto de cancelación. Utilice los procedimientos apropiados para que el mensaje incluido más abajo sea diseminado vía CRS/NWR. Asegúrese de seleccionar el transmisor costero apropiado en el que la información de cancelación de tsunami será transmitida. Incluya esta forma en la hoja de cotejo para vigilancia/aviso de tsunami. Este es el mensaje a llenar y leer:

“El Servicio Nacional de Meteorología ha cancelado la (VIGILANCIA/AVISO) de TSUNAMI para las siguientes áreas costeras en _____ (especifique el área), desde _____ (lugar) hasta _____, a las _____ AM/PM _____ zona de hora. El Centro para Avisos de Tsunami ha determinado que ya no existe el peligro de tsunami para _____ (especifique el área).”

Incluya la siguiente sección italizada si esta información apareciese en el producto de cancelación:

Un tsunami regional ha sido generado desde un terremoto de magnitud _____, aproximadamente a _____ millas al _____ (dirección) de _____. Las alturas observadas de las olas tsunami debido a este terremoto fueron de _____ (PIES) en _____ (LUGAR) y de _____ (PIES) en _____ (LUGAR).

Una vez más, la (VIGILANCIA/AVISO) de TSUNAMI ha sido cancelada para las áreas costeras en _____ (especifique el área), desde _____ (lugar) hasta _____, a las _____ AM/PM _____ zona de hora. El Centro para Avisos de Tsunami ha determinado que ya no existe peligro de tsunami para _____ (especifique el área). Algunas areas costeras podrían experimentar pequeños cambios en el nivel del mar. Debido a que las condiciones de resacas pueden variar de manera extensa, la determinación de que todo está libre de peligro debe ser tomada por las autoridades locales. Este es el comunicado final que será transmitido por su Oficina del Servicio Nacional de Meteorología en _____ (especifique el lugar) sobre esta situación. Nuestro ciclo normal de programación de radio NOAA regresará en breve.”

Appendix E: Product Examples from WC/ATWC

Example of a standard format Tsunami Warning/Watch (TSUAT1 product) issued by WC/ATWC:

WEXX20 PAAQ 172109
TSUAT1

BULLETIN
TSUNAMI MESSAGE NUMBER 1
NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
409 PM EST FRI FEB 17 2006

...THIS MESSAGE IS FOR TEST PURPOSES TO SHOW AN EXAMPLE
WEXX20 MESSAGE...

...A TEST TSUNAMI WARNING IS IN EFFECT WHICH INCLUDES THE
FLORIDA - GEORGIA - SOUTH CAROLINA AND NORTH CAROLINA
COASTAL AREAS FROM FLAGLER BEACH FLORIDA TO CURRITUCK BEACH
LIGHTHOUSE NORTH CAROLINA...

...AT THIS TIME THIS MESSAGE IS ADVISORY ONLY FOR U.S. AND
CANADIAN ATLANTIC AND GULF OF MEXICO COASTAL REGIONS NOT
INCLUDED IN THE WARNED AREA...

EVALUATION

IT IS NOT KNOWN - REPEAT NOT KNOWN - IF A TSUNAMI EXISTS BUT A
TSUNAMI MAY HAVE BEEN GENERATED. THEREFORE PERSONS IN LOW
LYING COASTAL AREAS SHOULD BE ALERT TO INSTRUCTIONS FROM THEIR
LOCAL EMERGENCY OFFICIALS. PERSONS ON THE BEACH SHOULD MOVE TO
HIGHER GROUND IF IN A WARNED AREA. TSUNAMIS MAY BE A SERIES
OF WAVES WHICH COULD BE DANGEROUS FOR SEVERAL HOURS AFTER THE
INITIAL WAVE ARRIVAL.

EARTHQUAKE DATA

PRELIMINARY MAGNITUDE - 7.2
LOCATION - 32.2N 78.9W
100 MILES S OF MYRTLE BEACH SOUTH CAROLINA
80 MILES SE OF CHARLESTON SOUTH CAROLINA
TIME - 1550 EST FEB 17 2006
1450 CST FEB 17 2006
2050 UTC FEB 17 2006

AMZ450-452-454-330-350-352-354-250-252-254-256-130-135-150-152-
154-156-158-FLZ024-025-033-038-GAZ154-166-141-139-117-119-SCZ051-
048>050-046-034-NCZ100-101-097-098-095-104-103-094-080-081-045>
047-172209-

COASTAL AREAS BETWEEN AND INCLUDING FLAGLER BEACH FLORIDA
TO CURRITUCK BEACH LIGHTHOUSE NORTH CAROLINA.

...A TEST TSUNAMI WARNING IS IN EFFECT WHICH INCLUDES THE
FLORIDA - GEORGIA - SOUTH CAROLINA AND NORTH CAROLINA
COASTAL AREAS FROM FLAGLER BEACH FLORIDA TO CURRITUCK BEACH
LIGHTHOUSE NORTH CAROLINA...

ESTIMATED TIMES OF INITIAL WAVE ARRIVAL

CHARLESTON-SC 1746 EST FEB 17 JACKSONVILLE B-FL 1835 EST FEB 17
CAPE HATTERAS-NC 1749 EST FEB 17 SAVANNAH-GA 1930 EST FEB 17

MYRTLE BCH-SC 1826 EST FEB 17

\$\$

GMZ130-150-155-235-230-250-255-330-335-350-355-455-450-555-550-
 630-655-650-750-755-830-856-853-850-657-656-032-075-052>054-
 AMZ630-650-651-550-555-ANZ630>633-650-652-654-656-658-530>534-
 537-430-431-450>455-330-335-338-350-353-355-230>237-250-254-
 255-150-050-081-TXZ251-256-257-242>247-236>238-213-214-215-216-
 LAZ051>054-066>070-040-062-064-MIZ080>082-ALZ061>064-FLZ002-
 004-006-008-012-014-015-027-018-028-034-039-042-048>051-055-
 060-062-065-069-070-075-073-074-072-068-076-064-059-054-047-
 147-141-NCZ030>032-015>017-102-VAZ082-089>091-093>096-098>100-
 084>086-074>078-MDZ021>025-014-018-017-011-007-012-015-019-008-
 DEZALL-NJZ016-020>026-012-013-NYZ006-071>081-CTZ009>012-RIZ002-
 005>007-MAZ019>024-016-007-NHZ014-MEZ022>028-029-030-172209-
 COASTAL AREAS FROM BROWNSVILLE TEXAS TO FLAGLER BEACH
 FLORIDA AND FROM CURRITUCK BEACH LIGHTHOUSE NORTH CAROLINA
 TO CAPE CHIDLEY LABRADOR.

...TSUNAMI ADVISORY STATEMENT...

NO - REPEAT NO - TSUNAMI WATCH OR WARNING IS IN EFFECT FOR
 THE COASTAL AREAS FROM BROWNSVILLE TEXAS TO FLAGLER BEACH
 FLORIDA AND FROM CURRITUCK BEACH LIGHTHOUSE NORTH CAROLINA
 TO CAPE CHIDLEY LABRADOR.

FOR INFORMATION ONLY - ESTIMATED TIMES OF INITIAL WAVE ARRIVAL

MELBOURNE-FL	1818 EST FEB 17	GRAND MANAN-NB	2124 EST FEB 17
MIAMI-FL	1820 EST FEB 17	PORTLAND-ME	2131 EST FEB 17
KEY WEST-FL	1920 EST FEB 17	BOSTON-MA	2204 EST FEB 17
MONTAUK-NY	1938 EST FEB 17	PANAMA CITY-FL	2113 CST FEB 17
VIRGINIA BCH-VA	1939 EST FEB 17	CORPUS CHRISTI-TX	2202 CST FEB 17
ATLANTIC CITY-NJ	1943 EST FEB 17	BONAVISTA-NF	2315 EST FEB 17
LOCKEPORT-NS	2001 EST FEB 17	ST PETERSBURG-FL	2328 EST FEB 17
NANTUCKET ISLE-MA	2002 EST FEB 17	BILOXI-MS	2236 CST FEB 17
NEW YORK CITY-NY	2040 EST FEB 17	BATTLE HARBOUR-NL	2354 EST FEB 17
SCATARIE IS-NS	2112 EST FEB 17	GALVESTON-TX	2318 CST FEB 17
ST LAWRENCE-NF	2121 EST FEB 17		

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TSUNAMI WARNINGS ARE ISSUED DUE TO THE IMMINENT THREAT OF TSUNAMI. WARNINGS
 CAN BE BASED SOLELY ON SEISMIC INFORMATION... OR BASED ON CONFIRMATION THAT A
 POTENTIALLY DESTRUCTIVE WAVE HAS OCCURRED. COASTAL RESIDENTS IN THE WARNING
 AREA WHO ARE NEAR THE BEACH OR IN LOW-LYING REGIONS SHOULD MOVE IMMEDIATELY
 INLAND TO HIGHER GROUND.

MESSAGES WILL BE ISSUED HALF-HOURLY OR SOONER IF CONDITIONS WARRANT. THE
 TSUNAMI WARNING WILL REMAIN IN EFFECT UNTIL FURTHER NOTICE. REFER TO THE
 INTERNET SITE WCATWC.ARH.NOAA.GOV FOR MORE INFORMATION AND EXPECTED ARRIVAL
 TIMES.

THIS IS A TEST MESSAGE. DO NOT TAKE ACTION BASED ON THIS TEST MESSAGE.

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Appendix E - Continued: Product Examples from WC/ATWC

Example of a "Public Friendly" Tsunami Warning/Watch (TSUATE product) issued by WC/ATWC:

WEXX30 PAAQ 172109
TSUATE

BULLETIN
PUBLIC TSUNAMI MESSAGE NUMBER 1
NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
409 PM EST FRI FEB 17 2006

...THIS MESSAGE IS FOR TEST PURPOSES TO SHOW AN EXAMPLE
WEXX30 MESSAGE...

...A TEST TSUNAMI WARNING IS IN EFFECT WHICH INCLUDES THE
FLORIDA - GEORGIA - SOUTH CAROLINA AND NORTH CAROLINA
COASTAL AREAS FROM FLAGLER BEACH FLORIDA TO CURRITUCK BEACH
LIGHTHOUSE NORTH CAROLINA...

A TSUNAMI WARNING MEANS... ALL COASTAL RESIDENTS IN THE WARNING AREA WHO ARE NEAR THE BEACH OR IN LOW-LYING REGIONS SHOULD MOVE IMMEDIATELY INLAND TO HIGHER GROUND AND AWAY FROM ALL HARBORS AND INLETS INCLUDING THOSE SHELTERED DIRECTLY FROM THE SEA. THOSE FEELING THE EARTH SHAKE... SEEING UNUSUAL WAVE ACTION... OR THE WATER LEVEL RISING OR RECEDING MAY HAVE ONLY A FEW MINUTES BEFORE THE TSUNAMI ARRIVAL AND SHOULD EVACUATE IMMEDIATELY. HOMES AND SMALL BUILDINGS ARE NOT DESIGNED TO WITHSTAND TSUNAMI IMPACTS. DO NOT STAY IN THESE STRUCTURES.

ALL RESIDENTS WITHIN THE WARNED AREA SHOULD BE ALERT FOR INSTRUCTIONS BROADCAST FROM THEIR LOCAL CIVIL AUTHORITIES. THIS TSUNAMI WARNING IS BASED SOLELY ON EARTHQUAKE INFORMATION - THE TSUNAMI HAS NOT YET BEEN CONFIRMED.

AT 350 PM EASTERN STANDARD TIME ON FEBRUARY 17 AN EARTHQUAKE WITH PRELIMINARY MAGNITUDE 7.2 OCCURRED 100 MILES SOUTH OF MYRTLE BEACH SOUTH CAROLINA. THIS EARTHQUAKE MAY HAVE GENERATED A TSUNAMI. IF A TSUNAMI HAS BEEN GENERATED THE WAVES WILL FIRST REACH SOUTH SANTEE RIVER SOUTH CAROLINA AT 537 PM EST ON FEBRUARY 17. ESTIMATED TSUNAMI ARRIVAL TIMES AND MAPS ALONG WITH SAFETY RULES AND OTHER INFORMATION CAN BE FOUND ON THE WEB SITE WCATWC.ARH.NOAA.GOV.

TSUNAMIS CAN BE DANGEROUS WAVES THAT ARE NOT SURVIVABLE. WAVE HEIGHTS ARE AMPLIFIED BY IRREGULAR SHORELINE AND ARE DIFFICULT TO PREDICT. TSUNAMIS OFTEN APPEAR AS A STRONG SURGE AND MAY BE PRECEDED BY A RECEDING WATER LEVEL. MARINERS IN WATER DEEPER THAN 600 FEET SHOULD NOT BE AFFECTED BY A TSUNAMI. WAVE HEIGHTS WILL INCREASE RAPIDLY AS WATER SHALLOWS. TSUNAMIS ARE A SERIES OF OCEAN WAVES WHICH CAN BE DANGEROUS FOR SEVERAL HOURS AFTER THE INITIAL WAVE ARRIVAL. DO NOT RETURN TO EVACUATED AREAS UNTIL AN ALL CLEAR IS GIVEN BY LOCAL CIVIL AUTHORITIES.

ADDITIONAL MESSAGES WILL BE ISSUED HALF-HOURLY OR SOONER IF CONDITIONS WARRANT. THE TSUNAMI WARNING WILL REMAIN IN EFFECT UNTIL FURTHER NOTICE. FOR FURTHER INFORMATION STAY TUNED TO NOAA WEATHER RADIO... YOUR LOCAL TV OR RADIO STATIONS... OR SEE THE WEB SITE WCATWC.ARH.NOAA.GOV.

THIS IS A TEST MESSAGE. DO NOT TAKE ACTION BASED ON THIS TEST MESSAGE.

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Appendix E - Continued: Product Examples from WC/ATWC

**Example of a standard format Tsunami Information Statement (TIBAT1 product) issued
by WC/ATWC:**

WEXX22 PAAQ 172113
TIBAT1

TSUNAMI INFORMATION STATEMENT NUMBER 1
NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
413 PM EST FRI FEB 17 2006

...THIS MESSAGE IS FOR TEST PURPOSES TO SHOW AN EXAMPLE
WEXX22 MESSAGE...

...THIS TSUNAMI INFORMATION STATEMENT IS FOR THE U.S. ATLANTIC
AND GULF OF MEXICO COASTS AND EASTERN CANADA...

NO - REPEAT NO - WATCH OR WARNING IS IN EFFECT FOR U.S. ATLANTIC
AND GULF OF MEXICO STATES AND THE EASTERN CANADIAN PROVINCES.

EVALUATION

BASED ON EARTHQUAKE AND HISTORICAL TSUNAMI INFORMATION THE
EARTHQUAKE WAS NOT SUFFICIENT TO GENERATE A TSUNAMI DAMAGING TO
THE U.S. ATLANTIC... EASTERN CANADIAN OR GULF OF MEXICO COASTS.
SOME OF THESE AREAS MAY EXPERIENCE SMALL SEA LEVEL CHANGES.

HOWEVER - EARTHQUAKES OF THIS SIZE SOMETIMES GENERATE
TSUNAMIS THAT CAN BE DESTRUCTIVE ALONG COASTS LOCATED IN THE
REGION OF THE EARTHQUAKE EPICENTER. AUTHORITIES IN THE REGION
SHOULD BE AWARE OF THIS POSSIBILITY AND TAKE APPROPRIATE ACTION.

EARTHQUAKE DATA

PRELIMINARY MAGNITUDE - 6.8
LOCATION - 36.1N 13.2W
- NORTH ATLANTIC OCEAN
TIME - 1550 EST FEB 17 2006
1450 CST FEB 17 2006
2050 UTC FEB 17 2006

THIS WILL BE THE ONLY STATEMENT ISSUED FOR THIS EVENT BY THE
WEST COAST AND ALASKA TSUNAMI WARNING CENTER UNLESS ADDITIONAL
INFORMATION BECOMES AVAILABLE. REFER TO THE INTERNET SITE
WCATWC.ARH.NOAA.GOV FOR MORE INFORMATION.

THIS IS A TEST MESSAGE. DO NOT TAKE ACTION BASED ON THIS TEST
MESSAGE.

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Appendix E - Continued: Product Examples from WC/ATWC

Example of a Tsunami Seismic Information Statement (EQIAT1 product) issued by WC/ATWC:

SEXX60 PAAQ 172116
EQIAT1

TSUNAMI SEISMIC INFORMATION STATEMENT
NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
416 PM EST FRI FEB 17 2006

...THIS MESSAGE IS FOR TEST PURPOSES TO SHOW AN EXAMPLE
SEXX60 MESSAGE...

...THIS IS AN INFORMATION STATEMENT...

EVALUATION

AN EARTHQUAKE HAS OCCURRED WITH A MAGNITUDE SUCH THAT A TSUNAMI
WILL NOT BE GENERATED. THIS WILL BE THE ONLY WC/ATWC MESSAGE
ISSUED FOR THIS EVENT.

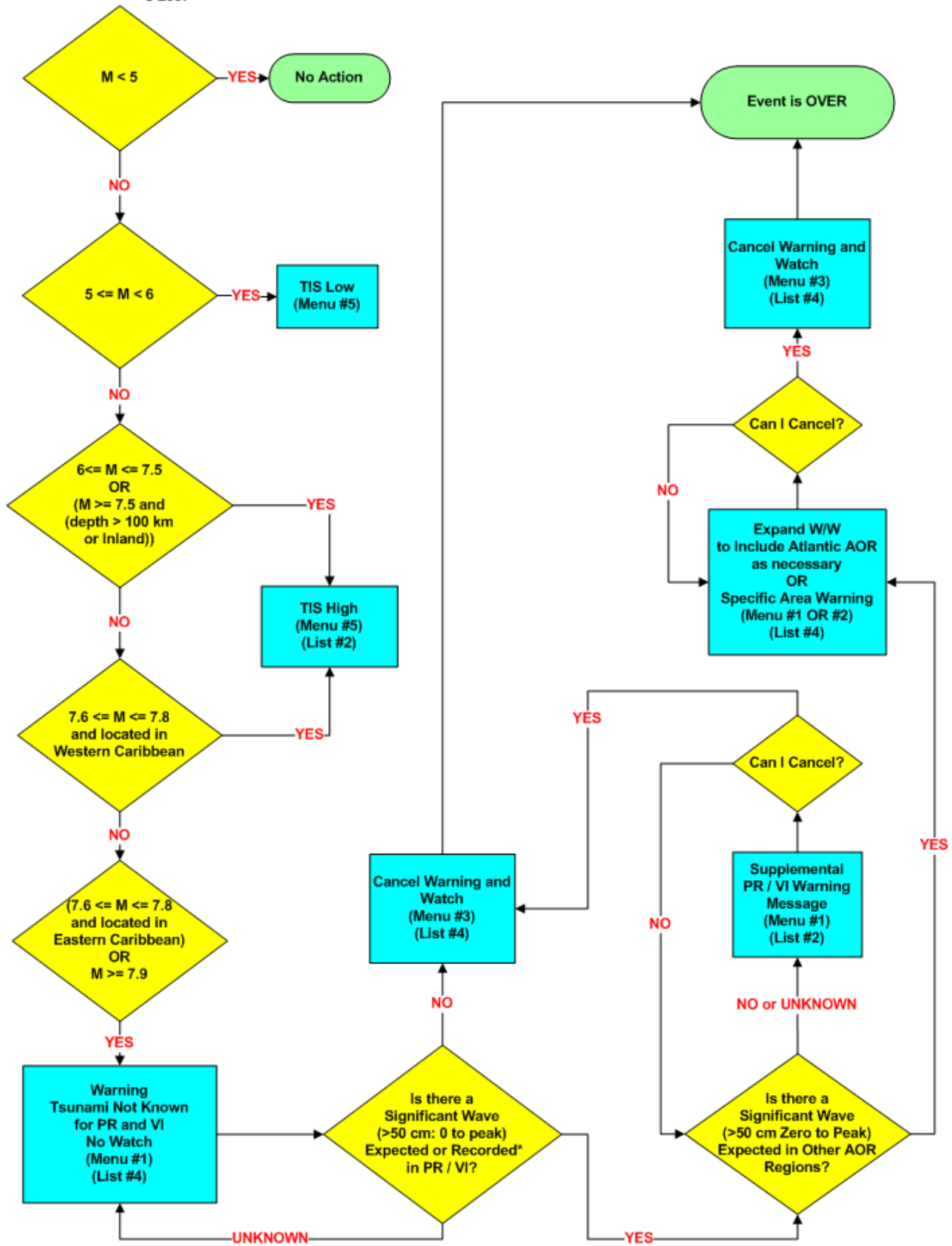
EARTHQUAKE DATA

PRELIMINARY MAGNITUDE - 4.9
LOCATION - 39.5N 74.3W
 15 MILES NE OF ATLANTIC CITY NEW JERSEY
 55 MILES SE OF PHILADELPHIA PENNSYLVANIA
TIME - 1550 EST FEB 17 2006
 1450 CST FEB 17 2006
 2050 UTC FEB 17 2006

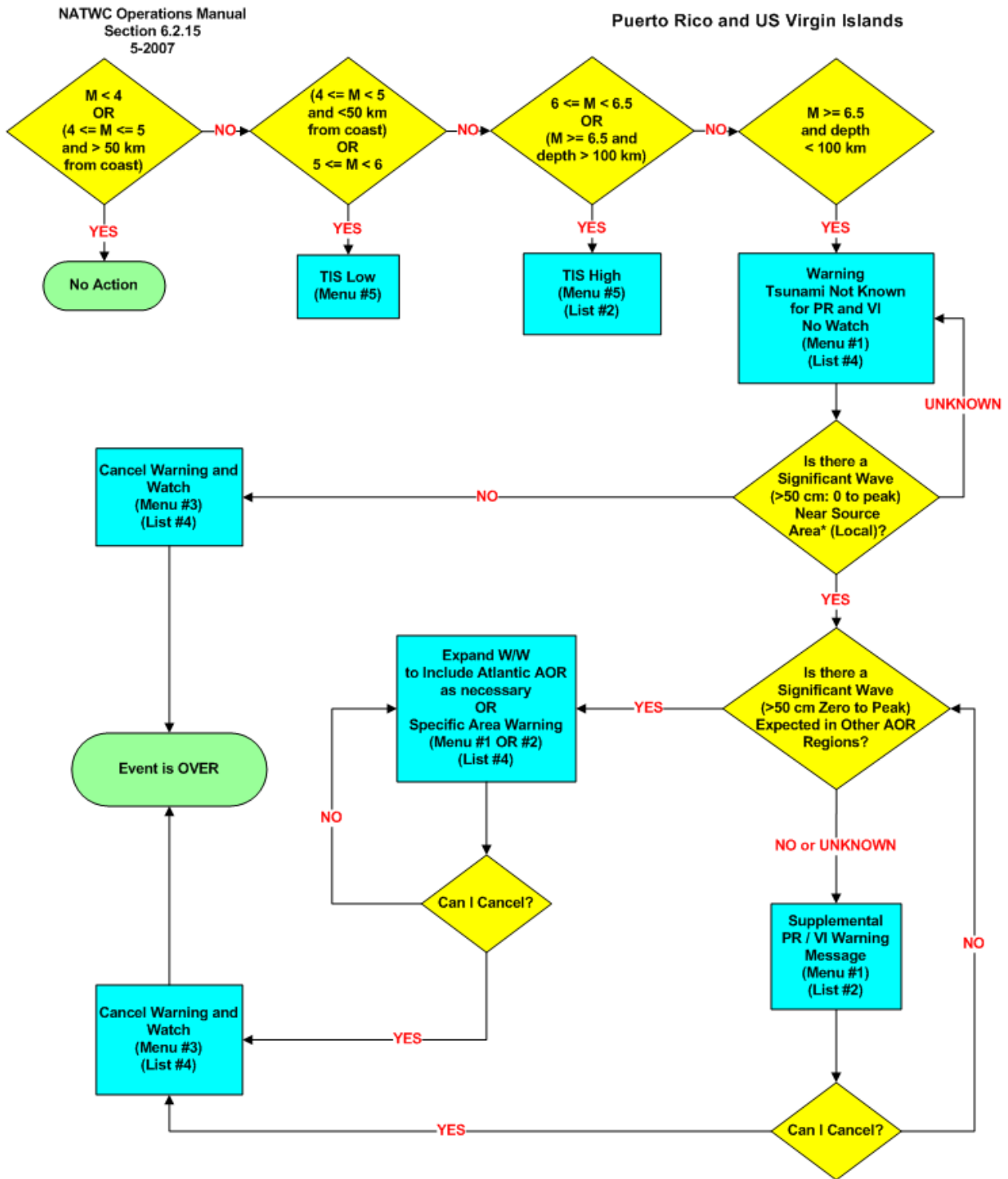
THE LOCATION AND MAGNITUDE ARE BASED ON PRELIMINARY INFORMATION.
FURTHER INFORMATION WILL BE ISSUED BY THE UNITED STATES
GEOLOGICAL SURVEY - EARTHQUAKE.USGS.GOV.

THIS IS A TEST MESSAGE. DO NOT TAKE ACTION BASED ON THIS TEST
MESSAGE.

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* Based on DART and Tide Gauges



* Within the initial warned area