

## CTBTO Response to an Underwater or Surface Test in International Waters

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- Prior to the ban on atmospheric testing in 1963 many early nuclear weapons tests were conducted in or near (for example on an island) the ocean.
- However, almost all were done in shallow water, and arguably none were clandestine
- The concept of truly international waters has evolved over time and The Law of the Sea has expanded state control and responsibility for territorial seas, Economic



- The CTBT precludes any test in the ocean, but does not directly address the issue of how allegations of testing in the ocean would be processed, whereas it goes into great detail as to how an allegation of testing in a State would be responded to.
- Presumably allegations of testing in some waters would follow jurisdiction.



• The International Monitoring System (IMS) is set up to deal with testing in the ocean. Although hydro-acoustic monitoring would be the most likely to detect an ocean-based event, infrasound, radionuclide, and seismic sensors may also detect a marine test.



### Tests in violation of the CTBT or testing outside the CTBT regime can be of two types:

- a) Tests like those conducted by DPRK that are outside the CTBT system (not pre-announced but known and/or acknowledged)
- b) Clandestine tests conducted by states wishing to conceal the test.



• Arguably CTBT is focused on the b) type of concealed test and **CTBTO** exercises to date have focused on how to determine whether a clandestine test has occurred.



• The incentives for conducting a clandestine test in the ocean, by states not openly defying the international norm of banning nuclear tests, may be far greater than incentives for conducting such tests on their own territory



- While "clandestine" open ocean testing may be far more readily detectable than a well concealed test on land, attribution to a particular state conducting the test may be far more difficult.
- Advantages of clandestine open ocean testing to estate might include:
  - ✓ Deniability
  - ✓ Ease of masking pretest preparations



• The potential also exists to stage a test on ocean areas within the jurisdiction of another state either to mask responsibility, or intentionally embarrass/harass another state.



- Ocean testing in all probability shifts the emphasis from "Was there a test?" to "Who did it?"
- In addition to a different set of equipment for CTBO response, different sciences and methodologies may be needed (e.g. ships, water sampling equipment, potential bottom coring equipment, and equipment capable of dealing with deep areas of the ocean).



• While normal meteorology will still remain significant for ocean testing, experts with a knowledge of ocean currents, saltwater ocean chemistry with radionuclides of interest, and other marine-related sciences will need to be ready to respond to an indication of an ocean test.



- Nuclear forensics with an emphasis on attribution will be important to answering the "Who" question. National technical means may be necessary, for example, to track vessels that may have been in the area prior to a detonation.
- Note that a testing state might use a vessel both as a transport mechanism and a test bed/platform with the vessel being destroyed by the test



 Also, it should be noted that modern test instrumentation could be employed that would transmit test data in a manner that it could be monitored from any location around the world



#### A Proposal for an Exercise

In 1962 the U.S. Navy conducted the Swordfish test as part of Operation Dominic. It was a deep water open ocean test - probably only one ever conducted in deep water. USS **Agerholm (DD 826) fired an operation ASROC** anti-submarine missile at a target 4000 yards away. ASROC used aW44 warhead (~10 kT) detonated at a depth of ~650 ft (200 m) in <u>water ~ 17,000 ft (5.2 km) deep</u>



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#### Test was conducted in international waters about 400 miles West of San Diego

#### **U.S. might reveal data?**

# Exercise could start with rough location and perform analysis



#### **Purposes of exercise**

- > Develop technical ability
- Exercise predictive sciences
- > Actually recover test evidence for analysis
- Perform nuclear forensics on recovered materials
- Map spread of detectable deposits and compare with prediction



#### **Purposes of exercise**

#### Work through admin and legal aspects of a CTBT response to a test in international waters



#### A Proposal for a Second Exercise

Use data and experiences developed in Swordfish exercise to try to determine if the disputed 1972 Vela event in the Indian Ocean was a nuclear test.

If cores from Swordfish show samples over a wide enough area, acoustic data associated with Vela could be used to try to locate core samples.

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Absonce of data would not indicate no test



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