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Department of Energy
Washington, D.C. 20585

November 8, 1979

MEMORANDUM FOR Henry Owen

Attached please find the description of an event that may have some bearing on the South Atlantic incident of September 22. In an effort to search all possible sources of corroborating data, DOE technical staff (Defense Programs) in cooperation with Los Alamos inquired if the Arecibo Atmospheric Observatory had detected any anomalous upper atmospheric acoustic waves during the time period of interest.

The initial examination of this "travelling ionospheric disturbance" indicates a signal that possibly may confirm the signal from the VELA system. The connection between nuclear detonations or other phenomena and acoustic wave detection is less well calibrated than the VELA information. Accordingly, a good deal of analysis will need to be undertaken before reaching a final assessment of this information. I have instructed DOE staff to undertake this analysis in cooperation with JAEIC and I am sending copies of this memorandum to other pertinent members of the SCC group by personal messenger. I believe the group formed by Frank Press should be apprised of this possibly pertinent evidence.

John Deutch
Under Secretary

cc: Harold Brown
Frank Press
Bruce Clark
Tom Pickering

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21-22 September Acoustic Gravity Wave Detection, Arecibo Ionospheric Observatory, Puerto Rico

- Facility operational in support of on-going LASL program.
- Ionospheric electron density profile shows acoustic gravity wave between 0545Z and 0715Z peaking at 0630Z.
- South to north velocity component greater than 250 M/S.
- Disturbance involved coupling to ionosphere in 200 to 260 KM altitude suggesting fully ducted wave.

Conclusions

- Wave shape of gravity wave consistent with traveling ionospheric disturbance phenomenology under study by ISA.
- There exists an ambiguity in the possible propagation velocities (i.e., 260 M/S, 430 M/S, 630 M/S), ambiguity due to different modes of propagation.
- Possible ranges to the source are therefore 12,700 KM, 8700 KM or 5300 KM.
- Range contours from Arecibo consistent with the VELA field of view footprint.
- The period of the observed gravity wave is longer than what is typically expected by a factor of at least 2 (could be due to non-linear dispersion in the media).
- Acoustic gravity wave phenomena consistent with either an earthquake or an explosion source.
- Similar observations have been seen in the past from Soviet tests at Novaya Zemlya in 1961.
- Additional data from sensors in the South America and Africa region required in order to resolve ambiguities.

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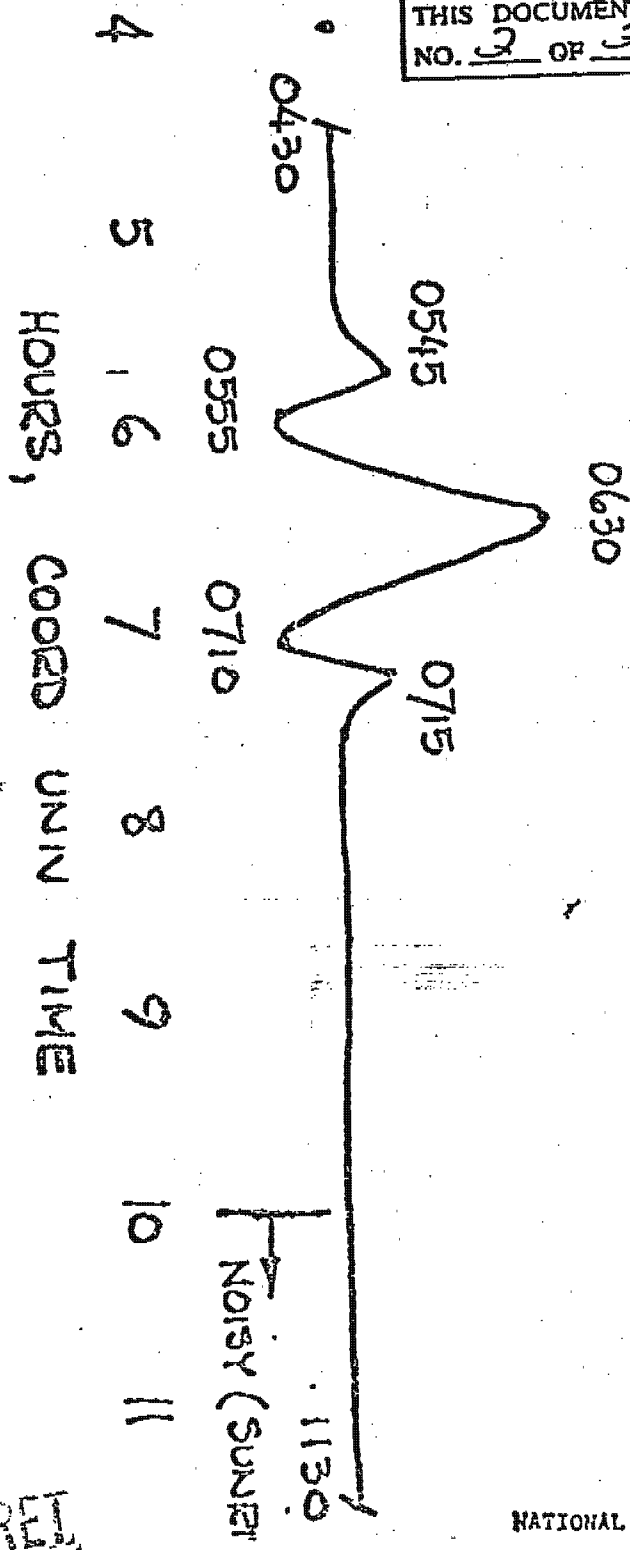
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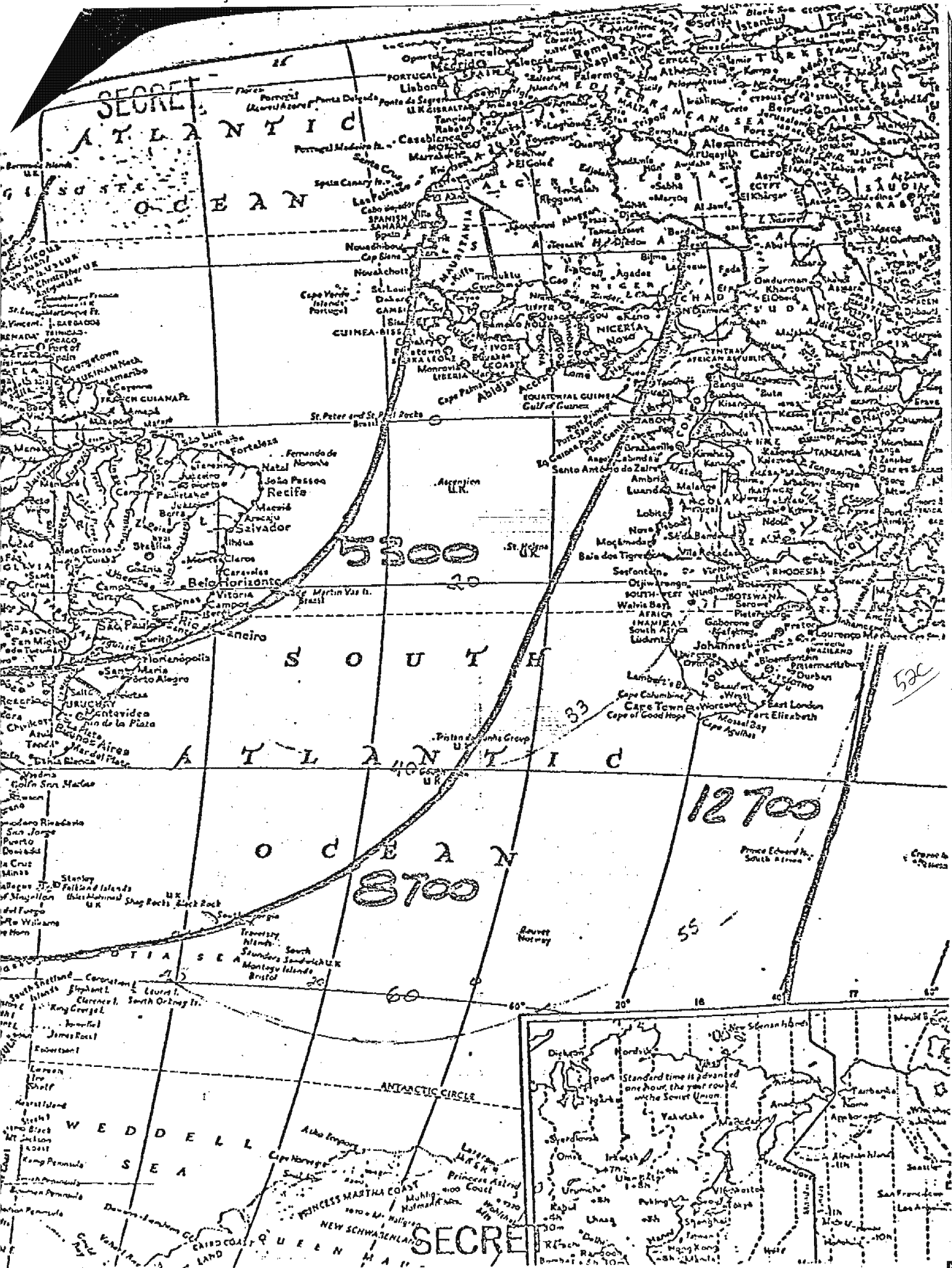


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