

TEXAS TOWER FILE VOLUME I

1 JAN 61 - 31 MAR 61

1012657

RETURN TO

AFSHRC

MAXWELL AFB AL 36112

JACOB FELD, PH. D.
CONSULTING ENGINEER
44-60 EAST 23RD STREET
NEW YORK 10, N. Y.

3/31/61

Data on Diving Inspection Costs.

from Frank Oberle, Mgr. Salvage Dept
Merritt Chapman Scott Corp.

Inquiry was for possible 30 hrs. of Inspection at 200 ft. depth.

at 200 ft depth, diver is limited to 15 min. exposure
with 2 hrs. decompression in a 12 hour cycle.

This means 120 dives - probably over 30 day period
Must include allowances for subsistence and transportation.

Rates for divers - Between 8:00 and 17:00, \$43²⁰/Day for 60' dive
plus \$24²⁵/Day for depths to 125 ft. for Diver.
and \$30²⁰/Day at 60' plus \$15⁰⁰/Day up to 125 ft for Tender

Should allow \$200/Day per team plus 100% Insurance, etc.
or \$400/per dive of 15 minutes.

To charter a fully manned boat for one month \$60,000.

Decompression lock \$175/Day x 30 d: 5,250

120 dives @ \$400 48,000

Total Cost \$113,250

Allow subsistence and transportation 6,750
for 5 or 6 teams of divers 120,000

Contingency and weather hindrance 24,000
20%

total \$144,000

1012857

Diving Inspection Costs

| | Dr Field | Bo Docks |
|--------|-----------|------------|
| Diving | \$ 58,000 | \$ 100,000 |
| Boat | 86,000 | - 260,000 |
| | 144,000 | 360,000 |

Costs do not include evaluation of
tower designs against findings.

53 800

5

144

58

86

In Dochs, after informal discussion with the 1st Naval District and the Marine Contracting Corp, indicates that 10 divers would be required to conduct and complete further underwater investigation. Each caisson and brace would be examined and photographed. A TV take would be made to orient the various components. Estimated cost of this work is \$ 100,000.

Boat and logistical support is estimated to cost \$ 10,000 to \$ 13,000 per day.

It is not possible to accurately estimate the number of days at sea. On basis of 20 days the cost would range from \$ 200,000 to \$ 260,000.

The outside total would be \$ 360,000 but BuDochs believe \$ 450,000 to be safer figure because of weather uncertainties.

Above does not include reevaluation of tower design

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

AF IN : 4391 (30 Mar 61)

A/WE INCOMING

ACTION: OOP-2 INFO : OOP-CP-1, OCE-2, OAC-1 (7)
NNNN

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M

SMB A 141

ZCZCHQA257ZCBA379

MM RJEZHQ

DE RBEPG 20

ZNR

M 301552Z

FM BUDOCKS

TO RJEZHQ/PQ USAF WASHDC

INFO RBEGMC/JPWO FIRST NAVDIST

RBEPJD/US COAST GUARD WASHDC

RJEZSN/26TH AIR DIV HANCOCK FLD NY

RJWFAL/HQ ADC COLORADO SPRINGS COLO

RJEZDG/OTIS AFB MASS

NAVY GRNC

B

UNCLAS

TEXAS TOWER NR 4

A. YOUR 282117Z

1. CONSIDER FURTHER DISPOSITION TEXAS TOWER NR 4 IS AF
RESPONSIBILITY. THIS BUREAU PLANS NO ACTION IN THIS REGARD
EXCEPT ON YOUR REQ. ALL INFO PROVIDED BY THIS BUREAU HAS BEEN
RELEASED ONLY THROUGH APPROPRIATE CHANNELS ON AN OFFICIAL BUSINESS
BASIS AND WILL CONTINUE TO BE O

HANDLED

BT

30/1552Z

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DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE
INCOMING

NOTED BY S/GEN KELLEY

2 ✓
M

AF IN : 3985 (30 Mar 61) PE/ns

INFO : OCE-2, SAFS-3, OOP-2, OOP-CP-1, IIS-3, CIG-2 (14)

SMB C 072

KZCHQE687ZCWJA395

MM RJEZHQ

DE RJWFAL 8

ZNR

M 300027Z ZEX

FM COMDR ADC ENT AFB COLO

TO RJEZSN/26AD HANCOCK FLD NY

INFO RJEZHQ/COFS USAF

BT

UNCLAS ADIDCI012629.

ACTION 26AIRDIV (IDC) INFO USAF (AFOCE). AND SAFOI) REPORT OF
UNDERWATER EXPLORATION FINDINGS AT TEXAS TOWER 4.

REFERENCE MESSAGE 26IFS-B/CVD, HQ 26 AIR DIV, 24 MAR 61.

THIS MESSAGE IN TWO PARTSJM PART I - REQUEST THE
REFERENCED MESSAGE BE RESCINDED AND RETRANSMITTED TO
ACCOMPLISH CONTROL OF THE SUBJECT REPORT AS INDICATED
BUT TO PERMIT ITS USE AS FOLLOWS: THE REPORT WILL IN
ALL INSTANCES BE CONSIDERED FOR QUOTE OFFICIAL USE
ONLY UNQUOTE AND FURTHER WILL BE USED ONLY ON AQUOTE

3072

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

INCOMING

AF IN : 3985 (30 Mar 61)

Page 2 of 2 pages

PAGE TWO RJWFAL 8

NEED TO KNOW BASIS UNQUOTE. THE REPORT MAY BE FURNISHED TO THE UNITED STATES AIR FORCE OR NAVY OR CIVILIAN CONTRACTORS OF EITHER ON THE ABOVE BASIS WHEN IN CONJUNCTION WITH OFFICIAL INVESTIGATIONS OR STUDIES AUTHORIZED BY THIS HQ. CONTENTS OF THE REPORT MAY BE FURNISHED TO OTHER GOVERNMENT AGENCIES OR TO CONGRESS ON THE SAME BASIS ONLY WITHIN THE PROVISIONS OF AFR 11-30(AND AFR 11-7. IPART II - THE 26 AIR DIV WILL INSURE THAT THE CONTRACTORS NOW MAKING INVESTIGATIONS OF TEXAS TOWERS CONSIDER HIS REPORTS TO BE QUOTE PRIVILEGED INFORMATION UNQUOTE AND THAT NO PART OF IT BE REVEALED VERBALLY OR OTHERWISE TO ANY PERSON NOT SPECIFICALLY DESIGNATED IN THE CONTRACT OR OTHERWISE WITHOUT SPECIFIC PERMISSION OF THE APPROPRIATE CONTRACTING OFFICER AND THAT SIMILAR ACTION BE TAKEN WITH THE MARINE CONTRACTING CORP. FOR USAF (AFOCE): THIS CONFIRMS CONVERSATION BETWEEN COL SCHUYLER THIS HQ AND COL IMPSON 28 MARCH.

BT

30/1000Z MAR RJWFAL



EDWARDS REPORT
DEPARTMENT OF THE NAVY
BUREAU OF YARDS AND DOCKS
WASHINGTON 25, D. C.

IN REPLY REFER TO

C-541/djd

30 MAR 1961

MISROUTED TO JAG, USAF

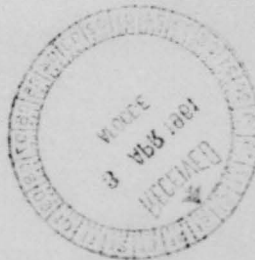
From: Chief, Bureau of Yards and Docks
To: Colonel Arthur Avertuck
Office, JAG, USAF
Room 50230
The Pentagon
Washington 25, D. C.

Subj: Texas Tower No. 4; Report of trip in connection with collapse of

1. A copy of the subject report is forwarded herewith in accordance with your request of 24 March.

W. C. G. CHURCH
CAPTAIN, CEC, USN
Assistant Chief for Construction

Copy to:
Col. I. H. Impson, AFOCE
Lt. Col. C. E. Nichols, AFOCE
Mr. C. W. Harris, AFOCE



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OMR EDWARDS
REPORT

C-541/mrp
20 March 1961

MEMORANDUM

From: C-541
To: C-100
Via: C-110
C-500
C-540

Subj: Texas Tower #4; Report of trip in connection with collapse of

Encls: 1-7--Summaries of daily conferences

1. Subject trip was made to assist Mr. Stuart French, Special Counsel Senate Preparedness Investigating Subcommittee and Mr. Paul Bauer of the House Merchant Marine and Fisheries Committee in investigating circumstances involved in the failure of Texas Tower #4.
2. Meetings were held with Mr. French and/or Mr. Bauer as follows:
 - Tuesday, March 7: Afternoon meeting at DFWO IHD office with Capt. T.J. White and Congressional Representatives. (Encl. 1)
 - Wednesday, March 8: Morning meeting at DPWC IHD office with Messrs. Anderson and Mingick of Anderson--Nichols A&R firm and with Mr. Alan Crockett and Mr. Cahill of Marine Contractors, Inc. and Cdr. W.C. Owens. (Encl. 2)
 - Thursday, March 9: Writer and Mr. French drove from Boston to Otis Air Force Base in Falmouth, Massachusetts. Held meeting from 1100 to 1700 with personnel of Otis Air Force Base. (Encl. 3)
 - Friday, March 10: In the afternoon, held conference at Woods Hole Oceanographic Institute, Woods Hole, Massachusetts with Mr. Bauer, Mr. French and Woods Hole representatives. (Encl. 4)
 - Saturday, March 11: In the morning, Mr. French held private meetings with crew members and master of the AKL-17, MSTB supply ship for the Texas Towers. Mr. Bauer, Mr. Edwards and Cdr. O'Shaughnessy (MSTB) discussed supply operations with Capt. Mangual, Civil Service skipper of the AKL-17. In the afternoon met with Mr. Brewer and Mr. VanStone of Brewer Engineering Laboratories in Marion, Massachusetts. (Encl. 5)

C-541/mep

Monday, March 13: At 0900, writer unaccompanied by Congressional Representatives met with Capt. George Fischer, Cdr. Martini and civilian representatives of 3rd MD. At 1100, Congressional Representatives and Mr. Edwards met with Messrs. Steers, Pills, Rau and Koch of J. Rich Steers Co. at their offices in New York. (Encl. 5)

Tuesday, March 14: Congressional Representatives and Mr. Edwards met with Moran, Proctor, Mueser, and Rutledge at their offices in New York City. Mr. Daniel F. Callahan of Whitman, Reuscha, and Coulson was also present as legal representative of the A&E firm. (Encl. 6)

Wednesday, March 15: 3rd MD arranged for car and driver to take Mr. French to Stewart Air Force Base at Newburg, New York to interview representatives of Headquarters, Boston Air Defense sector.

3. Data requested by the Congressional Representatives is listed at the conclusion of each conference report (enclosures 1-7). These are being assembled by C-541 and will be submitted via the Navy's office of legislative affairs. Mr. French indicated that Washington investigations might get underway in approximately one month.

GORDON C. EDWARDS

Copy to:
C-540 R.F.

T. T. 4 Conference - Tuesday, March 7, 1961

Time: 1300 - 1730
Place: DPWD IHD Office
Conference:

| | |
|--------------------|------------------------------------|
| CAPT T. J. White | DPWD IHD |
| Mr. Stewart French | Special Counsel (Senate) |
| Mr. Paul Bauer | House Marine & Fisheries Committee |
| Mr. Gordon Edwards | Bureau of Yards and Docks |

Discussion:

Questioning and discussion followed history and development of entire project from selection of A&E's to construction of TP-4 with emphasis on such items as:

1. Selection of A&E for feasibility study:

Why did we not select or at least consider engineering firms with patented off shore platform devices?

Why were not Gulf Coast contractors included in list of A&E's interviewed?

General Navy reply to these questions was that independent evaluation of all patented and non-patented ideas was desired. A&E selections generally limited to area in which work to be accomplished, if qualified firm available within the area.

2. Ted Russ - Design Engineer for Moran, Procter, Messer & Rutledge:

Discussion of his patent on foundation of TP-4.

Question as to when he started working for Moran, Procter, Messer and Rutledge.

3. Tower leg diameters

Discussion of why TP-4 legs only 12' - 6" diameter when TP-3, in more shallow water used 14'.

4. Navy waivers of specification requirements

Particular attention to waiver of pin connection tolerances. What other waivers, if any, were granted by DISCOT?

5. Damage to structure during towing and erection.

Loss of folded K bracing struts in AB plane during up-lifting of foundation. Extent of damage in starting of legs when platform floated into position. Method of compensating for strength reduction caused by damage.

6. Ocean bottom situation TP-4.

Effect of .6 nautical mile error in position of tower.
Why was only one boring taken?

NOTE: Concern regarding possible inadequate ocean bottom investigation dispelled when divers reported all foundations intact and unswayed after towers collapsed.

7. Additional Loads on tower by Air Force.

Navy representatives said they had no knowledge of added loads being placed on tower by Air Force.

8. Fuel and water storage

Question raised regarding storage of oil in A&B legs and sea water in C leg. Would differences in the specific gravities of the two liquids have any effect? Was fuel stored in platform itself? (This answered in affirmative later at meeting with Otis AFB personnel.)

Requests:

During 7 March conference committee members requested:

1. Date LEO first informed of Tussan Tower project.
2. Copy of DFWG letter to BUDGES of 23 March 1954.
3. Copy of enclosure (2) of C-541 memo to C-100 for Mr. Buser.
4. Date Ted Kiss started working for HFRMA.
5. List of waivers on TT-4 fabrication and erection specifications.
6. Copy of Operation & Maintenance Manual.
7. Copy of leg dent repair plans.
8. Copy of GINOC letter to BUDGES of 23 December 1957.
9. Statement of how maintenance scaffold was attached to base of platform.
10. Copy of LEO rejection of Anderson & Nichols first submission of Possibility Study.

T. T. 4 Conference - Wednesday, March 8, 1961 (A.M.)

Time: 0700 - 1200
Place: OPWO I&D Office
Conferees:

| | |
|--------------------|------------------------------------|
| CDR W. C. Owens | OPWO I&D |
| Mr. Stuart French | Special Counsel (Senate) |
| Mr. Paul Bauer | House Marine & Fisheries Committee |
| Mr. Anderson | Anderson-Richols (A&R) |
| Mr. Minnick | Anderson-Richols (A&R) |
| Mr. Gordon Edwards | Bureau of Yards and Docks |

Discussion:

Questioning primarily covered design from derivation of criteria to opinion on probable cause of failure. Also relationship between Anderson-Richols and Moran, Proctor, Messer and Rutledge. Highlights were:

1. Determination of probable max wave height.

Anderson-Richols representatives said this was responsibility of Moran, Proctor, Messer and Rutledge. Wave data based on estimates by ship observers not accurate. Also ships avoid shoal areas under storm conditions, therefore few estimates available for Texas Tower locations.

2. Reasons for limiting number of legs to three.

Anderson-Richols representatives said three legs offered least presentment to wave forces and triangular shaped platform was well suited functionally to Air Force space requirements. Three legs proposed by Moran, Proctor, Messer and Rutledge.

3. Additional loads added to platform.

Anderson-Richols knew of no loads added beyond original design. Firms provided loaded platform weight to Moran, Proctor, Messer and Rutledge for them to use in structural design of tower. Anderson-Richols made study for increasing power supply for larger towers but nothing was done on this proposal.

4. Platform and Foundation Design.

Platform as designed by Anderson-Richols for TT-2 and TT-3 was re-designed by Kuss of M,P,N & S on TT-4 to provide for gate type attachment of platform to legs. Structure design including foundation, platform main girders and attachment of platform to foundation legs was responsibility of Moran, Proctor, Messer and Rutledge.

5. Dynamic Studies.

On being questioned by Mr. Bauer on extent of dynamic study made for TT-4, Mr. Minnick stated that dynamic studies not always conclusive and often of doubtful value.

6. Added weight on tower.

Mr. Minnick said that within limits increasing weight of platform would increase stability of platform. (Believe this question asked with respect to reported 250 tons of sand and gravel stacked on platform deck by Air Force. Later proved to be no more than 200 tons and inconsequential in view of 5000 ton weight of platform and contents.)

7. Cause of TT-4 failure.

^{And-Nich}
Mr. Minnick said authentic information not available to him but in his personal opinion it appeared that bracing difficulties not properly corrected and tower collapsed because of bracing failure.

8. Division of Responsibility Anderson-Nichols & Moran, Proctor, Messer and Rutledge.

During Feasibility Study division of responsibility for various aspects of design was by mutual agreement between the two firms arrived at thru series of conferences. On final design Anderson-Nichols (Mr. Anderson) was told verbally by LRD (CAPT Wassman) that all structural design for platform and foundations would be done by Moran, Proctor, Messer and Rutledge. In reply to questioning Messrs Anderson and Minnick said M, F, M & R responsible for all structural design of platform and tower and for determination of weight of platform above mean low water. Weight of platform and contents computed by Anderson-Nichols and turned over to M, F, M & R.

9. Anderson-Nichols reputation damaged.

Mr. Anderson believes firm's reputation damaged as result of issues being connected with project yet they had no control over phases of design involved in the failure. Mr. Anderson said his firm had been particularly insulated from the design of TT-4 and were concerned over rumors of damage during towing, pin connections and above water bracing. If structural design had been a joint effort Anderson-Nichols would never have gone along with some of the things done by M, F, M & R.

10. Quality Control.

Mr. Bauer asked who had responsibility for quality control. Mr. Edwards replied LRD and Supships at Bata, Mo. Mr. Bauer. When legs were dented during erection Mr. Edwards, LRD.

11. Fee distribution.

Mr. French asked amount of total fee and distribution between Anderson-Nichols and M, F, M & R. CCK Owens of LRD will get total fee and Anderson-Nichols amount they received.

12. Continental Copper & Steel Industries, Inc.

AME representatives asked by Mr. Bauer if they knew anything about Continental Copper & Steel. Mr. Anderson replied negative except that he thought they were formed for this job only. (This firm fabrication sub-contractor to Stearns-M.K.)

Requests:

During 3 March conference committee members requested:

1. Data on LRD designation of M, P, M & R responsibility for connection of platform to legs.
2. Total fee paid to joint venturer A&Z contractor and fee split between the two contractors.

AFOCE-E

29 March 1961

1. How and by whom was original design criteria established?
Was this design criteria confirmed by Navy authorities?
2. What was source of background data for development of design criteria?
3. It is understood that TT #4 was designed to withstand 125 mile per hour wind loads and breaking waves having height of 35 feet. What safety factor do these criteria provide? What other criteria governed the structural design?
4. Were these major deviations from the basic design criteria? In what respects?
5. To what extent and number of items was the criteria exceeded?
6. Was consideration given in the design criteria to the specific location of TT#4 with respect to the topography of the ocean floor which would affect ocean currents and wave action?
7. What was the basis for the selection of the A-E? What was his experience in the design of marine structures?
8. What method of design was used in consideration of basic criteria?
This would include, but not be limited to, stress analysis, allowable stresses, strength of material, connection tolerances and allowable movement. Was the A-E design verified by Navy authorities?
9. Was the design confirmed by model tests under simulated water and wave conditions?
10. What type prime contract was ~~AWAYEN~~ awarded?
11. What background and experience did the prime contractor, ~~XXXX~~ fabricator and erector have in marine construction?

12. Were significant deviations made from approved design during fabrication and erection of TT #4?
13. Who checked and approved the adequacy of the ~~Fabrication~~ fabricators shop drawings?
14. What measures were used to insure that fabrication complied with approved shop drawings?
15. By what means were the welds, rivets, structural and other components determined to be adequate during and after fabrication?
16. During the transportation and erection phases did any untoward incident occur which may have weakened the structure?
17. Were modifications made prior to or during erection that would tend to weaken the tower?
18. What was extent of inspection of construction during and at the completion of erection? By whom was the inspection performed?
19. What means was used to inspect repair work while being accomplished? Was repair work inspected to insure adequacy after completion of installations?

AFOCE-3

ROUTING SLIP

DATE MAR 28 1961

| | | |
|-------------------------------|--------------|---------|
| 1. BRIG GEN KELLEY | COORDINATION | |
| 2. COL FOWLER | INFORMATION | |
| 3. COL HURLBURT ✓ | ACTION | |
| 4. MISS SCHOPPER | FILE | |
| 5. JUNE | SIGNATURE | |
| | APPROVAL | |
| AFOCE | AFOCE-1 | AFOCE-2 |
| AFOCE-C | AFOCE-E ✓ | AFOCE-H |

REMARKS:

AFOCE-E/Mr. Harris/med/71215/27 Mar 61

AFOCE-E

MAR 28 1961

Texas Tower #A

AFOCE (ATTN: Colonel R. B. Allison)

1. Attached for your information is a copy of message to BuDocks, with information copies to appropriate agencies, requesting that the collapsed Texas Tower not be destroyed or repositioned without prior approval of this Headquarters.
2. Preliminary discussions have been initiated with BuDocks personnel to determine details of development of investigational plans.

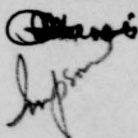
H. K. KELLEY
Brigadier General, U. S. Air Force
Deputy Director for Construction
Directorate of Civil Engineering, DCS/O

1 Atch
TNY to BuDocks

cc: Mr. Golden SAFCC
Gen Kuhfeld AFCEA
Gen Agee AFCEA

AFOCE-E R/File
AFOCE-E Coord
AFOCE-E Stybck

COORD: AFOCE-E AFOCE-3



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| JOINT MESSAGEFORM | | SECURITY CLASSIFICATION | |
| | | UNCLASSIFIED | |
| SPACE BELOW RESERVED FOR COMMUNICATION CENTER | | | |
| 20 MAR 61 21 17z | | | |
| HQ USAF | | | |
| PRECEDENCE | TYPE MSG (Check) | ACCOUNTING SYMBOL | ORIG. OR REFERS TO |
| ACTION ROUTINE | BOOK MULTI SINGLE | AF | X |
| INFO ROUTINE | | | |
| FROM: | | | SPECIAL INSTRUCTIONS |
| HQ USAF TO: BUDOCKS, U. S. NAVY, WASHINGTON 25, DC INFO: 1ST NAVAL DISTRICT, BOSTON, MASSACHUSETTS U. S. COAST GUARD 1300 E. ST., NW. WASHINGTON, DC 26TH AIR DIVISION HANCOCK FLD, N. Y. HQ ADC COLORADO SPRINGS, COLORADO OTIS AFB MASSACHUSETTS | | | AFOCE-E Coord AFOCE-E Stybck AFOCE-E R/File cc: AFCCS (Col Allison) |
| 97388 | | | |
| UNCLAS FR AFOCE-E _____ | | | |
| In view of public interest in the unfortunate destruction of Texas Tower #4, it is requested that no action be taken to destroy or to reposition any component of the tower without prior approval of this Hq. Pending completion of an investigation as to the cause of the failure, it is requested that replies to requests for information be released only through appropriate channels on an official business basis. | | | |
| COORD: <i>Jupron</i> AFOCE-E AFCEE-3 <i>Col Allison</i> | | | DATE TIME 27 1030 MONTH YEAR MARCH 1961 |
| SYMBOL AFOCE-E TYPED NAME AND TITLE (Signature, if required) Mr. C. W. Harris PHONE 71215 SECURITY CLASSIFICATION UNCLASSIFIED | SIGNATURE TYPED (or stamped) NAME AND TITLE H. K. HOLLEY Brigadier General, U. S. Air Force Deputy Director for Construction Directorate of Civil Engineering, DCS/O | | |

AFOCE-2
ROUTING SLIP

DATE 27 MAR 61
INIT

| | | | | |
|----------|-----------------|----------|--------------|---------|
| 2 | BRIG GEN CURTIN | <i>W</i> | COORDINATION | |
| | MR GIBBENS | | INFORMATION | |
| | COL CONE | | ACTION | |
| 1 | LT COL KOHL | <i>W</i> | FILE | |
| | MISS LADUE | | SIGNATURE | |
| | MRS POTVIN | | APPROVAL | |
| AFOCE | | AFOCE-1 | | AFOCE-3 |
| AFOCE-M | | AFOCE-R | | AFOCE-P |
| AFOCE-2F | | AFOCE-2L | | |

REMARKS:

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| ACTION DEFERRED | BOOK | MULTI | SINGLE | AT | |
| INFO | | | | | |
| FROM: HQ USAF | | | | | SPECIAL INSTRUCTIONS |
| TO: ALC ENT AND COLO | | | | | DISTRIBUTION |
| UNCLAS FROM AFABF-6. 96848 THIS MESSAGE IN TWO PARTS. | | | | | AFOP-10 - 2 |
| PART I Reference your ADIFS-MP 9905, 14 Mar 61, and AFABF-6 95648, 20 Mar 61, which authorized \$85,000 for additional inspection costs of Texas Towers 2 and 3. | | | | | AFOP-10-OF - 2 |
| PART II In view of (1) specific statement in par. 4, AFABF letter AFABF 16 Dec 60 that "emergency funds will be made available to agencies upon request" (2) the flexibility authorized commands through budget program adjustments (3) the obligational status of your FY 1961 program and (4) the obvious priority, attached to the inspection of the Texas Towers, your statement in ADIFS-MP 9905 that "possibility exists that inspection services will have to be terminated unless additional ABA is provided immediately" is not understood. Please advise. | | | | | 4 |
| | | | | | DIST WAVE |
| | | | | | DATE TIME |
| | | | | | 24 1150 |
| | | | | | MONTH YEAR |
| | | | | | March 1961 |
| SYMBOL AFABF-6 | | SIGNATURE <i>L. S. Mitchell</i> | | | |
| TYPED NAME AND TITLE (Signature, if required) Mr. Travis/cmi/24 Mar 61 | | TYPED (or stamped) NAME AND TITLE L. S. MITCHELL Colonel, USAF Deputy, Operation and Maintenance Dir, Directorate of Budget | | | |
| PHONE 78855 | PAGE 1 | NO. OF PAGES | | | |
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DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

AF IN : 58342 (24 Mar 61)

F/scc

INFO : OCE-2, OOP-2, OOP-~~CPN1C~~ ~~SMB~~ ~~1~~ ~~AFS~~-3

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MM RJEZHQ

DE RJEZSN 17

ZNR

M 241616Z

FM 26TH AIR DIVISION HANCOCK FLD SYR NY

TO RJEZDG/551 AEWCONWG OTIS AFB MASS

INFO RJEZKN/BOADS STEWART AFB NY

RJEZDG/4604TH SUP SQ OTIS AFB MASS

RJWFAL/ADC ENT AFB COLO

RJEZHQ/HQ USAF WASHINGTON DC

BT

UNCLAS/FROM 26IFS-B/CVD 3-119.

ACTION: 551 AEWCONWG. INFO: BOADS, 4604 SUP SQ, ADC (ADIDC)
ADC (ADIFS), HQ USAF (AFOCE). SUBJ: REPORT OF UNDERWATER
EXPLORATION FINDINGS AT TEXAS TOWER #4. THIS MSG IN THREE
PARTS. PART I. CONFIRMING TELECON ON 22 MAR 61 BETWEEN
COL. IMPSON AND MR. HARRIS, AFOCE, HQ USAF, AND MR. DICOCO,
THIS HQ, ALL ADDRESSESS ABOVE ARE CAUTIONED AGAINST RELEASING
OR TRANSMITTING SUBJ REPORT, IN WHOLE OR IN PART, TO ANY
PRIVATE AGENCIES, PRIVATE FIRMS OR PUBLIC NEWS MEDIA OF ANY
DESCRIPTION. THIS REPORT WITH ATTACHED UNDERWATER PHOTOGRAPHS

2707

DEPARTMENT OF THE AIR FORCE
26TH AIR DIVISION
UNCLASSIFIED MESSAGE

INCOMING

AF IN : 58342 (24 Mar 61)

Page 2 of 3

PAGE TWO RJEZSN 17

WAS ACCOMPLISHED BY CONTRACT BETWEEN THE P&C OFFICE AT OTIS AFB AND THE MARINE CONTRACTING CO, INC, OF BOSTON AND COVERED THE PERIOD FROM 16 JAN 61 THRU 15 FEB 61. ALL PERSONS WHO ARE ASSIGNED TO OR ASSOCIATED WITH THE ABOVE AIR FORCE AGENCIES WHO ARE ACQUAINTED WITH OR WILL BECOME ACQUAINTED WITH THE CONTENTS OR INFORMATION CONTAINED IN SUBJ REPORT ARE FUTHER CAUTIONED NOT TO DIVULGE THE NATURE OF THIS INFORMATION TO AGENCIES OR PERSONS OUTSIDE THE AIR FORCE. FURTHER, THE EXCHANGE OR USE OF INFORMATION CONCERNING SUBJ REPORT BETWEEN PERSONS WITHIN THE AIR FORCE WILL BE RESTRICTED TO A "NEED-TO-KNOW" BASIS. THE IMPOSITION OF THIS CONTROL ON THE RELEASE OF SUBJ REPORT OR ITS CONTENTS WILL BE OF INDEFINITE DURATION AND WILL BE REMOVED ONLY BY AIR FORCE AUTHORITY AT A HQ LEVEL HIGHER THAN 26TH AIR DIVISION. PART II. (FOR 551 AEWCONWG) CONFIRMING TELECON ON 22 MAR 61 BETWEEN MR. MCCONNEL, - OTIS AFB, AND MR. DICOCO, THIS HQ, IT IS OUR UNDERSTANDING THAT ONLY TWENTY (20) COPIES OF THIS REPORT ARE EXTANT IN OFFICIAL AIR FORCE CHANNELS. FOUR OF THESE COPIES WERE TRANSMITTED BY YOUR HQ TO HQ USAF (AFOCE-2) ON 20 MAR 61. FOUR COPIES HAVE BEEN RETAINED BY YOUR HQ AND THE REMAINING TWELVE (12) COPIES WERE

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

INCOMING

AF IN : 58342 (24 Mar 61)

Page 3 of 3

PAGE THREE RJEZSN 17

HANDCARRIED TO THIS OFFICE ON 22 MAR 61 BY YOUR LT COL CORCORAN.
ALL TWENTY OF THESE COPIES ARE TO BE STAMPED "FOR OFFICIAL USE
ONLY". REQUEST YOUR HQ TAKE ACTION IN WRITING TO OBTAIN THE
MANUSCRIPT OF SUBJ REPORT AND THE PHOTOGRAPHIC NEGATIVES FROM
THE MARINE CONTRACTING CO, INC, AND DEPOSIT SAME IN SUITABLE
SAFEKEEPING. PART III. COPIES OF SUBJECT REPORT WILL BE
TRANSMITTED FROM THIS HQ TO THE 4604TH SUP SQ, BOADS, AND
HQ ADC IN THE IMMEDIATE FUTURE.

BT

24/1832Z MAR RJEZSN

12 APR 61



DEPARTMENT OF THE NAVY
BUREAU OF YARDS AND DOCKS
WASHINGTON 25, D. C.

IN REPLY REFER TO

C-541/djd

23 MAR 1961

From: Chief, Bureau of Yards and Docks
To: Headquarters, U. S. Air Force
Directorate of Civil Engineering
Engineering Division
(AFOCE-E/Mr. C. W. Harris
The Pentagon
Washington 25, D. C.

Subj: Texas Towers Nos. 2 and 3 - Structural Investigations and
Reports

Ref: (a) Department of the Air Force letter AFOCE-EA to BUDOCKS
dated 28 Feb 1961

Encl: (1) Copy of Notice of Award Contract NBy 27417
(2) Copy of Notice of Award Contract NBy 37424
(3) Activity Reports No. 1-5, Texas Tower No. 2 Inspection
(4) Activity Reports No. 1-5, Texas Tower No. 3 Inspection
(5) Copy of DPWO LND letter to BUDOCKS dated 27 Jan 1961
(6) Copy of BUDOCKS letter to DPWO LND dated 13 Feb 1961

1. In response to reference (a), enclosures (1) through (6) are
forwarded herewith.

2. Additional interim reports and final reports on the investigations
of both towers will be forwarded as received.

W. C. G. CHURCH
CAPTAIN, CEC, USN
Assistant Chief for Construction

Copy to:
DPWO LND



DEPARTMENT OF THE NAVY
BUREAU OF YARDS AND DOCKS
WASHINGTON 25, D. C.

IN REPLY REFER TO

C-541/djd

23 MAR 1961

From: Chief, Bureau of Yards and Docks
To: Headquarters, U. S. Air Force
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2. Additional interim reports and final reports on the investigations of both towers will be forwarded as received.

W. C. G. CHURCH
CAPTAIN, CEC, USN
Assistant Chief for Construction

Copy to:
DPWO LND



C-310
MH:erc
MBY-37417

DISTRICT PUBLIC WORKS OFFICE
FIRST NAVAL DISTRICT
495 Summer Street, Boston 10, Mass.

C-540
NBY-27417

Moran, Proctor, Mueser & Rutledge
415 Madison Avenue
New York 17, New York

27 January 1961

\$ 215,000 (Mr Edwards)

The Government hereby awards you a contract to make an investigation and prepare a report pertaining to the structural condition of Texas Towers TT-2 and TT-3 (George's Bank and Nantucket Shoals), for a lump sum fee to be negotiated at a later date. Under the authority of this notice, you are directed to proceed with the investigation, based on but not limited to the following work, to determine the present capability of the towers to meet the requirements of the original design:

- a. Magnaflux all primary welds and spot check secondary welds.
- b. Inspect Towers at all locations for possible corrosion, damage or structural deficiency.
- c. Determine bottom scour or build-up of material around the Tower legs.
- d. Re-evaluate structural design based on possible revised information to be procured by this office from the Woods Hole Oceanographic Institute concerning increased magnitudes of wind and wave effect that might be encountered.

In performing this work you are authorized to incur expenses in an amount not to exceed \$20,000.00 without the prior written approval of the Officer in Charge.

The formal contract will be prepared on the Bureau's standard contract form for similar projects with such modification therein as the Bureau may determine proper under the particular circumstances. The contract will provide that payments will be made by the Officer in Charge, U. S. Navy Regional Accounts Office, Third Naval District, 3rd Ave. & 29th Street, Brooklyn 32, New York and the cost of the work will be chargeable to Appropriation 17X1205 MCON; Allotment 62464/99201 issued to DPWO, IND; Allotment Acct'g By 62464; BuControl No. 99201; Expenditure Account No. 98017; Object Class. No. 079. (Ultimately reimbursable by Std Form 1080 from AF Appropriation 5713400 Allotment Serial 179 7611 Project 459,2 Object 0790 Station No. S667400 OA Advice No. 61-134 Otis AFB).

The Bureau's standard provisions for termination, at the convenience of the Government or otherwise, shall be applicable to this notice of award.

You are urgently requested to expedite this investigation to the fullest extent.

Please acknowledge receipt and acceptance on the original of this notice and return such original to the District Public Works Officer immediately.

The above award received and accepted
this day of 1961

Very truly yours,

MORAN, PROCTOR, MUESER & RUTLEDGE
(Contractor)

Civil Engineer Corps, USN
For Chief, Bureau of Yards and Docks
Contracting Officer

By _____
(Name and Official Title)

Encl: Notice w/poster

Copy to:
BuDocks(6)
FinActgOff, Otis AFB
CO, Otis AFB

C-310
MH:erc
NBY-37424

DISTRICT PUBLIC WORKS OFFICE
FIRST NAVAL DISTRICT
495 Summer Street, Boston 10, Mass.

3-502
NBY-37424
Spec. 37424/61
9 February 1961

Metropolitan Boiler Service, Inc.
826 Washington Street
Braintree, Massachusetts

The Government hereby awards you a contract in the sum of \$7,900.00 for Tank Cleaning, Texas Towers TT-2 and TT-3, in accordance with Specification No. 37424/61. You are directed to proceed immediately.

The formal contract will be prepared on the Bureau's standard contract form DD 1261 with Standard Form 32 and NavDocks 114, with such modification therein as the Bureau may determine proper under the particular circumstances. The contract will provide that payments will be made by the Officer in Charge, U. S. Navy Regional Accounts Office, Third Naval District, 3rd Avenue & 29th Street, Brooklyn 32, New York and the cost of the work will be chargeable to Appropriation 17X1205 MCON; Allotment 62464/99201 issued to DFWO, 1ND; Allotment Acct'g by 62464; BuControl 99201; Expenditure Account No. 98017; Object Class No. 079. (Ultimately reimbursable by Std Form 1080 from AF Appropriation 5713400, Allotment Serial 179-2611, Project 459.2, Object 0790, Station No. S667400, QA Advise No. 61-134 Otis AFB).

Specification No. 37424/61 and the formal contract will be prepared on the basis of agreement reached between the Contractor and the Government at a conference held at the Chemistry Laboratory, Boston Naval Shipyard, on 7 February 1961, and will include the following provisions:

- a. That the Contractor shall furnish a performance bond in the sum of \$7,900.00
- b. That the Contractor shall have his crew, materials and equipment at the State Pier, New Bedford, Massachusetts, ready for loading on board ship at 1200 hours 10 February 1961, and that all work shall be completed on 24 February 1961.
- c. That the tanks to be cleaned shall consist of the following:
 - 2 - 58,000 gallon each diesel fuel tanks on TT-2
 - 2 - 1,500 gallon each AvGas tanks on TT-2
 - 1 - 3,000 gallon AvGas tank on TT-3
- d. That the Government will transport the Contractor's crew, materials and equipment from the State Pier, New Bedford, Massachusetts to the Towers and return, and between the Towers.
- e. That the Government will have the tanks available, and the Contractor shall accomplish the work on the tanks, according to the following schedule:

MBY-37424
Spec. 37424/61

9 February 1961

- (1) One 58,000 gallon diesel fuel tank upon contractors arrival on TT-2
- (2) The second 58,000 gallon diesel fuel tank on TT-2 upon contractor's completion of the first
- (3) Both AvGas tanks on TT-2 for cleaning during the period of cleaning the two diesel fuel tanks.
- (4) The AvGas tank on TT-3 upon completion of all work on TT-2

f. That the Government will pay the Contractor for men, materials and equipment on standby time occasioned by delays in transportation and Government delays in making tanks available, at the following rates per day:

- (1) \$322.00 for TT-2 Crew
- (2) \$180.00 for TT-3 Crew
- (3) \$142.00 for balance of TT-2 crew after departure of TT-3 crew

and that the contract time will be extended accordingly.

The Bureau's standard provisions for termination, at the convenience of the Government or otherwise, shall be applicable to this notice of award.

Please acknowledge receipt and acceptance on the original of this notice and return such original to the District Public Works Officer immediately.

The above award received and accepted
this day of 1961

Very truly yours,

METROPOLITAN BOILER SERVICE, INC.
(Contractor)

By _____
(Name and Official Title)

Civil Engineer Corps, USN
For Chief, Bureau of Yards and Docks
Contracting Officer

Encl: Notice w/poster

Copy to:
BuDocks(6)
FinActgOff, Otis AFB
CO, Otis AFB

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 2 INSPECTION

Activity Report No. 1

Period: January 29 to February 10, 1961

Personnel Data

Jan. 29 MPM&R man (Zutraun), two NYTL men and two Steers' men on tower.
Feb. 1 Hinchman Corp. man on tower.
Feb. 7 Replacement man for NYTL arrived.

| <u>Welding Inspection Progress</u> | <u>Gamma -ray</u> | <u>Magna -flux</u> |
|------------------------------------|-----------------------|------------------------|
| Total estimated lineal feet | 2,595 | 4,146 |
| Total lineal feet previous | 0 | 0 |
| Total lineal feet this period | 241 | 80 |
| Total lineal feet to date | 241 | 80 |
| Percent complete | 9% | 5% |

General

Welding to date has been found generally satisfactory. Some rather serious corrosion has been found at platform connections to legs.

Staging has been completed at B and C legs for inspection of shear plates between caissons and caisson wells.

MORAN, PROCTOR, MUESER & FULLER
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 2 INSPECTION

Activity Report No. 2

Period: February 10 to February 17, 1961

Personnel Data

Feb. 11 Four-man crew of Metropolitan Boiler Company arrived at tower. Also Mr. Brown, Engineer for First Naval District, to approve tank purging.

Feb. 14 NYTL man left tower, new Steers' man arrived.

Feb. 16 Two NYTL men arrived.

Feb. 17 Crew from TT-3 arrived (Caldwell of MPM&R, two NYTL men and two Steers' men).

| <u>Welding Inspection Progress</u> | <u>Gamma -ray</u> | <u>Magna -flux</u> |
|--|-----------------------|------------------------|
| Total estimated lineal feet (new estimate) | 2,500 | 2,500 |
| Total lineal feet previous | 241 | 80 |
| Total lineal feet this period | 90 | 152 |
| Total lineal feet to date | 331 | 232 |
| Percent complete | 13% | 9% |

General

No important discoveries from welding inspection but additional bad corrosion conditions found on main deck.

Tank cleaning 100% complete around B leg and 50% complete around A leg.

Working staging in well around legs is 100% installed at B and C legs and about 75% complete at A leg.

MORAN, PROCTOR, MUISER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 2 INSPECTION

Activity Report No. 3

Period: February 18 through 24
1961

Personnel Data

Feb. 21 MPM&R man (Caldwell) came ashore --
replaced by Weiner; also Mr. Hickey of
Steers Co. came ashore

| <u>Welding Inspection Progress</u> | <u>Gamma -ray</u> | <u>Magna -flux</u> |
|------------------------------------|-----------------------|------------------------|
| Total estimated lineal feet | 2,500 | 2,500 |
| Total lineal feet previous | 331 | 232 |
| Lineal feet this period | 449 | 75 |
| Total lineal feet complete | 780 | 307 |
| Percent complete | 31% | 12% |

General

Tanks around A and B legs completely cleaned.

Inspection in tanks 60% complete at A leg and 80% complete
at B leg.

Mr. Caldwell in MPM&R office February 23.

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 2 INSPECTION

Period: February 25 through March 3, 1961
Activity Report No. 4

Personnel Data

Feb. 25 MPM&R man, Caldwell, arrived on tower and Zutraum went ashore. Mr. Hickey of Steers Co. returned to tower.

March 3 Caldwell of MPM&R, two N.Y.T.L. men and two Steers men left on boat for New Bedford, enroute to TT-3.

| <u>Welding Inspection Progress</u> | <u>Gamma-ray</u> | <u>Magnaflux</u> |
|------------------------------------|------------------|------------------|
| Total estimated lineal feet | 2,500 | 2,500 |
| Total lineal feet previous | 780 | 307 |
| Lineal feet this period | 345 | 455 |
| Total lineal feet complete | 1,125 | 762 |
| Percent complete | 45% | 30.5% |

General

Mr. Zutraum in MPM&R office on March 2.

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 2 INSPECTION

Period: March 4 through March 10, 1961
Activity Report No. 5

Personnel Data

No change in personnel. Mr. Zuttraun of MPM&R
unable to return to Tower because of transportation
difficulties brought about by weather conditions.

| <u>Welding Inspection Progress</u> | <u>Gammaray</u> | <u>Magnaflux</u> |
|------------------------------------|-----------------|------------------|
| Total estimated lineal feet | 2500 | 2500 |
| Total lineal feet previous | 1125 | 762 |
| Lineal feet this period | 25 | 603 |
| Total Lineal feet complete | 1150 | 1365 |
| Percent complete | 46% | 55% |

General

Crew ran out of film for gammaray work.

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 3 INSPECTION

Activity Report No. 1

Period: January 26 to February 10, 1961

Personnel Data

Jan. 26 MPM&R man (Caldwell) and two NYTL men arrive
at tower.

Jan. 27 Two Steers' men arrive at tower.

Feb. 8 Hinchman Corp. man on tower.

| <u>Welding Inspection Progress</u> | <u>Gamma -ray</u> | <u>Magna -flux</u> |
|------------------------------------|-----------------------|------------------------|
| Total estimated lineal feet | 735 | 1,104 |
| Total lineal feet previous | 0 | 0 |
| Total lineal feet this period | 282 | 0 |
| Total lineal feet to date | 282 | 0 |
| Percent complete | 38% | 0% |

General

No serious deficiencies in welds have been discovered so far. Also no serious corrosion conditions have been disclosed such as have been found on TT-2. This is generally because of less complicated details of connections of legs to platform.

ENCL (4)

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 3 INSPECTION

Activity Report No. 2

Period: February 10 to February 17, 1961

Personnel Data

Feb. 16 Entire inspection crew left tower (Caldwell of MPM&R, two NYTL men and two Steers' men).

| <u>Welding Inspection Progress</u> | <u>Gamma -ray</u> | <u>Magna -flux</u> |
|------------------------------------|-----------------------|------------------------|
| Total estimated lineal feet | 735 | 1,104 |
| Total lineal feet previous | 282 | 0 |
| Total lineal feet this period | 49 | 357 |
| Total lineal feet to date | 331 | 357 |
| Percent complete | 45% | 32% |

General

Considerable time lost by this crew in making transfer to Tower 2. They had to pack up pending arrival of boat which could not take them on, then remained idle waiting for helicopter. Crew finally arrived at TT-2 on February 17.

No significant discoveries made from welding inspection.

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 3 INSPECTION

Activity Report No. 3

Period: February 18 through 24
1961

No progress, inspection crew on TT-2.

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 3 INSPECTION

Activity Report No. 4

Period: February 25 through March 3, 1961

No progress, inspection crew on TT-2.

MORAN, PROCTOR, MUESER & RUTLEDGE
CONSULTING ENGINEERS
415 Madison Avenue
New York New York

TEXAS TOWER NO. 3 INSPECTION

Activity Report No. 5

Period: March 4 through March 10, 1961

Personnel Data

March 4 Caldwell of MPM&R and two man crews of Steers and NYTL returned to Tower

| <u>Welding Inspection Progress</u> | <u>Gammaray</u> | <u>Magnaflux</u> |
|--|-----------------|------------------|
| Total estimated lineal feet (new est.) | 870 | 2100 |
| Total lineal feet previous | 331 | 357 |
| Total lineal feet this period | 199 | 280 |
| Total lineal feet to date | 530 | 637 |
| Percent complete | 61% | 30.3% |

DISTRICT PUBLIC WORKS OFFICE
FIRST NAVAL DISTRICT
NAVY BUILDING
495 SUMMER ST., BOSTON 10, MASS

IN REPLY REFER TO:
10
TJW:rf
4330 TT

JAN 27 1961

From: District Public Works Officer, First Naval District
To: Chief, Bureau of Yards and Docks (Code 541)

Subj: Texas Towers #2 and #3; examination of

Ref: (a) Telcon Capt. Thompson, BuDocks and Capt. White, DPWO, LND of
18 Jan 1961

Encl: (1) Copy of 26th Air Div msg 172100Z to DPWO, LND
(2) Minutes of meeting on 19 Jan 1961
(3) Cy of ltr from MPM&R dtd 20 Jan 1961 regarding examination of
Texas Towers #2 and #3

1. By enclosure (1) the District Public Works Officer was requested to take immediate emergency action to inspect and determine the seaworthiness of Texas Towers #2 and #3. Further, a study to determine feasibility of installing instrumentation to forecast and/or indicate possible dangerous conditions in the structures was also requested. By reference (a) the DPWO was authorized to provide these services.

2. Because of the need for immediate action and because the work required was essentially a comparison between the present conditions and stresses in the towers and those contemplated by the original design, it was decided that the firm of Moran, Proctor, Mueser and Rutledge was the best qualified to manage and evaluate the results of the specialized investigations required. This firm made the original evaluations of the available information on the effect of wind and waves prior to developing the detailed design of the structures.

3. Accordingly, a meeting was arranged on January 19, 1961 of the interested parties. Those attending the meeting and the items discussed are listed in enclosure (2). At this meeting it was brought out that since the towers had been erected, there had been an opportunity to observe actual wind and wave conditions, particularly those at Tower #4 during Hurricane "Donna". Further, the Naval Hydrographic Office had periodically taken readings of wind and sea conditions at all towers subsequent to their erection. Such information at the sites was not available in 1954 and 1955 when the towers were designed. Thus, at the request of the Air Force representatives, it was decided that the Woods Hole Oceanographic Institute which had correlated the wind and wave data available in 1954 and 1955 would be asked to correlate the additional information available as to wind and sea conditions that might be expected at Texas Towers #2 and #3. Should the re-evaluation of wind and wave data based upon

ENCL (5)

10
TJW:rf
4330 TT

this correlation indicate the possibility of conditions of greater severity than those assumed in the original design, Moran, Proctor, Mueser and Rutledge will reanalyze the structures and as appropriate recommend any structural revisions deemed necessary.

4. Enclosure (3) is a proposed scope of the work to be performed by the A&E. It should be noted that this scope does not include a review of the original design of the towers. It does, however, provide for a review of the known and assumed conditions upon which the original design was based versus the more comprehensive wind and wave effects information now available. Funds in the amount of \$25,000 have been made available by the Air Force for the preliminary portions of this study with the balance to be provided upon approval of the contractor's proposal by the DFWO. The contractor has been notified to proceed and as of this date has men on the towers to radiograph and magnify the structural welds.

5. A copy of this proposed scope is being furnished the cognizant Air Force officials at Otis Air Force Base for their comment and concurrence.

6. The Bureau's comments and advice regarding the proposed scope are requested as soon as possible.

T. J. White

T. J. WHITE

Copy to:
CO, Otis AF Base



DEPARTMENT OF THE NAVY
BUREAU OF YARDS AND DOCKS
WASHINGTON 25, D. C.

IN REPLY REFER TO

C-541/djd

13 FEB 1961

From: Chief, Bureau of Yards and Docks
To: District Public Works Officer, First Naval District

Subj: Texas Tower #2 and #3; examination of

Ref: (a) DPMO LND ltr 10 TJSrf 4330 TT of 27 Jan to BUDOCKS

1. The scope of the investigative work outlined in reference (a) and the enclosures thereto is considered sufficiently broad to identify any weaknesses which may exist in these towers.
2. With respect to the review of observed wind and wave conditions at the sites, particular attention should be given to any observed raised elevation of the mean sea level during severe exposure.
3. The proposed studies would include re-evaluation of attempts to instrument the towers for measuring lateral displacements. It is believed that this matter should receive primary attention in an effort to install instruments of the necessary sensitivity for measuring lateral displacements. Any measured excesses above those arrived at by calculations would indicate the need for a further survey of the integrity of the structural connections, possible cracks in structural members and structural failure of other types.

W. C. G. CHURCH
CAPTAIN, CEC, USN
Assistant Chief for Construction

Copy to:
CO Otis AF Base

ENC (6)

50 A15
OFFICE OF THE CHIEF OF STAFF, USAF

The bearer has been instructed to
handcarry the attached papers to

AFOCE-Son Keller
EXPEDITE --- DO NOT DETACH

AFOCE-2
ROUTING SLIP

DATE 22 Mar 61
INIT

| | | | | |
|--------------|-----------------|------------|--------------|--|
| 3 | BRIG GEN CURTIN | | COORDINATION | |
| 2 | MR GIBBENS | <i>JRS</i> | INFORMATION | |
| 4 | COL CONE | | ACTION | |
| 1 | LT COL KOHL | <i>JK</i> | FILE | |
| | MISS LADUE | | SIGNATURE | |
| | MRS POTVIN | | APPROVAL | |
| AFOCE | | AFOCE-1 | AFOCE-3 | |
| AFOCE-M | 5 | AFOCE-R | AFOCE-P | |
| AFOCE-2F | | AFOCE-2L | | |

REMARKS:

ATT: COL NICKOLS

Received 22 - 61

*Return to Mr. Harris
after signature*

1

HEADQUARTERS UNITED STATES AIR FORCE
OFFICE OF THE CHIEF OF STAFF

DATE

REFERRAL SLIP

MAR 27 1961

TO:

| | | | | |
|-------|-------|-------|-------|---|
| SAFS | AFCRF | AFAAC | AFMTP | AFOOP |
| SAFOI | AFCJA | AFABF | | <input checked="" type="checkbox"/> AFOCE |
| | AFCSG | | AFPDC | AFOMO |
| SAFLL | AFCGM | AFDDC | AFPCH | AFORQ |
| AFCSA | AFCIN | AFDRD | AFPCP | AFOAC |
| AFCVC | AFCIG | | AFDPD | |
| AFCAV | AFCSI | AFMDC | AFPMP | AFXDC |
| AFCAC | AFCDF | AFMMS | AFPTR | AFXPD |
| AFCCS | | AFMPP | | AFXPR |
| AFCAS | AFCPM | AFMSS | AFODC | AFXAC |

ATTENTION:

Gen. Kelley

FOR:

- APPROPRIATE ACTION
- COMMENT AND/OR RECOMMENDATION
- DIRECT REPLY WITH COPY TO AFCCS
- PREPARATION OF APPROPRIATE FORWARDING CORRESPONDENCE
- PREPARATION OF REPLY FOR SIGNATURE C/S, USAF
- PREPARATION OF REPLY FOR SIGNATURE EXEC TO C/S, USAF
- PREPARATION OF REPLY FOR SIGNATURE OF
- NOTE AND RETURN OR FORWARD
- INFORMATION AND/OR FILE
- COORDINATION
- C/S HAS ORIGINAL
- C/S HAS SEEN
- C/S HAS NOT SEEN

COMMENTS

Re my memo dated 22 Mar 61

FOR THE CHIEF OF STAFF

R.B.A.
ROYAL B. ALLISON
Colonel, USAF
Executive to C/S, USAF

DEPARTMENT OF THE AIR FORCE
OFFICE OF THE CHIEF OF STAFF
UNITED STATES AIR FORCE
WASHINGTON, D.C.



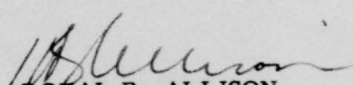
REPLY TO
ATTN OF: AFCCS

SUBJECT: Texas Tower No. 4

22 March 1961

TO: General Kelley, AFOCE

1. Attached for your information is a copy of a message (Incl 1) which the President received from Mr. Harrigan, Vice President, Massachusetts State Council of Carpenters, and a draft reply (Incl 2) which this office provided to the White House. Our draft reply was coordinated with Mr. Golden, General Kuhfeld, and General Agee.
2. You will note in our draft reply that assurance is given that the Tower will not be destroyed until full underwater investigation can be completed. I am informed that message AFOOP-DE 84709, 10 Feb 61, issued instructions to that effect and that you now have the job of assuring appropriate underwater investigation.
3. I am calling this to your attention with the request that you assure that no tower destruction action is taken which would prejudice our statements to the White House or prejudice future legal actions which may ensue. Your actions must include close coordination with ADC, the Navy and the Coast Guard.


ROYAL B. ALLISON
Colonel, USAF
Executive to C/S, USAF

2 Incls
a/s

cc: Mr. Golden
Gen Kuhfeld
Gen Agee

Boston, Mass -- March 12

The President
The White House

Respectfully request appointment with you regarding recent Texas Tower disaster. All but 3 of the civilian dead were pile drivers and divers of our union. 2 of the others were operating engineers. Have unearthed appalling design and construction condition which should be brought directly to your attention. Tower should not be destroyed as menace to navigation until survivors counsel agents can make surveys and tests of ocean floor and tower structure; prior to doing anything that will change the wreck's present condition. This wire confidential and is not being released to press or any other parties or agencies. Kindest personal regards. Mike Harrigan, VP, Mass. State Council of Carpenters.

Incl. 1

Transcript of Wire sent by Colonel McHugh to Mr. Harrington, relayed over phone by White House secretary 27 March 1961.

FROM: White House, Washington dated 22 March 1961

TO: Mike Harrington
Vice President
Massachusetts State Council of Carpenters
546 E. Fifth Street
South Boston, Massachusetts

The President asked me to reply further to your telegram of March 12, and to convey to you the assurance that he fully appreciates and shares your deep concern regarding the Texas tower disaster. Further, he hoped you will understand that an appointment at this time to discuss design and structural matters would be premature in as much as the complete facts regarding underwater conditions which caused the disastrous breakdown of Texas Tower No. 4, and the tragic loss of lives are not yet available. The extremely adverse weather conditions in the North Atlantic during this season preclude completion of necessary examination of the remaining tower structure. The President has been assured that this phase of the investigation will be accomplished as soon as weather conditions permit, and until this is completed, no action whatsoever will be taken to destroy the remaining vestiges of the tower. In the meantime it would be most helpful if you could present your information concerning this tragic accident to an Air Force investigator. Please let me know by return telegram if you wish to meet with this investigator, and the time and place most convenient to you.

Signed... GODFREY T. MCHUGH,
Colonel, USAF
Air Force Aide to the President

This sent

22 March 1961

Draft Reply to Message from Mr. Harrigan (Vice President, Massachusetts State Council of Carpenters) to the President

I fully appreciate and share your deep concern regarding Texas Tower disaster, but an appointment at this time to discuss design and structural matters would be premature. Complete facts regarding underwater conditions which caused disastrous breakdown of Texas Tower No. 4 and tragic loss of lives are not yet available. The extremely adverse weather conditions in the North Atlantic during this season preclude completion of necessary examination of remaining tower structure. This phase of the investigation will be accomplished as soon as weather conditions permit, and until this is completed no action will be taken to destroy remaining vestiges of tower. Meanwhile, it would be most helpful if you could present your information to an investigator who the Air Force would be pleased to have visit you at your convenience.

Sincerely

NOT
SENT
See memo file

AFOCE-3

ROUTING SLIP

DATE MAR 22 1961

- | | |
|--|--------------|
| <input checked="" type="checkbox"/> 1. BRIG GEN KELLEY | COORDINATION |
| <input type="checkbox"/> 2. COL FOWLER | INFORMATION |
| <input checked="" type="checkbox"/> 3. LT COL HURLBURT | ACTION |
| <input type="checkbox"/> 4. MISS SCHOPPER | FILE |
| <input type="checkbox"/> 5. JUNE | SIGNATURE |

APPROVAL

| | | |
|---------|---------|---------|
| AFOCE | AFOCE-1 | AFOCE-2 |
| AFOCE-C | AFOCE-E | AFOCE-H |

REMARKS:

*AFC has a copy
of a report which
might suffer if
we decide that it
is releasable info*

*we have
copy
[initials]*

1

TEL: MELROSE ~~XXXX~~ 5-8911
EXT: 2840

HEADQUARTERS
AIR DEFENSE COMMAND
UNITED STATES AIR FORCE
ENT AIR FORCE BASE, COLORADO



REPLY TO
ATTN OF: ADIDC

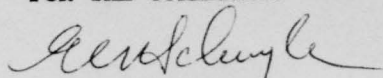
SUBJECT: Texas Tower #4

21 MAR 1961

TO: Hq USAF (AFOCE-3)

Confirming the telephone conversation between General Kelley and Col Schuyler, the attached letter from the Task Committee on Wave Forces of the American Society of Civil Engineers and related correspondence is forwarded for necessary action.

FOR THE COMMANDER


E V N SCHUYLER
Colonel, USAF
DCS/Civil Engineering

2 Atch
1. Ltr 17 Feb 61 fr
Mr Wiegel
2. Ltr 4 Mar 61 fr
Gen Jensen



AMERICAN SOCIETY OF CIVIL ENGINEERS
WATERWAYS AND HARBORS DIVISION
Committee on Coastal Engineering
Task Committee on Wave Forces
412B Nesse Hall, Univ. of Calif., Berkeley 4, Calif.

17 February 1961

Major General Clifford Jensen
c/o Otis Air Force Base
Massachusetts

Dear Sir:

This letter is in regard to the failure of Texas Tower No. 4.

The American Society of Civil Engineers has had a Task Committee on Wave Forces since December 1960. The purpose of this committee is to investigate and report on methods of determining forces exerted by water waves on structures, to set the criteria for design of structures for strength and stability, and to disseminate the information on the design criteria. The engineering and oceanographic information that your investigating group obtain on the failure of Texas Tower No. 4 will be of great value to our committee. It is requested that this information be made available to us, if possible, although it is realized that much of the information will not be ready for some time. We would like, if possible, to obtain at the present time copies of both the feasibility study and the design report on this tower.

Very truly yours,

Robert L. Wiegel
Chairman

RLW:vb

cc: Robert Y. Hudson, Sr.
John T. O'Brien
Lars Skjelbreia
Thorndike Saville, Jr.

attch 1

HEADQUARTERS
AIR DEFENSE COMMAND
UNITED STATES AIR FORCE
ENT AIR FORCE BASE
COLORADO SPRINGS, COLORADO

47 Mar 61

American Society of Civil Engineers
Waterways and Harbors Division
Task Committee on Wave Forces
ATTN: Robert L. Wiegel, Chairman
412B Messe Hall
University of California
Berkeley 4, California

Dear Sir:

With respect to your letter of 17 February 1961, concerning determination of forces exerted by waves on structures as may have been developed by the Board of Inquiry concerning the loss of Texas Tower #4, please be advised that the Board has forwarded your request to the Deputy Chief of Staff for Civil Engineering, Headquarters Air Defense Command, Ent Air Force Base, Colorado, with request that copies of the Feasibility Report, and Design and Construction Report on Texas Tower offshore radar platforms be furnished you, if available.

The Board of Investigation submitted its report concerning Texas Tower #4 to the Commander, Air Defense Command on 5 March 1961. It is expected that the report will reach the Chief of Staff, United States Air Force, Washington, D. C., in the very near future. Since the report is considered a privileged document, not releasable to agencies outside the United States Air Force without the express approval of the Secretary of the Air Force, it is suggested that further requests for information which may be contained in the report be directed to the Chief of Staff, United States Air Force.

We trust the foregoing information will be satisfactory.

Yours truly,

JAMES C. JENSEN
Major General, USAF
President

attch 2

2840

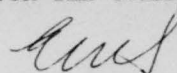
ADIDC

Texas Tower #4

Hq USAF (AFOCE-3)

Confirming the telephone conversation between General Kelley and Col Schuyler, the attached letter from the Task Committee on Wave Forces of the American Society of Civil Engineers and related correspondence is forwarded for necessary action.

FOR THE COMMANDER


E V N SCHUYLER
Colonel, USAF
DCS/Civil Engineering

2 Atch
1. Ltr 17 Feb 61 fr
Mr Wiegel
2. Ltr 4 Mar 61 fr
Gen Jensen

20 March 1961

21 MAR 1961



STAUNTON MILITARY ACADEMY
STAUNTON, VIRGINIA

Feb
19 March 1961

Colonel Ivan H. Impson
Chief, Engineering Division
Directorate of Civil Engineering
United States Air Force

Dear Colonel Impson:

I am looking forward to meeting you on 24 March. I decided to write you and let you know that I am coming.

I will arrive in Washington about 8300 and will take the bus that you suggested to the Pentagon.

I thank you very much for your invitation.

Sincerely,

Larry Levy
Cadet Sgt. Larry Levy
Staunton Military
Academy

27 January 1961

AFOCE-E

Texas Tower

Cadet Sergeant Larry Levy
Staunton Military Academy
Box 382
Staunton, Virginia

Dear Cadet Sergeant Levy

1. Your recent letter concerning your views of Texas Tower design is sincerely appreciated.
2. Reviewing the design history of these towers may be of interest to you. The Bureau of Yards & Docks, U. S. Navy was the United States Air Force design agent in this particular instance. They, in turn, employed two competent, experienced Architect and Structural Engineer firms to do the actual design.
3. The records of previous recorded winds and wave actions were reviewed thoroughly and the design was such to withstand such natural occurrences. In addition, the engineers reviewed the design of oil drilling towers in use in the Gulf of Mexico that had withstood numerous high winds and waves.
4. The final design that resulted from these studies is quite similar to your proposal. The legs of the tower rested on the ocean bottom but in our case the leg foundations were encased in concrete because of the sand and to resist lateral movement. The chamber was floated to the site, as you have indicated, and jacked up on the legs sufficiently to provide clearance for the ocean waves.
5. What happened to this particular Texas Tower is not known and will not be known for a long time. From preliminary accounts, a structural failure must have occurred in one of the legs. No one is more sorry than I that personnel aboard lost their lives in the disaster.
6. I appreciate the interest that you have shown in the Air Force. I hope your interest continues and that you will consider the United States Air Force when you decide on a career.

Sincerely

IVAN H. IMPSON
Colonel, United States Air Force
Chief, Engineering Division
Directorate of Civil Engineering, DCS/O

Stybek AFOCE-E ✓

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON 25, D.C.



REPLY TO
ATTN OF: AFOCE-E

27 January 1961

SUBJECT: Texas Tower

TO: Cadet Sergeant Larry Levy
Staunton Military Academy
Box 382
Staunton, Virginia

*Asst Coord of
Calculation
How retype*

Dear Cadet Sergeant Levy

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Sincerely

IVAN H. IMPSON
Colonel, United States Air Force
Chief, Engineering Division
Directorate of Civil Engineering, DCS/O

*Checked out
with HC Hubbard
OK
HJE*

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AFOCE-E

27 January 1961

Texas Tower

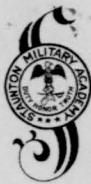
Cadet Sergeant Larry Levy
Staunton Military Academy
Box 382
Staunton, Virginia

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Sincerely

IVAN H. IMPSON
Colonel, United States Air Force
Chief, Engineering Division
Directorate of Civil Engineering, DCS/O



Staunton

Staunton, Va.

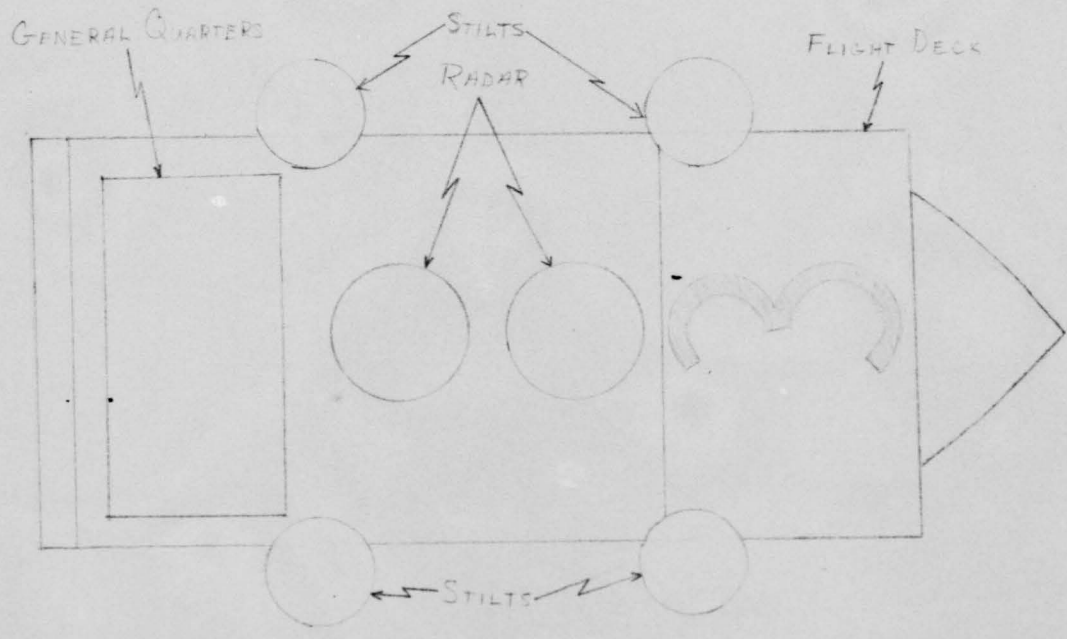
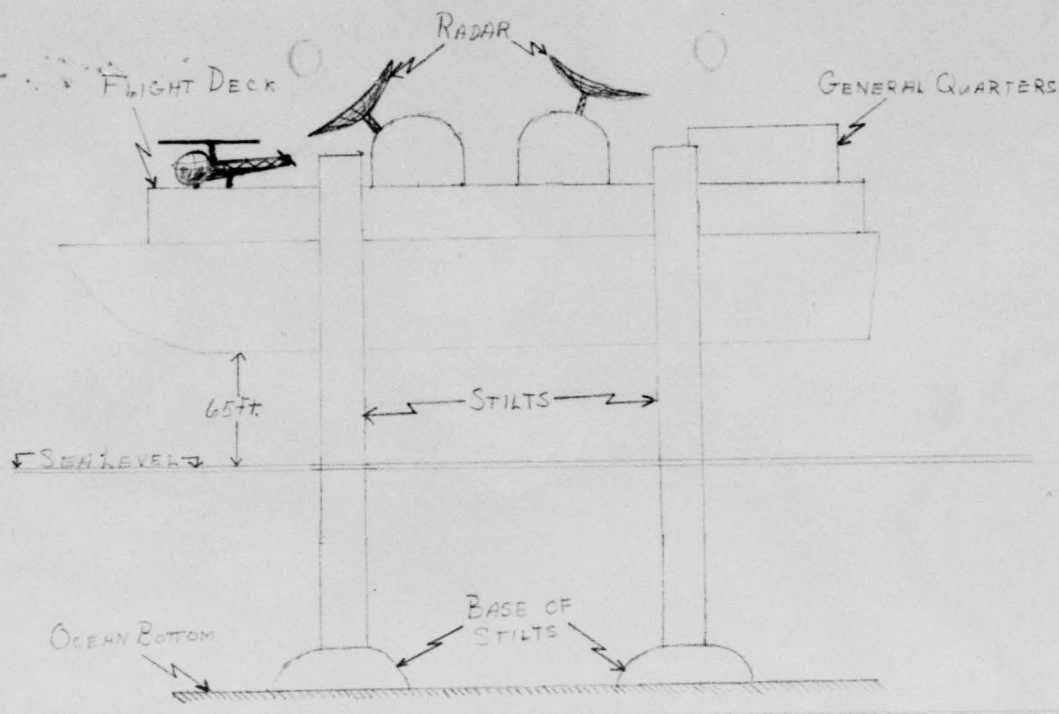
Engineering Dept.
U.S.A.F.
Pentagon
Washington, D.C.

Dear Sirs:

After reading about the Texas Tower that collapsed recently, my roommate and I began to think the problem over about how to prevent such an accident from happening again. Please do not get us wrong. We are not condemning the Air Force for what happened. We have merely dreamed up an idea. We have enclosed a sketch of our idea. The reason for the boat like shape is to make the tower more mobile. If the stilts could be made to retract somehow, the tower would become mobile. The reason for its being mobile is that it could be towed into a ship yard for quick repair. Also it could be moved to another location if the occasion arises. We would appreciate any opinions you could give us on our idea. Thank you.

Yours Truly,

Larry Ley
Cadet Sergeant
S.M.A.



IDEA MAN: LAWRENCE LEVY
 DRAFTSMAN: ROBERT BOSWELL



14 May 61

NO REPORT

#20 ?

Access w/ Gordon Edwards Cudds

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

INCOMING

F/afc

AF IN : 43558 (11 Mar 61)
NN

ACTION: OOP-2

INFO : OOP-CP-1, OCE-2 (6)

SMD C 014

CHQD397ZCDGA405

PP RJEZHQ

DE RJEZDG 41

ZNR

FM 551AEWCON WG OTIS AFB MASS

TO RJEZHQ/HQ USAF WASH DC

INFO RJWFAL/ADC ENT AFB COLO

RJEZSN/26ADIV HANCOCK FLD NY

RJEZKN/BSN AD SECTOR STEWART AFB NY

RBEGMC/DPWO 1ST NAV DIST BOSTON MASS

AF GRNC

BT

UNCLAS 5511DC 3-312 FOR AFOOP-DE-WC AND AFOCE;

INFO ADCCS, ADIDC, 261DC. SUBJ: TEXAS TOWER TWO AND
THREE INSPECTION PROGRESS REPORT NUMBER TWENTY-ONE.

PROFESSORS PIERSON AND NEUMANN OF NYU COMPLETED ON-THE-

SPOT INTERROGATION OF PERSONNEL 4 MARCH. THEY WILL

CORRELATE INFORMATION AVAILABLE FROM ALL SOURCES INCLUDING

AIR FORCE, NAVY HYDROGRAPHIC OFFICE AND COAST GUARD TO

DETERMINE ACTUAL WIND AND WAVE CONDITIONS WHICH ALL TOWERS

HAVE UNDERGONE. THEY WILL PROPOSE INSTRUMENTATION REQUIRED

UPON COMPLETION OF STUDY. TWO EMPLOYEES OF HINCHMAN CORP.

22
M
✓ E

TT-2 on 3.
REPORT #21

2998

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DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
(UNCLASSIFIED MESSAGE)

I N C O M I N G

AF IN : 43558 (11 Mar 61)

Page 2 of 2

PAGE TWO RJEZDG 41

OF CHICAGO REPORTED YESTERDAY TO TRANSFER TO TOWERS IN
CONNECTION WITH ABOVE WATER CORROSION INVESTIGATION. DUE
TO POORWEATHER TRANSPORTATION CANNOT BE EFFECTED EARLIER
THAN 11 MAR. MAGNAFLUX AND RADIOGRAPHING OF WELDS
PROGRESSING ON SCHEDULE.

BT

10/2211Z MAR RJEZDG

T. I. 4 Conference - Tuesday, March 14, 1961

Time: 0900 - 1300
Place: Offices of Moran, Proctor, Bueser & Rutledge, N. Y. City, N. Y.
Attendees:

| | |
|------------------------|--------------------------------------|
| Mr. Rutledge | Moran, Proctor, Bueser & Rutledge |
| Mr. F. H. Kuss | Moran, Proctor, Bueser & Rutledge |
| Mr. Daniel F. Callahan | Whitman, Hanson & Coulson (law firm) |
| Mr. Stuart French | Special Counsel (Senate) |
| Mr. Paul Bauer | House Marine & Fisheries Committee |
| Mr. Gordon Edwards | Bureau of Marine and Fisheries |

Discussion:

Discussion covered design features, waivers during construction, cause of failure static versus dynamic design analysis, and possibility of obtaining information on cause of failure thru salvage operations, also relationships between the joint venturers on the T-1 Contract. Details were as follows:

1. Cause of T-1 Failure

Mr. Rutledge said: wind and wave forces of hurricanes "normal" were apparently in excess of design criteria. Repair of diagonal bracing not completed when tower collapsed.

2. Wave Data

Mr. Rutledge stated that current contract with I&D for safety inspection of T-1 and used in original design. This study being done by Pearson and Bowen of New York University and will be based on review of recorded wave conditions at Texas Tower sites. Mr. Bauer asked who did wave analysis and Mr. Rutledge said "Primarily Good Hope". Force analysis was by Mr. Kuss and Mr. Richards of Moran, Proctor, Bueser & Rutledge office.

3. "X" Bracing

Mr. French: To what extent does fixed bracing above water affect design?
Mr. Kuss: Presents added drag of course, but also increased strength.

4. Pin connections for underwater bracing

Mr. Bauer: Why was a pin connection used? Mr. Kuss: When pin type connection no secondary forces are involved and the joint can be much smaller than a bolted connection. Waiver of pin tolerances were necessary in fabrication to permit insertion of pins thru 5 layers of steel plate. We knew pins were loose but didn't think they would become increasingly looser. Pins not loose in other than 5-5 plates and we have never had a pin failure.

5. Static versus Dynamic Design

Mr. Bauer: Did you design tower on basis of static or dynamic loads?
Mr. Kuss: On basis of static loads. Mr. Bauer: Why don't you think Brewer conclusions were successful? Dr. Rutledge: Because seven wave conditions were not encountered. The maximum was 15'. Mr. Bauer: The oscillograph shows 30'.

Note: Review of oscillographs made by A&E and Mr. Bauer. Mr. Bauer: Were model dynamic studies made? Dr. Rutledge: No, we talked to hydraulic labs at MIT and Stevens Institute but they could not simulate all forces.

6. Replacement of Diagonal Braces at -67'

Question raised regarding collar attachment of diagonals to A and B legs. (Collar attachment rather than pin connection used because of difficulties in working underwater) Mr. Kuss said the replacement diagonal braces were designed to restore original integrity of members. He pointed out that inadequate dardelot bolt installation was indicative of underwater construction difficulties.

7. Cathodic Protection

Moran, Proctor, Mueser & Rutledge said they had nothing to do with cathodic protection design and that this had been done by Hinchman Corporation. Congressional representatives requested copies of Hinchman's reports on inspections after installation of cathodic protection.

8. Situation after Hurricane "Daisy"

Mr. Kuss and Dr. Rutledge stated that no repairs were required after hurricane "Daisy".

9. Situation after Hurricane "Donna"

Mr. Kuss stated that after "Donna", Moran, Proctor, Mueser & Rutledge thought there was great danger of tower collapse. He said General Sider (DC Boston Air Defense Sector) asked him to indicate what wind and wave conditions could be tolerated in the tower's weakened condition. Moran, Proctor, Mueser & Rutledge would not give any wind and wave criteria for this tower condition but stated verbally that it was considered to be extremely dangerous. Mr. Kuss denied that anyone had been told told by Moran, Proctor, Mueser, and Rutledge that tower was 55% effective. He said this impression may have been gained erroneously thru conference discussion of ability of tower legs to bracing. It had been determined that the legs without concrete reinforcement would only take 55% of the design tension in the casing.

10. Relationship of Joint Venturers

Asked whether Anderson-Nichols selected Moran, Proctor, Mueser, & Rutledge as joint venturer or vice versa, Dr. Rutledge said he was not sure but thought probably Cdr. Albers (CICG) had suggested Moran, Proctor, Mueser & Rutledge talk to Anderson-Nichols.

11. Dangerous Condition of T1-4

Mr. Ems said that in meeting at J. Rich Steers office on 12 January 1961 with Air Force personnel present, he had advised that T1-4 was in a dangerous condition.

12. Safety Factor

Mr. Ems said tower was designed on basis of basic stress of 20,000 ψ /sq. in. with yield stress of 33,000 ψ /sq. in..

Recommendations:

1. Copies of Minsham Reports on T1-4 Cathodic Protection.
2. Copy of study on Wave Forces being made by Pearson-Houman under Moran, Proctor, Hueser, & Rutledge safety inspection contract.

T. T. 4 Conference - Monday, March 13, 1961.

Time: 1100 - 1400

Place: Office of J. Rich Steers, N. Y.

Conference:

| | |
|--------------------|------------------------------------|
| Mr. J. Rich Steers | J. Rich Steers Co. |
| Mr. Gene Rau | |
| Mr. Pills | |
| Mr. Koch | |
| Mr. Stewart French | Special Counsel (Senate) |
| Mr. Paul Baur | House Marine & Fisheries Committee |
| Mr. Gordon Edwards | Bureau of Yards and Docks |

Discussion:

Primarily concerned with fabrication and erection procedures with emphasis on reinforcement and repair after towers had been turned over to Air Force. Areas of discussion were:

1. Original design changes or waivers.

Asked whether or not J. Rich Steers requested any design changes, replies were:

Mr. Rau: Yes, use of temporary platforms for erection eliminated, and pile type footing changed to caisson type.

Mr. Koch: Tolerances for in connections on upper tier of "H" bracing were increased by 1/8" to facilitate on site connection of folded "H" bracing. Installation of buoyancy struts a design change for upending purposes.

2. Steers - MK relations with Continental Copper & Steel.

Reply to questions on this subject were:

Mr. Rau: Continental Copper and Steel Industries, Inc. are still in business but not in South Portland, Me. Continental a 100% subcontract under Steers - MK for fabrication of the tower. Prime Contractor had responsibility for quality control of fabrication by sub.

3. A-Bracing above Water.

Asked why pin connections were used for underwater bracing. Mr. Rau replied that this was the "A E" design. Cross Bracing above water was also an "A E" design. Some reinforcement recommended by J. Rich Steers and accepted by MK.

Note: Questioning has emphasized fact that designer limited number of tower legs to three to minimize presentment to wave action, yet later added substantial above water bracing which increases presentment under storm conditions.

4. Steers Repair and Rehab. Contracts.

Mr. Rau stated 1st contract was for installation of above water cross

bracing. This completed in August 1960. After hurricane Donna (12 Sept. 1960). Change Order to this contract covered maintenance scaffold replacement, above and below water foundation inspection and inspection of connections between platform and legs. Second contract covered installation of cable bracing on A-B plane, installation of strong-backs on legs and installation of repair sleeve on horizontal strut in A-B plane at minus 75' elevation.

5. Condition of Tower 7 Jan. 1961

J. Rich Steers representatives stated that on 7 January 1961 1 diagonal in the lower panel of A-B plane and 1 diagonal in the third panel were ineffective. Other breaks had been repaired. Mr. Steers stated this lack of bracing no greater than existed through hurricane 'Donna'. However, with heavy weather expected in Feb and March, J. Rich Steers thought the tower should be orderly evacuated until better weather conditions would prevail.

6. Period 8 - 15 January

Mr. Pau said that during this period Moran, Director, Mueser and Rutledge were engaged in determining tower stability with two braces missing. Mr. Kuss of A & E reported to have told Steers (Mr. Pau) on 12 Jan that tower good for 55% of design strength in existing condition. This not reduced to what wind and wave forces tower could withstand. All of this later denied by Mr. Kuss who said he could not possibly quote on design strength with bracing missing and many other factors unknown. He thought possibly a statement that caisson shells at proposed point of attaching cable bracing were only good for 55% of the design tension of the cables might have been misinterpreted giving impression entire tower was within 55% of design strength.

Requests:

1. Copy of 7 Jan. findings (J. Rich Steers will supply)
2. Copy of 20 Nov. report by J. Rich Steers
3. Copies of A & E drawings of proposed cable bracing
4. Copies of memoranda of telephone calls from TT-4 to J. Rich Steers including Jan 15 call at 7:15 P. M. from Mr. Shutz.

f

T. T. 4 Conference - Saturday, March 11, 1961

Time: 0900 - 1300
Place: aboard MSTB Vessel AXL-17, New Bedford, Massachusetts
Participants:

| | |
|--------------------------|------------------------------------|
| CAPT. Sixto Mangual | AXL-17 |
| Cdr. James O'Shaughnessy | MSTB-MY |
| Mr. Stuart French | Special Counsel (Senate) |
| Mr. Paul Bauer | House Marine & Fisheries Committee |
| Mr. Gordon Edwards | Bureau of Yards and Docks |

Discussion:

The AXL-17 is a MSTB vessel operated by Civil Service personnel as a supply ship for all three Texas Towers. Movements of the vessel are controlled by the 4604th Support Squadron for Texas Towers. The squadron is located at Otis Air Force Base at Palanuth, Massachusetts. Mr. French held confidential interviews with various crew members. Commander O'Shaughnessy, Mr. Bauer, and Mr. Edwards, held a discussion with Captain Mangual. Items discussed were:

1. Load of sand and gravel on deck of TT-4

Captain Mangual stated that he had brought two loads of sand and gravel from a New York port to Texas Tower #4. This material was in 100-pound bags and had been stowed on the deck preparatory to dumping into two of the caissons. After dumping into A and B legs, grout was to be pumped into the aggregate to provide reinforcing concrete slugs at the proposed locations for attachment of cable bracing. Captain Mangual said that he had carried two loads of this aggregate to the tower, one of 100-tons and one 105-tons. He did not know how much of the material might have been ducted into the caisson legs.

2. Method of tying supply ship to TT-4.

Using a rough model of tower and ship, Captain Mangual indicated method of tying the vessel to the tower. This involved use of a chain around the C leg to which nylon ropes were attached. These ropes were thrown from the tower platform to the AXL-17. After tying the bow to the C leg, the AXL-17 propellers were used to hold the stern in position. Stern anchors were not used. Captain Mangual said this was the only method of preventing the ship from hitting and possibly damaging tower legs.

3. Saturday, January 14

Captain Mangual said he was engaged in off-loading salvageable material from TT-4 on the day before the tower collapsed. He said material removed included electronic and other gear estimated at no more than 40 dead weight tons. During this operation, Captain Phelan, CO of TT-4, said that 50-60 knot winds were expected from the northeast. After salvageable material had been off-loaded, Captain Mangual asked Captain Phelan if he wanted to evacuate personnel before anticipated high wind and wave conditions would make

evacuation impossible. Captain Phelan said that he did not yet consider evacuation necessary. Again later in the day, Captain Phelan was asked if he wanted to evacuate and again turned down the offer of the AKL-17.

Captain Mangual also reported that divers were in the water and welders and riggers were engaged in work on the tower all day Saturday.

4. Sunday, January 15

Again on Sunday morning, Captain Mangual recommended evacuation of the tower since winds and sea conditions were reaching a point where evacuation would be dangerous. Reportedly, Captain Phelan again decided against evacuation. During Sunday afternoon, sea conditions worsened to the extent that AKL-17 had to maneuver at some distance from TT-4. Captain Mangual said that the sea conditions encountered were the worst that he experienced in his several years of supplying the Texas towers. He said that immediately after the reported time of collapse of TT-4, he recalls a series of excessively high waves.

5. Captain Mangual's report

Captain Mangual has written a detailed report of the AKL-17 activity before, during, and subsequent to the failure of TT-4. The Bureau (Captain Davis) is attempting to obtain a copy of this document.

T. I. 4 conference - Saturday, March 11, 1961 (P.M.)

TIME:

1500 - 1800

PLACE:

Brewer Laboratories, Massachusetts

REPRESENT:

| | |
|--------------------|------------------------------------|
| Mr. G. A. Brewer | Brewer Laboratories |
| Mr. R. A. Vanstone | Brewer Laboratories |
| Mr. Stuart French | Special Counsel (Senate) |
| Mr. Paul Bauer | House Marine & Fisheries Committee |
| Mr. Gordon Stewart | Bureau of Yards and Docks |

Discussion:

Purpose of visit to Brewer Laboratories was to discuss a motion study that this firm had performed in connection with TI-4. The study was made primarily in connection with operational characteristics of the radome bases. However, in making the study for this purpose, comments also were made re loss of effectiveness of the underwater bracing as indicated by the motion study results. Highlights of the meeting included:

1. Possible Causes of Failure

After being given some general information regarding position of tower after failure, location of breaks in caissons, and so forth, Mr. Brewer suggested that failure may have been caused by weld failure and thought this might particularly be true in areas of high stress, such as, joints in legs where holes had been burned for attachment of collar bracing. He also suggested that rupture of welded connection between legs and stiffener might have caused failure. He recommended that sections of steel at these locations be recovered and analyzed. More exact diver determinations are required, such as, location of breaks, bends, and so forth.

2. Static versus Dynamic Design of Tower

Mr. Brewer assumed that tower was designed on the basis of a static analysis. When asked whether or not he would have performed a dynamic analysis for original design, he said that he probably would not have done this. He said, however, that his motion studies indicated a period of 17 cycles per minute whereas the design frequency was approximately 77 cycles per minute. This indicated that the cross-bracing was ineffective under the forces applied during the test period. In view of these results, Mr. Brewer says his report recommended that a dynamic analysis be made.

3. Differences of Opinion

Moran, Proctor, Mueser, and Rutledge Design and Construction Report states that Brewer Laboratories findings were inconclusive. Questioned regarding this statement, Mr. Brewer expressed surprise and said he thought his observations were well correlated and of better than average quality. He could not understand the Moran, Proctor, Mueser, and Rutledge statement.

4. Platform weight

The platform was given to Mr. Brewer by Moran, Proctor, Mueser, and Rutledge for use in Brewer computations was 5000-tons. This is indicated in a letter from Mr. Cuss to Mr. Brewer dated 14 November 1958.

Remarks:

1. Mr. Brewer requested a better copy of BUDOCKS memorandum to CAC dated
2. Mr. Bauer and Mr. French requested copies of all six parts of the Brewer Report.

T. T. 4 Conference *March 11/1961*

Time: 1300 - 1600
Place: Woods Hole Oceanographic Institute, Woods Hole, Mass.
Conference:

| | |
|--------------------|--|
| Dr. Iselin | Director, Woods Hole Oceanographic Institute |
| Mr. Vine | Woods Hole Oceanographic Institute |
| Mr. Stuart French | Special Counsel (Senate) |
| Mr. Paul Bauer | House Marine & Fisheries Committee |
| Mr. Gordon Edwards | Bureau of Yards and Docks |

Discussions:

Discussion with representatives of the Woods Hole Oceanographic Institute primarily concerned wind and wave data and scope of contracts held by Woods Hole Oceanographic Institute in determination of wave criteria and positioning of Texas Tower No. 4. Principal items were:

1. Oceanographic Institute participation in determination of design criteria

The Oceanographic Institute acted as consultant to OICC and A&H contractors during preparation of Texas Towers' feasibility study. Oceanographic information held by the Institute with respect to the proposed location areas was made available to the designers.

2. Oceanographic Institute contracts

Dr. Iselin stated that the Institute had had contracts for sounding and coring George's Banks and Nantucket sites. They had also acted as consultant to Anderson-Nichols on salt water storage and had set location buoys for TT 2 and TT-4. Also did sounding work in connection with positioning of TT-4.

3. Waves hitting bottom of platforms

Dr. Iselin stated that there was some indication that waves higher than theoretically expected had hit the bottom of TT 2 platform. He further stated, however, that wave abnormality such as had hit the bottom of TT 2 should not be expected for the TT 4 site because of the much deeper water at this location. Dr. Iselin suggested that the maximum design wave criteria was based on a study of worse known conditions and application of the Pearson wave forecasting formula.

4. Cause of failure

Dr. Iselin said that failure was probably caused by a series of small waves with equal periods rather than by an abnormally high wave. He said that a series of such waves with equal periods coinciding with the natural period of the tower might have caused failure. He said this is the type of wave phenomenon which frequently causes tankers to break in two.

5. Tendency of waves to climb cylindrical surfaces

On being questioned regarding water entering vents on underside of platforms, Dr. Iselin discussed the phenomena of waves' tendency to climb a cylindrical surface. He thought that with vents near the legs, water would enter them because of the tendency to climb the cylindrical leg rather than because of any solid wave hitting the platform bottom. Dr. Iselin mentioned the possibility of a heavy log having crashed the above water bracing of the tower.

6. Model studies

Dr. Iselin said that he had recommended a model study of the IT-4 tower prior to fabrication in a natural tidal basin on Cape Cod. He said this study had not been made because of time factor. He said that such a study in a tank would not be satisfactory since artificial waves are sinusoidal whereas natural waves are not and, therefore, have different affect on structures.

Requests:

Congressional representatives made no requests for specific data at the 10 March meeting.

T. T. 4 Conference - Wednesday, March 8, 1961 (P.M.)

Time: 1400 - 1700
Place: EPFO LMD Office
Attendees:

| | |
|--------------------|------------------------------------|
| CEB V. C. Owens | EPFO LMD |
| Mr. Stuart French | Special Counsel (Senate) |
| Mr. Paul Bauer | House Marine & Fisheries Committee |
| Mr. Alan Crockett | Marine Contractors, Inc. |
| Mr. Cahill | Marine Contractors, Inc. |
| Mr. Gordon Edwards | Barren of Yards and Boats |

Discussion:

Mr. Crockett somewhat reluctant to discuss details of his operations in connection with diving inspections of TP-4 because of possible adverse effects on his relationship with his employer the U.S.A.F. Mr. Crockett said a full report of approximately 10,000 words would be turned over to CAPT Grassfield, Air Force Procurement Officer within one week. This report to cover all work by Marine Contractors, Inc. after hurricanes "Irene" (12 Sep 1960), 6 Jan 1961 and following collapse of TP-4. List of information received from Crockett covered:

1. Model photos showing postulated conditions after collapse of TP-4 indicate tower platform location 800 yards west of south free foundation caissons. Platform is substantially intact and has 115 feet of "A" leg still attached. B-C side rests on ocean bottom with "A" corner supported above ocean bottom by 115 feet of "A" leg. Platform had rotated 37° in a counter-clockwise direction.

2. Condition of caisson footings.

Mr. Crockett said all caisson footings were intact and remained embedded in the ocean bottom in their original position. There was no evidence of tilting of the footings or of sand scour around them. Portions of tower legs were bent over and in some cases torn at the point of connection with the caisson footings.

3. Diver investigations after collapse.

Mr. Crockett states these dives were under his direction as technical advisor. Divers numbered as many as 24 and included Navy divers as well as Mr. Crockett's commercial men. All operations were conducted from the "Sunbird", a naval vessel attached to Subcom II. Purpose of diving operations was to a. free trapped survivors if any, b. remove any bodies remaining within vessel, and c. determine extent of hazard to navigation. In diving operations to date no specific effort has been made to determine cause of failure. All diving operations suspended on 14 February when Navy withdrew "Sunbird".

4. Navy contact

CAPT Wood (USN), a Navy line officer attached to Barcock Air Force Base in Syracuse, N. Y. has detailed reports and photographs of all of foregoing diver investigations.

Reports:

None from Navy. Congressional representatives asked for many copies and reports held by Crockett to be submitted by Air Force.

T. T. & Conference - Thursday, March 2, 1961

Time: 1100 - 1700
Place: Otis Air Force Base, Falmouth, Mass.
Participants:

| | |
|---------------------|---|
| COL E. J. White | Base Commander, Otis AFB |
| COL E. E. Cooper | Deputy Base Commander |
| MAJ W.R. Sheppard | C.O. 4604th Support Squadron |
| MAJ R.L. Stork | ChS Officer for 4604th Support Squadron |
| | Acting C.O. 13 Jan '61 to 13 Jan '61 |
| | 1st C.O. of 17-4 |
| LT Weaver | 551st Wing C.E. Squadron |
| Chief Warrant Hardy | ChS for 4604th Support Squadron |
| Mr. Stewart French | Special Counsel (Secrete) |
| Mr. Gordon Edwards | Bureau of Yards and Docks |
| Mr. Paul Bauer | House Marine & Fisheries Committee |

Discussion:

Discussion at Otis Air Force Base primarily concerned command responsibilities. Otis is operated by the 551st Airborne Early Warning and Control Wing under the 26th Air Division at Hancock AFB in Syracuse, N. Y., and the Air Defense Command Headquarters at Otis is directly responsible to HQ, Boston Air Defense Sector for providing administrative, technical and logistical support for all T-28 Towers. HQ, Boston Air Defense Sector are at Stewart AFB in Westbury, N. Y. under the command of Brig. Gen. Elder. Items of technical interest in Otis AFB discussion were:

1. Condition of breeding pin connections February 1960.

After Marine Contractor's report of 15 Feb 1960 Mr. Kane of Morse, Peckor, Moser and Kitzke said tower might not last until spring unless some repairs made. As a result above water v-breeding recommended and installed under Air Force contracts.

2. Meeting of 14 November 1960.

This meeting apparently covered damage to tower caused by hurricane "moss" (Sep '60) and recommendations for repair. (Attempting to get report of meeting for Bureau.)

3. Weather Reports.

Air Force representatives said Air Defense Command in New York provided towers with weather forecasts for all winds in excess of 40 knots. Advance warning of weather conditions varied from 3 to 36 hours. Storm of 12 Dec 1960 recorded winds of 37 knots.

4. Meeting of 14 January 1961.

At meeting in New York on 14 Jan '61 AAS and construction contractors recommended to Air Force representatives that T-28 be abandoned until spring when better weather conditions would facilitate tower repairs. Air Force representatives agreed and tentatively set 1 February as evacuation date in order that boilers, water pipes, etc. might be secured before evacuation.

5. Tower reports Sunday, 15 January 1961.

On the date of TT-4 collapse CAPT Phelan, C.O. aboard the tower reported that a loud pop was heard at 10:00 A.M. Air Force representatives thought this might possibly have been fracture of another brace. In view of increasing winds on Saturday, 14 January and Sunday, 15 January, CAPT Phelan advised Otis that he would clear decks for possible evacuation by heli-copters from carrier ramp on Monday morning, 16 January. Clearing involved removing bags of sand and gravel stored on deck for use in bracing repairs. Air Force representatives at Otis believe all hands except Telephone operator were clearing deck when tower collapsed.

6. Constant tension winches.

In talking to Air Force personnel I requested information regarding performance of constant tension winches which the Bureau had specified for the towers to facilitate loading or off-loading of cargo and personnel under adverse weather conditions. Air Force representatives said constant tension winches were not being used as they were too complicated for Air Force personnel to operate.

7. Position of TT-4.

Geographical position of TT-4 originally determined by "Loran" which at best is only accurate to $\frac{1}{2}$ mile. More than two years after original determination of position the Coast and Geodetic Survey using "Rajvid" (accurate to $\frac{1}{2}$ mile) determined tower position to be .6 of a nautical mile to the south of the earlier designated position. I queried Air Force representatives on whether or not this position discrepancy would have any effect on radar operations from the tower. They were not sure but in any event thought that relative position in the radar net was of more importance than the actual position of the tower. Air Force representatives also thought that position used in radar calculations had been independently determined by Air Force. They said I could get the position used by the Air Force from the New York Air Defense Sector.

8. Safety inspection of TT-2 and TT-3.

Mr. French expressed surprise when informed that a contract is currently underway covering safety inspection of TT-2 and TT-3. At Air Force request this contract is being administered by the First Naval District with Messer, Peeter, Messer and Rutledge as contractor. The contract includes visual inspection above and below water, live-loading of all welds connecting platform to legs, acceleration and strain gauge measurements, re-evaluation of wind and wave factors based on actual conditions experienced at the tower sites and recommendations for corrective measures if required.

9. Determination of cause of failure.

Air Force representatives said diving operations suspended after ascertaining no more personnel aboard and determining position of platform and foundation. Further diving operations directed at determining causes of failure suspended until better weather conditions prevail in air. Salvage of missing sections at rupture points for metallurgical examination has been suggested. Salvage of entire platform and foundation has been evaluated as impractical.

Requests:

1. Copy of scope of contract for safety inspection of TT-2 and TT-3.
2. Air Force requested to provide photos and memoranda of various meetings.

AFOCE-2
ROUTING SLIP

DATE 6 Mar 61

INIT

| | | | |
|----------|-----------------|------------|------------------|
| | BRIG GEN CURTIN | | COORDINATION |
| | MR GIBBENS | | INFORMATION |
| | COL CONE | | ACTION |
| <u>1</u> | LT COL KOHL | <u>WJR</u> | FILE |
| | MISS LADUE | | SIGNATURE |
| | MRS POTVIN | | APPROVAL |
| AFOCE | AFOCE-1 | | AFOCE-3 |
| AFOCE-M | AFOCE-R | | AFOCE-P |
| AFOCE-2F | AFOCE-2L | | <u>AFOCE-E 2</u> |

REMARKS:

ATTN: MR. ADDISON

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION

AF IN : 36458 (4 Ma 51) F/cgd UNCLASSIFIED MESSAGE
INFO : OOP-2, OOP-CP-1, OCE-2, IST-2, IIM-2, IDS-1 (11)

2 ✓
m

INCOMING

Texas Tower #4

not

SMD C 014

ZCZCHQB009ZCBJA019

RR RJEZHQ

DE RBEPJD 058

ZNR

R 032138Z

FM COMDT COGARD

TO RBEGUF/CCGD THREE

INFO RBEGUF/COMEASTAREA

RBEPW/CNO

RJEZHQ/HQ COFS USAF

RBKHC/CINCLANTFLT

RBEGUH/COMEASTSEAFRON

USCG GRNC

BT

UNCLAS

TEXAS TOWER 4

1. FOLLOWING RECEIVED FROM CNO QUOTE THE AIR FORCE IS CONCERNED ABOUT POSSIBLE COMPROMISE OF CLASSIFIED DOCUMENTS AND EQUIPMENT WHICH WERE ABOARD TEXAS TOWER NUMBER 4. REQUEST YOUR ESTABLISHED PATROLS PROVIDE SUCH SURVEILLANCE AS PRACTICABLE TO PREVENT SALVAGE ATTEMPTS BY UNAUTHORIZED PERSONS. SALVAGE OPERATIONS WILL BE RESUMED AS SOON AS WEATHER AND OTHER CONSIDERATIONS PERMIT UNQUOTE.

2. TAKE NECESSARY ACTION

BT

CFN 4 4

03/2148Z

2654

1

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

20
11

AI IN : 36517 (4 M: 61) V'cgs

INCOMING

ACTION: OOP-2

INFO : OOP-CP-1, OCE-2 (5)

Texas Tower #A.

well

SMD C 037

ZCHQB021ZCDGA880

PP RJEZHQ

DE RJEZDG 57

ZNR

P 031500Z ZEX

FM 551AEWCONWG OTIS AFB MASS

TO RJEZHQ/HQ USAF WASH DC

INFO RJWFAL/ADC ENT AFB COLO

RJEZSN/26ADIV HANCOCK FLD NY

RJEZKN/BOADS STEWART AFB NY

RBEGMC/DPWO 1ST NAV DIST BOSTON MASS

AF GRNC

BT

UNCLAS 551IDC 3-123 ACTION HQ USAF (AFOOP-DE-WC

AND AFOCE); INFO ADC (ADCCS AND ADIDC); 26ADIV (26 IDC);

BOADS; DPWO 1ST NAV DIST; SUBJ: TEXAS TOWER TWO AND

THREE INSPECTION PROGRESS REPORT NUMBER GWENTY RADIO

GRAPING ALL FUEL TENKS ON IT TOW COMPLETED FVE

TESTING PRRSONNEL WILL RETURN FRO TT TOW TO THREE 4 MAR

61 TO RESUME MAGNAFLUXING WELD INSPECTION 50 PER CENT COMPLET

DR WILLARD PRIESON JR AND DR GERHARD NUEMANN OF NEW YORK

UNIVERSITY AON BOARD THIS DATE INTERROGATIION PERSONEL

REVIEWING OFFICIAL FILM PRIVATELY OWNED PICTURES AND

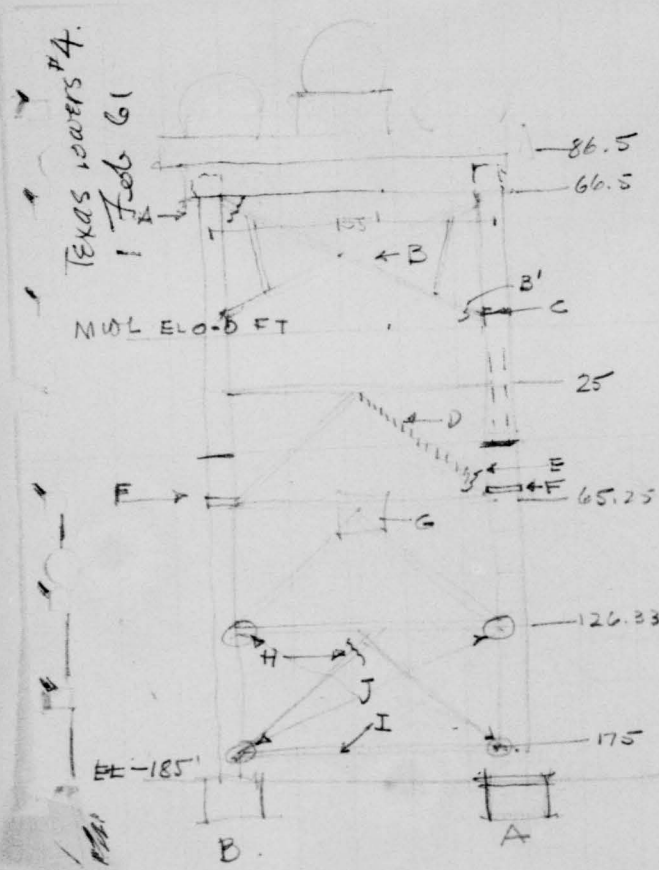
OFFICAL WEATHER RECORDS IN CONNECTION WITHUPDATION

WIND AND WAVE STUDIES.

BT

2622

1



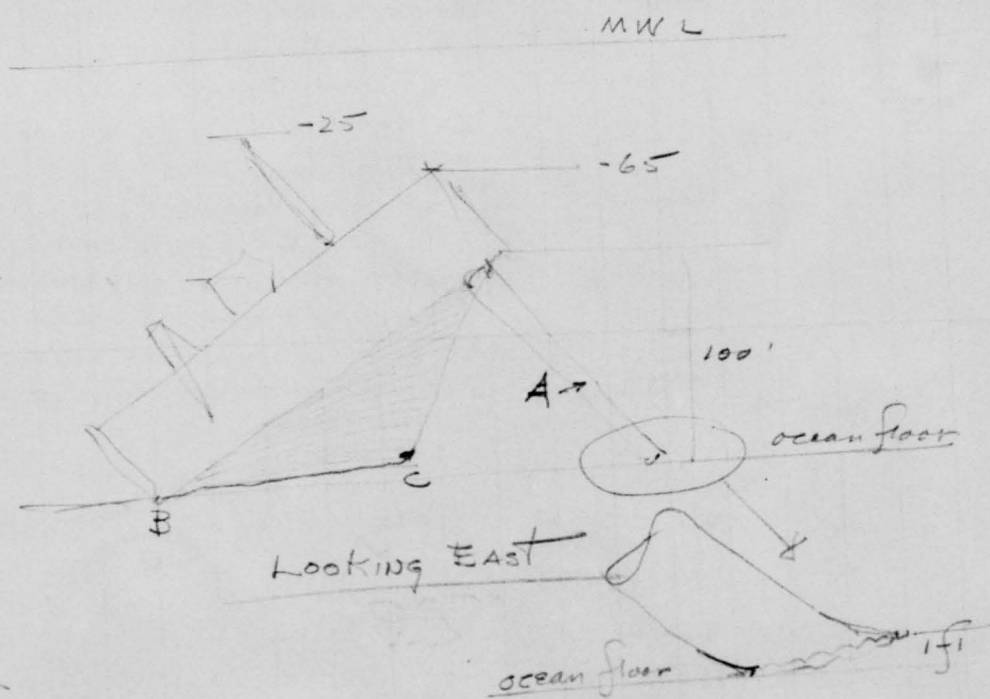
- A = Partial Fracture - 12 Dec 60 -
- B = Bracing Completed 8 Aug 60
- B' = Partial Fracture - 12 Dec 60
- C = Minor Fractures - 12 Sept 60
- D = Diagonal Removed to prevent further damage
- E = Fractured 12 Sept 60
- F = Field Connections
- G = Pin plates torn loose from horizontal member
12 Sept 60 - Repaired by collar conn. 6 Jan 61
Pins rotate .1 turn to 1 1/2 turns per min.
- H = Diagonal broken - 12 Dec 60
- I = Horizontal brace never installed.
- J = All pins at these points are within original tolerances.

OTC AFB Drawing
 Notes taken from Drawg. OTS-140-061 A.
 Sheet 1 of 1



TEXAS TOWER #4.

2 Mar 1961
Report coming in on Courier. Sunday. 5 Mar 1961



3 Mar 61

Letter from A.E. 16 Nov 60. states that
X bracing installation completed & Angloo
Tower #4 was safe to resist "125 mph
wind - with 35' breaking wave or a
60' non breaking wave" (with the same wind)

"Due to factors of safety in design
and uncertainties and inadequacies
in theoretical analyses the ultimate
wind and wave conditions which
the tower structure could resist
cannot be determined."

"There is, of course a factor of safety
in the calculations and provided these are
not used up in faulty workmanship
and deterioration of the structure, they
would increase the ultimate strength."

Notes from Em repair report. - Page 11

Prevailing weather occurred in the SSE-SW
quadrant (mainly 204° to 212°) - wind, sea and
current in the same direction produce a synchronous

effect - Bracing (delta) snapped
like harp strings -

Page 14 Future Maintenance Considerations
Corrosion pitting - $\frac{3}{16}$ " deep - tower legs.

Exhibit #25. TT #4 Journals

19 Dec 60 - Tower rotating in excess
of 5'-6"

21 Dec 60 - Tower appears to be more
stable than it has been

22 Dec 60 - Tower oscillating more
than normal

Tab A. Vol. 5.

Constantine De Cocco -

Dep. for Civil Engineering 26 95

Statement. Para 7 - 12 Sept 60.

winds in excess of 100 knots with
breaking waves of 65' ranging to
as high as 75' -

Mr Kues (C/E) opined that these
conditions exceed design by as much as $\frac{100}{100}$ %

Exhibit D.

At Col Battison - Fast pass.

Capt Phelan reported they were clearing deck of gravel and grout which was being placed in the legs. Any material left in the morning to be pilsoned to make room for helicopter

Tab J. -

Report by Marine Contractor 9 Feb 1954. No scouring around wooden leg. Build up of sand to depth of 6'

Tab K

15 Mar 60

Capt G J White - CEC (USN)

District Public Works Officer

"would look favorably on request for Navy to administer both Engineering and Repair contract for correction of the deficiencies"

Vol. 6. Appendix N

Sketch shows concrete lining in upper portion of caisson down to elevation -50 with empty caisson down to -115. (Question advisability of the added weight to the upper part weight?)

Appendix S.

Climatology report.

13 storms producing 20' or higher waves struck TT #4.

Table XIV - TT #4 subject to 48 hours of 30-35' waves. (Early in January ⁴¹)

Appendix V.

Carrier Wasp experienced series of unusual waves at time of Tower collapse. This deserves investigation by research into the effect of very deep bottom contours upon surface wave action in the vicinity of this area in the vicinity of Hudson Canyon

1800 1800 1800 1800 1800 1800

1800 1800

140 pm

1:30

8

AFOCE-E/Col Impson/med/54622/2 Mar 61

AFOCE-E

2 March 1961

Mr. Robert L. Wiegel, Chairman
Task Committee on Wave Forces
412B Hesse Hall
University of California
Berkeley 4, California

Dear Mr. Wiegel:

Your letter of February 22, 1961, concerning Texas Tower data, has been referred to me for reply.

The design agency for the Air Force Texas Tower was the U. S. Navy, Bureau of Yards & Docks. The feasibility and design reports you request are not available to us at this time.

Our design agent is presently restudying the oceanographic effects and reanalyzing the design of the remaining towers to avoid repetition of the disaster. These studies will probably not be completed for three or four months.

I suggest that your query be made to the U. S. Navy, Bureau of Yards and Docks.

Sincerely,

WINSTON C. FOWLER
Colonel, U. S. Air Force
Acting Deputy Director for Construction
Directorate of Civil Engineering, DCS/O

AFOCE-E Stybck ✓
AFOCE-E Coord ✓
AFOCE-E R/File

COORD: AFOCE-E AFOCE-3

[Handwritten signature]

AFOCE-EA/Mr Hodgdon/ald/77474
27 Feb 61

AFOCE-EA

FEB 28 1961

Texas Towers Nos 2 and 3 - Structural Investigations
and Reports

Chief, Bureau of Yards and Docks, Department of the Navy (Mr. Gordon Edwards)

1. This letter will confirm telecon 24 February 1961 between Mr. Gordon Edwards of your Bureau, and Messrs. C. W. Harris and Nat C. Hodgdon of this Headquarters relative to reports, etc., being furnished on the work being performed on subject facilities by BuDocks for the Air Force.
2. The information to be furnished is as follows:
 - a. A copy of the Scope of Work to be performed in the investigations of Texas Towers Nos. 2 and 3.
 - b. Copy of the final report of the investigations of both towers.
 - c. Copy of each periodic or interim report prepared as the work progresses.
3. The above information and reports are to be sent to Headquarters USAF, Directorate of Civil Engineering, Engineering Division (AFOCE-E/Mr. C. W. Harris), The Pentagon, Washington 25, D. C.

FOR THE CHIEF OF STAFF:

IVAN W. JIMSON
Chief, Engineering Division
Directorate of Civil Engineering, DCS/0

AFOCE-EA

AFOCE-E

N. C. Hodgdon
N. C. HODGDON

I. W. Jimson

Q

Coord AFOCE-EA
Stbk AFOCE-EA
R/File AFOCE

Notes: Contents of work.

Report #19 -

Part I.

- 1 TT-2 - work in fuel tanks area
- 2 Weld radio graphing schedule
a. "B" leg 27 Feb. Comp.
1. "A" leg 2 Mar. Comp.
- 3 TT-3 - Fare of snap team to return 1 Mar
- 4 Prof. Neuman and WJ Pierson Nyll at Otis Mar 2.
- 5 Interrogate tower personnel
- 6 Review Movies and Records in order to update wind and wave study.

Part II

1. US Navy - Contract w/ MPMR
2. Complete study by Pierson and Neuman
3. Weather and Oceanic conditions.
4. Determine if in excess of orig. design
5. P-11 most qualified in U.S.A.
recommended by Woods Hole Oceanographic Institute.
6. Any other study should be held until P-11 study is completed.

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

FILE: TEXAS TOWERS

INCOMING

MOA 2

M

*TT-2 end 3
REPORT #19*

AF IN : 29289 (25 Feb 61) G/jhs

ACTION: OOP-2

INFO : OOP-CP-1, OCB-2 (6)

SMD C064

KZCHQE130ZCDGA316

PF RJEZHQ

DE RJEZDG 79

ZNR

P 242115Z ZEX

FM 551AEW CON WG OTIS AFB MASS

TO RJEZHQ/HQ USAF WASH DC

INFO RJWFAL/ADC ENT AFB COLO

RJEZSN/26ADIV HANCOCK FLD NY

RJEZKN/BSN AD SECTOR STEWART AFB NY

RBEGMC/DPWO 1ST NAV DIST BOSTON MASS

AF GRNC

BT

UNCLAS 551IDC 2-638 ACTION HQ USAF (AFOOP-DE-WC

AND AFOCE); INFO ADC (ADCCS) AND (ADIDC); 26ADIV (26IDC);

BOADS; DPWO 1ST NAV DIST; SUBJ: TEXAS TOWER TWO AND

THREE INSPECTION PROGRESS REPORT NUMBER NINETEEN. MESSAGE

IN 2 PARTS. PAR. I: ALL INSPECTION PERSONNEL ARE WORKING

ON TT TWO TO EXPEDITE WORK IN FUEL TANK AREAS. RADIO-

GRAPHING OF WELDS IN B LEG WILL BE COMPLETED 27 FEB. A

LEG WILL BE COMPLETED 2 MAR. INSPECTION TEAM WILL BE

SPLIT UP AND 5 MEMBERS RETURNED TO TT THREE ON OR ABOUT

1 MAR WEATHER PERMITTING. PROFESSORS GERHARD NEUMANN

2331

(X)

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

INCOMING

AF IN : 29289 (25 Feb 61)

Page 2 of 2

PAGE TWO RJEZDG 79

AND WILLARD J. PIERSON JR OF NEW YORK UNIVERSITY UNDER CONTRACT TO MORAN PROCTOR MUESER AND RUTLEDGE WILL ARRIVE OTIS AFB ON 2 MAR TO INTERROGATE TOWER PERSONNEL, AND REVIEW MOVIES AND RECORDS IN CONNECTION WITH UPDATING WIND AND WAVE STUDY. PART II: REFERENCE ADC (ADIDC) LTR 17 FEB TO HQ USAF (AFOOP-DE) SUBJ: TECHNICAL INVESTIGATION OF TEXAS TOWER NR4 FAILURE. UNDER THE CONTRACT WHICH THE US NAVY HAS MADE WITH MORAN, PROCTOR, MUESER AND RUTLEDGE A COMPLETE STUDY OF WEATHER AND OCEANIC CONDITIONS WILL BE MADE BY PROFESSORS PIERSON AND NEUMANN OF NYU TO DETERMINE IF FACTORS EXIST OR HAVE OCCURRED WHICH ARE IN EXCESS TO THE ORIGINAL DESIGN CRITERIA. UPON COMPLETION OF THE STUDY THE A-E WILL MAKE ANY NECESSARY RECOMMENDATIONS TO IMPROVE THE TOWER DESIGN IF REQUIRED. DR PIERSON HAS BEEN RECOMMENDED BY WOODS HOLE OCEANOGRAPHIC INSTITUTE AS BEING THE MOST QUALIFIED PERSON IN THE UNITED STATES FOR THIS TYPE OF INVESTIGATION. THEREFORE IT IS RECOMMENDED THAT ANY OTHER STUDY WHICH HAS BEEN PROPOSED BE HELD IN ABEYANCE UNTIL THE RESULTS OF PRESENT INVESTIGATION BY DR PIERSON ARE PUBLISHED.

BT

24/2209Z FEB RJEZDG

5-8911

TEL: MELROSE ~~XXXX~~
EXT: 2528

REPLY TO
ATTN OF: ADIDC

SUBJECT: Technical Investigation of Texas Tower #4
Failure

TO: HQ USAF (~~APOOP-DE~~) A70CG-E

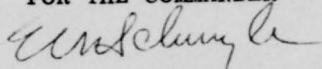
INFO TO: 26 Air Div (IDC)
Otis AFB, Mass

1. This hq feels that an engineering investigation of Texas Tower No. 4 failure to determine causes is necessary for several reasons. There is a definite need for a complete study of tower design factors affected by oceanographic dynamics. Such a study should include a review of the oceanographic dynamics factors used in the tower design and a determination of the design aspects by updating the design as a result of the recent adverse weather and oceanic conditions experienced at No. 4 site. Other factors which may have added to the cause of failure should be included.

2. The following list of research units is provided when considering such a study by your hq pertaining to any technical investigations of Texas Tower No. 4 failure.

- a. Navy Research and Development Center.
- b. Consultants for research in oceanographic dynamics.
 - 1) Texas A & M Research Department (contact Dr Spencer J. Buchanan, Civ Engr Dept).
 - 2) University of California at Berkeley (contact Dr Joseph W. Johnson).

FOR THE COMMANDER



E. V. N. SCHUYLER
Colonel, USAF
DCS/Civil Engineering

HEADQUARTERS
AIR DEFENSE COMMAND
UNITED STATES AIR FORCE
ENT AIR FORCE BASE
COLORADO SPRINGS, COLORADO
DEPUTY FOR CIVIL ENGINEERING



MAILING ADDRESS: ENT AFB
OFFICE: 527 SO. TEJON ST.

17 FEB 1961

AFOCE-EA/Mr Hodgdon/ald/77474
27 Feb 61

AFOCE-EA

Texas Towers Nos 2 and 3 - Structural Investigations
and Reports

Chief, Bureau of Yards and Docks, Department of the Navy (Mr. Gordon Edwards)

1. This letter will confirm telecon 24 February 1961 between Mr. Gordon Edwards of your Bureau, and Messrs. C. W. Harris and Nat C. Hodgdon of this Headquarters relative to reports, etc., being furnished on the work being performed on subject facilities by BuDocks for the Air Force.

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a. A copy of the Scope of Work to be performed in the investigations of Texas Towers Nos. 2 and 3.

b. Copy of the final report of the investigations of both towers.

c. Copy of each periodic or interim report prepared as the work progresses.

3. The above information and reports are to be sent to Headquarters USAF, Directorate of Civil Engineering, Engineering Division (AFOCE-E/Mr. C. W. Harris), The Pentagon, Washington 25, D. C.

FOR THE CHIEF OF STAFF:

Directorate of Civil Engineering, DCE/0

AFOCE-EA

AFOCE-E

Coord AFOCE-EA
Stbk AFOCE-EA
R/File AFOCE

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

INCOMING

AF IN : 29289 (25 Feb 61) g/jhs

ACTION: OOP-2

INFO : OOP-CP-1, OCE-2 (6)

SMD 0664

KZCHQE130ZCDGA316

PP RJEZHQ

DE RJEZDG 79

ZNR

P 242115Z ZEX

FM 551AEW CON WG OTIS AFB MASS

TO RJEZHQ/HQ USAF WASH DC

INFO RJWFAL/ADC ENT AFB COLO

RJEZSN/26ADIV HANCOCK FLD NY

RJEZKN/BSN AD SECTOR STEWART AFB NY

KBEGMC/DPWC 1ST NAV DIST BOSTON MASS

BT

BT

UNCLAS 551IDC 2-638 ACTION HQ USAF (AFOOP-DE-WC

AND AFOCE); INFO ADC (ADCCS) AND (ADIDC); 26ADIV (26IDC);

ROADS; DPWO 1ST NAV DIST; SUBJ: TEXAS TOWER TWO AND

THREE INSPEC ION PROGRESS REPOR. NUMBER NINETEEN. MESSAGE

IN 2 PARTS. PAR. I: ALL INSPEC ION PERSONNEL ARE WORKING

ON IT TWO TO EXPEDITE WORK IN FUEL TANK AREAS. RADIO-

GRAPHING OF WELDS IN B LEG WILL BE COMPLETED 27 FEB. A

LEG WILL BE COMPLETED 2 MAR. INSPECTION TEAM WILL BE

SHUT UP AND 5 MEMBERS RETURNED TO IT THREE ON OR ABOUT

2 MAR WEATHER PERMITTING. PROFESSORS GERHARD NEUMANN

TT-2 end 3.
REPORT #19



DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE
INCOMING

AF IN : 29289 (25 Feb 61)

Page 2 of 2

PAGE TWO RJEZDG 79

AND WILLARD J. PIERSON JR OF NEW YORK UNIVERSITY UNDER CONTRACT TO MORAN PROCTOR MUESER AND RUTLEDGE WILL ARRIVE OTIS AFB ON 2 MAR TO INTERROGATE TOWER PERSONNEL, AND REVIEW MOVIES AND RECORDS IN CONNECTION WITH UPDATING WIND AND WAVE STUDY. PART II: REFERENCE ADC (ADIDC) LTR 17 FEB TO HQ USAF (AFOOP-DE) SUBJ: TECHNICAL INVESTIGATION OF TEXAS TOWER NR4 FAILURE. UNDER THE CONTRACT WHICH THE US NAVY HAS MADE WITH MORAN, PROCTOR, MUESER AND RUTLEDGE A COMPLETE STUDY OF WEATHER AND OCEANIC CONDITIONS WILL BE MADE BY PROFESSORS PIERSON AND NEUMANN OF NYU TO DETERMINE IF FACTORS EXIST OR HAVE OCCURRED WHICH ARE IN EXCESS TO THE ORIGINAL DESIGN CRITERIA. UPON COMPLETION OF THE STUDY THE A-E WILL MAKE ANY NECESSARY RECOMMENDATIONS TO IMPROVE THE TOWER DESIGN IF REQUIRED. DR PIERSON HAS BEEN RECOMMENDED BY WOODS HOLE OCEANOGRAPHIC INSTITUTE AS BEING THE MOST QUALIFIED PERSON IN THE UNITED STATES FOR THIS TYPE OF INVESTIGATION. THEREFORE IT IS RECOMMENDED THAT ANY OTHER STUDY WHICH HAS BEEN PROPOSED BE HELD IN ABEYANCE UNTIL THE RESULTS OF PRESENT INVESTIGATION BY DR PIERSON ARE PUBLISHED.

BT

24/2209Z FEB RJEZDG

AFOCE-EA
(Mr. Hodgler)

AFOCE-2
ROUTING SLIP

DATE 27 Mar 61

INIT

| | | | | |
|----------|------------------------|---------------------|-----------------|---------|
| 2 | BRIG GEN CURTIN | <i>M</i> | COORDINATION | |
| | MR GIBBENS | | INFORMATION | |
| | COL CONE | | ACTION | |
| 1 | LT COL KOHL | <i>M</i> | FILE | |
| | MISS LADUE | | SIGNATURE | |
| | MRS POTVIN | | APPROVAL | |
| AFOCE | | AFOCE-1 | | AFOCE-3 |
| AFOCE-M | | AFOCE-R | | AFOCE-P |
| AFOCE-2F | | AFOCE-2L | | |

REMARKS:

DEPARTMENT OF THE AIR FORCE
STATE MESSAGE DIVISION
UNCLASSIFIED MESSAGE

AF IN : 58754 (25 Mar 61)

INCOMING

ACTION : OOP-2

INFO : OOP-CP-1, OCE-2 (6)
SMB C 086

ZCZCHQA215ZCDGA617

PP RJEZHQ

DE RJEZDG 75

ZNR

P 242114Z

FM 551AEWCONWG OTIS AFB MASS

TO RJEZHQ/HQ USAF WASH DC

INFO RJWFAL/ADC ENT AFB COLO

RJEZSN/26ADIV HANCOCK FLD NY

RJEZKN/BOADS STEWART AFB NY

RBEGMC/DPWO 1ST NAV DIST BOSTON MASS

AF GRNC

BT

UNCLAS 551IDC 3-769 FOR AFOOP-DE-WC AT AFOCE;

INFO ADCCS, ADIDC, 26IDC. SUBJ: TEXAS TOWER TWO AND
THREE INSPECTION PROGRESS REPORT NUMBER TWENTY-THREE.

IN 3 PARTS. PART I: CONFERENCE HELD 21 MAR 61 AT DPWO
1ST NAV DIST WITH A-E, NAVY, 4604 SUPPRON (TT) AND OTIS
AFB PERSONNEL TO FIRM TIME SCHEDULE AND COMPLETION OF
STRUCTURAL INVESTIGATION OF TOWERS. APPROXIMATE DATES
ARE A/ MAGNAFLUXING AND GAMMAY INSPECTION OF WELDS--
TWR TWO 15 APR 61; TWR THREE 8 APR 61 B/ ABOVE WATER
CORROSION INSPECTION--TWR TWO 26 MAR 61; TWR THREE

2 ✓
M

3708

1

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION
UNCLASSIFIED MESSAGE

INCOMING

AF IN : 58754 (25 Mar 61) Pg 2 of 2

PAGE TWO RJEZDG 75

17 APR 61 C/ WIND AND WAVE STUDY--PRELIMINARY REPORT
6 MAY 61 D/ UNDERWATER INVESTIGATION 30 MAY 61. WIND
AND WAVE STUDY CANNOT BE COMPLETED SOONER. DATA MUST BE
CORRELATED FROM SEVERAL SOURCES BEFORE FINAL ANALYSIS
CAN BE MADE. THIS WORK BEING PERFORMED BY DRS NEUMANN AND
PIERSON OF NYU AS TIME IS AVAILABLE FROM THEIR NORMAL
DUTIES AS PROFESSORS. UPON COMPLETION OF STUDY MORAN
PROCTOR MEUESER AND RUTLEDGE WILL MAKE NECESSARY RECOM-
MENDATIONS AS TO WIND, WAVE, MOTION AND STRAIN INSTRUMENTS
REQUIRED TO PROVIDE CONTINUOUS ANALYSIS OF ACTUAL
CONDITIONS EXPERIENCED BY TOWERS. IF WIND AND WAVE STUDY
INDICATES TOWERS HAVE UNDERGONE CONDITIONS IN EXCESS OF
ORIGINAL DESIGN CRITERIA M.P.M. AND R WILL PERFORM
COMPLETE STRESS/RE-ANALYSIS OF TOWERS TO DETERMINE IF
ADDITIONAL STRENGTHENING OF MEMBERS REQUIRED. PART II:
TO THIS DATE NO STRUCTURAL WEAKNESSES HAVE BEEN FOUND
EITHER BY FAILURE OF WELDS OR CORROSION. PART III: TOTAL
COST STRUCTURAL ANALYSIS INCLUDING DIVING AND INSTRUMENTEN-
TATION WILL APPROACH \$300,000.

BT

24/2225Z MAR RJEZDG .

AFCE-E/Col Impson/54622/med/13 Feb 61

FEB 16 1961

Mr. Bennett H. Griffin
Aviation Consultant
4000 Massachusetts Ave., N.W.
Washington 16, D. C.

Dear Mr. Griffin:

Your letter of January 31, 1961 to Secretary Zuckert has been referred to me for reply.

At this time, it is not known if a replacement tower will be necessary.

You can rest assured that if action is taken to design a replacement tower, the firm of Howard, Needles, Tammen & Bergendoff will be given every consideration.

Sincerely,

(signed)

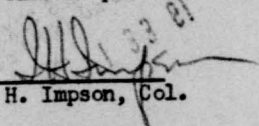
GEORGE S. ROBINSON

Deputy Special Assistant for Installations

Ofc of Sig
SAFS File Cy
AFCVC
AFCE-E Coord ✓
AFCE-E R/File
AFCE-E Stybck

COORD: This rewrite is substantially same as previous writing thus coordination remains valid.

FEB 18 12 13 61


I. H. Impson, Col.

OUTGOING

FEB 17

AFOCE-E/Col Impson/med/10 Feb 61/54622

Mr. Bennett H. Griffin
Aviation Consultant
4000 Massachusetts Ave., N. W.
Washington 16, D. C.

Dear Mr. Griffin:

Your kind letter of January 31, 1961 to Secretary Zuckert has been referred to me for reply.

At this time it is not known if a newly constructed tower will be necessary to replace the collapsed tower.

You can rest assure that if action is taken to redesign a replacement tower, the firm of Howard, Needles, Tammen & Bergendoff will be given every consideration in our selection of the designing engineer.

Sincerely,

AFOCE-E Stybck
AFOCE-E Coord ✓
AFOCE-E R/File
AFCVC
Ofc of Sig
SAFS File Cy

COORD: AFOCE-E

AFOCE-3

AFOCE

SAFIE

Impson
EX-104
10 53 01

Shullbent

Stybeck
10 53 01

10 53 01

| | | | | | | |
|--|-------|-------|-------|-------|-------|------------|
| HEADQUARTERS UNITED STATES AIR FORCE | | | | | | DATE |
| OFFICE OF THE VICE CHIEF OF STAFF | | | | | | FEB 3 1961 |
| REFERRAL SLIP | | | | | | |
| TO: | | | | | | |
| AFCSS | AFCOA | AFPDC | AFODC | AFXDC | AFMDC | AFDDC |
| AFCAS | SAFIS | AFPMP | AFOOP | AFXSC | AFMPP | AFDRD |
| AFCIG | SAFLL | AFPTR | AFOMO | AFXWH | AFMMP | AFDDS |
| AFCIN | AFAAC | AFPCP | AFOCE | AFXLR | AFMMS | AFDDP |
| AFCJA | AFABF | AFDPD | AFOAC | AFXPD | AFMSS | AFDAP |
| AFCRF | AFASC | AFPGS | AFOAT | AFXPR | AFMTP | AFDRQ |
| AFCSG | AFAMA | AFPDW | AFORQ | AFXAC | AFMLP | AFDFD |
| AFCSA | AFAAF | AFPCP | AFOWX | | AFMME | AFDAT |
| AFCGM | AFAUD | | | | | |
| ATTENTION: | | | | | | |
| FOR: | | | | | | |
| APPROPRIATE ACTION | | | | | | |
| DIRECT REPLY | | | | | | |
| COMMENT AND/OR RECOMMENDATION | | | | | | |
| COORDINATION | | | | | | |
| CCS, CVC AND CAV HAVE/HAS NOT SEEN | | | | | | |
| PREPARATION OF REPLY TO SAF | | | | | | |
| PREPARATION OF REPLY FOR SIGNATURE OF SAF <i>W. Robinson</i> | | | | | | |
| PREPARATION OF REPLY FOR SIGNATURE AFCCS | | | | | | |
| PREPARATION OF REPLY FOR SIGNATURE AFCVC | | | | | | |
| PREPARATION OF REPLY FOR SIGNATURE AFCAV | | | | | | |
| PREPARATION OF REPLY FOR SIGNATURE | | | | | | |
| COPY OF REPLY FOR | | | | | | |
| NOTE AND RETURN | | | | | | |
| INFORMATION AND/OR FILE | | | | | | |
| INFORMATION COPIES HAVE GONE TO | | | | | | |
| ACTION HAS GONE TO | | | | | | |
| SUSPENSE DATE <i>20 Feb 61</i> | | | | | | |
| COMMENTS: | | | | | | |
| <i>DIS/SAFIE-21 Feb 61</i> | | | | | | |
| FOR THE VICE CHIEF OF STAFF | | | | | | |
| <i>W. Jones 153222</i> | | | | | | |
| Colonel, U.S. Air Force | | | | | | |
| Deputy Executive To The Vice | | | | | | |

AFOCE-E/Col Impson/med/54622/18 Feb 61

AFOCE-E

FEB 14 1961

Ltr fr Mr. Arthur Frosberg, Sr., Re: Construction of Air Force
Off-shore Radar Towers

SAFLL

1. The following is a draft of a proposed reply to a letter from
Mr. Arthur Frosberg, Sr. forwarded to this headquarters by Congressman
Langen:

"I refer to your letter of January 17, 1961 in which concern
was expressed regarding the construction of our off-shore radar
towers.

"The design of these towers was accomplished by two competent
and experienced Engineering firms. Many types of designs were
studied. The records of previous recorded wind and sea conditions
were studied and the design of the tower was such to withstand
such recorded natural occurrences. In addition, the engineers
reviewed the design of the oil drilling towers in use in the Gulf
of Mexico that had withstood numerous high winds and waves.

"The final design that resulted from these studies was the
so called Texas Towers. The platform was floated to the site
and then jacked up on the legs to provide clearance for the
ocean waves. A fixed and stable platform was essential to the
operation of the precision radar equipment mounted on the platform.

"It can be ascertained from the above that the design was
such to withstand any expected natural phenomena. The platform
was not designed to float, once the heavy equipment was installed,
since the foundations and legs were to resist these natural forces.

"A thorough investigation is now underway as to the failure.
When the cause or causes are actually determined, correction will
be made in future designs. Studies of all possible solutions to
the problem, including your suggestion will be made if and when
additional structures of this type are to be constructed.

"We regret the tragedy that occurred. We are very appreciative
of the interest shown by you in the United States Air Force and
one of its problems."

2. Action Officer is Colonel Ivan H. Impson, AFOCE-E, Extension 54622.
Coordination outside AFOCE is not required.

DANA F. HURLBURT
Lt Colonel, U. S. Air Force
Executive
Dep Dir for Construction
Directorate of Civil Engineering, DCS/O

AFOCE-E Stybek
AFOCE-E R/File
AFOCE-E Coord

MEMO ROUTING SLIP

USE FOR APPROVALS, DISAPPROVALS, CONCURRENCES, OR SIMILAR ACTIONS

| | | |
|--------------------------------------|----------|------------------|
| 1 NAME OR TITLE AFCEE Col. Grubbs | INITIALS | CIRCULATE |
| ORGANIZATION AND LOCATION 5D ACO | DATE | COORDINATION |
| 2 Lt. Col. Eric Linhof | | FILE |
| SAPILL-2 5 D 218 | | INFORMATION |
| 3 | | NECESSARY ACTION |
| | | NOTE AND RETURN |
| 4 | | SEE ME |
| | | SIGNATURE |

REMARKS

P R I O R I T Y (Ref HOI 10-20 dated 2 Nov. 60)

Forwarded for preparation of draft for proposed reply to Congressman Langen

SUSPENSE: 17 February 1961

ACTION OFFICER: Lt. Col. Eric Linhof, 56905

CA

| | |
|--|--------------------|
| NAME OR TITLE JAMES O. MORSE Colonel, USAF | DATE 10 Feb 61 |
| ORGANIZATION AND LOCATION Investigations Branch Congressional Committee Division | TELEPHONE 56905 |

JOHN LANGEN
THIEF RIVER FALLS, MINNESOTA
MEMBER OF CONGRESS
INTERNAL AND BUREAU AFFAIRS
GOVERNMENT DEVELOPMENT

1961
THIEF RIVER FALLS, MINN.
JAN 25 1961

Congress of the United States
House of Representatives
Washington, D. C.

January 25, 1961

Department of Defense
Washington, D. C.

Gentlemen:

I received a letter from Mr. Arthur Forbach, Sr.,
Thief River Falls, Minnesota, expressing his concern and
views regarding the construction of radar towers.

A copy of his letter is enclosed for your information
and consideration.

Sincerely yours,
John Lagen
JOHN LANGEN
Member of Congress

John
enc.





OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON 25, D. C.

January 26, 1961

Dear Mr. Longan:

This is to acknowledge your letter of January 19, 1961, in behalf of Mr. Arthur G. Longan, Sr., 1001 West 10th Street, Minneapolis, concerning the construction of a new house.

The matter has been referred to the appropriate officials within the Department of the Army and we are requesting that a reply to me be directed to me.

Sincerely,

STUART

STUART S. BELL
Assistant to the Secretary
(Legislative Affairs)

Respectfully,
Honorable Arthur G. Longan

House of Representatives

cc: Dept/Air Force w/basic correspondence for direct reply.

C O P Y

Jan. 17, 1961

Hon. Odin Langen
Minn. Rep--House of Representatives
Washington, D. C.

Dear Mr. Langen:

I am taking this opportunity of writing to you as our representative--not that I want anything special at this time for our community--but in viewing the news over TV and reading newspaper accounts in regards to the radar tower that was destroyed the other day with the loss of twenty-five lives and the tower worth \$20,000,000, I stopped to think about it.

It seems to me as if this could have been avoided to a great extent if it had been properly built. I believe the radar tower should have been built with air-tight compartments so that if it broke loose it would still have floated into the sea and could have been repaired.

If you think I am right in my thinking, I would ask that you hand this suggestion to some one in Washington who would be interested. If any more are built, they should be built so that they would be buoyant in case of a catastrophe such as this tower went through.

Yours, truly

s/ Arthur Frosberg

Arthur Frosberg, Sr

C O P Y

Col I. H. Impson/med/54622/9 Feb 61

AFOCE-E

54622

10 FEB 1961



AFODC Appr
~~AFCCS~~ Appr
SAFIE Sig

Colonel Ivan H. Impson med

Letter from Anna N. Yarum Regarding "Texas Towers"

1. Herewith is memorandum prepared for signature of Mr. McCombs to the Assistant Secretary of Defense (Installations and Logistics).
2. The memorandum contains a proposed reply to Anna N. Yarum in regard to her suggestion that Texas Towers be placed on land or on piers adjacent to land.

RECOMMENDATION

3. That the attached memorandum (TAB A) be signed and dispatched by SAFIE.

W. E. GRUBBS
Colonel, U. S. Air Force
Executive
Directorate of Civil Engineering, DCS/O

1 Atch
Tab A, Prop memo for sig
of SAFIE

COORD: AFOCE-E

AFOCE-3

AFOCE

AFOCE

Impson
Hull

*Telephone
Coord w/
Col Baldwin*

AFOCE-E Coord ✓
AFOCE-ESTybak
AFOCE-E R/File
Dfcs of Sig - SAFIE
SAFS File cy
cc: AFODC ✓

LE 13 10 38 21
Q 38493
M 001103

406-61

AFODC 0491

1

AFOCE-E/Col Impson/9 Feb 61/med/54622
REWRN: AFOCE-E/Col Impson/15 Feb/med/54622

FEB 16 1961

MEMORANDUM FOR THE ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS)

SUBJECT: Letter from Anna M. Yarum Regarding "Texas Towers"

1. The following is a draft of a proposed reply to a letter from Anna M. Yarum:

"Your kind letter of January 21, 1961 has been referred to this office by the U. S. Coast Guard.

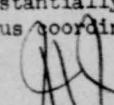
"The suggestion that the Texas Tower be located on land or on piers adjacent to the coast line was considered. The best possible radar coverage for protection of our East Coast dictated the location of the towers where no islands existed and where it was too distant from the shore to build a pier. With this operational requirement in mind, the Texas Towers were built on large columns at the required locations.

"The Department of Defense is greatly distressed by the tragedy which occurred. Particularly so when so much professional and conscientious study was made to design against such phenomena of nature. Unfortunately, such phenomena have shown that man cannot always predict the ways of nature.

"We in the Department of Defense are very appreciative of the interest that you have shown in one of the problems that face us."

Signed
HAROLD W. HOUSTON
Lt. Colonel, USAF
Executive to the Special
Assistant for Installations

M/R: This rewrite is substantially same as previous writing thus coordination remains valid.


Ivan H. Impson, Colonel

AFOCE-E Stybck
AFOCE-E R/File
AFOCE-E Coord
Ofc of Sig
SAFS File
AFVC
AFDC

AFOCE-E/Col Impson/54622/9 Feb 61/med

MEMORANDUM FOR THE ASSISTANT SECRETARY OF DEFENSE (INSTALLATIONS AND LOGISTICS)

SUBJECT: Letter from Anna M. Yarum Regarding "Texas Towers"

1. The following is a draft of a proposed reply to a letter from Anna M. Yarum:

"Your kind letter of January 21, 1961 has been referred to this office by the U. S. Coast Guard.

"The suggestion that the Texas Tower be located on land or on piers adjacent to the coast line was considered. The reason that the towers had to be located where they were was to afford the United States the best possible radar coverage for protection of our East Coast.

"Design was then initiated to meet this operational requirement. The records of previous recorded winds and sea conditions were carefully studied and the design was such to withstand natural occurrences. In addition, the design engineers reviewed the design of oil drilling towers in use in the Gulf of Mexico that had withstood numerous high winds and waves. The final design that resulted was the so called Texas Towers.

"The Department of Defense is greatly distressed by the tragedy which occurred. Particularly so when so much professional and conscientious study was made to design against such phenomena of nature. Unfortunately, such phenomena have shown that man cannot always predict the ways of nature.

"We in the Department of Defense are very appreciative of the interest that you have shown in one of the problems that face us."

2. Action Officer is Colonel Ivan H. Impson, AFOCE-E, Ext 54622. Coordination outside AFOCE is not required.

2 Incls

1. Ltr fr U. S. Coast Guard,
21 January 1961
2. Ltr fr Anna M. Yarum,
21 January 1961

AFOCE-E Stybek
AFOCE-E R/File
AFOCE-E Coord
Ofc of Sig
SAFS File Cy
cc: AFODC

MEMO ROUTING SLIP

NEVER USE FOR APPROVALS, DISAPPROVALS, CONCURRENCES, OR SIMILAR ACTIONS

| | | | |
|---|---------------------------|-----------|--|
| 1 | NAME OR TITLE | INITIALS | CIRCULATE |
| | ORGANIZATION AND LOCATION | DATE | COORDINATION |
| 2 | | | FILE |
| | | | INFORMATION |
| 3 | AFOCE | | <input checked="" type="checkbox"/> NECESSARY ACTION |
| | | | NOTE AND RETURN |
| 4 | | | SEE ME |
| | | | SIGNATURE |
| REMARKS | | | |
| <p>Please prepare reply for SAFIE signature to OASD/I&L(Mr Sheridan)...</p> <p>AFODC Suspense: <u>13 February 1961.</u></p> <p style="text-align: center;"><i>GM</i></p> <p style="text-align: right;">AFODC <u>441</u></p> | | | |
| FROM NAME OR TITLE | | DATE | |
| GEORGE M. HENNINGER CWO W3 USAF | | 8 Feb 61 | |
| ORGANIZATION AND LOCATION | | TELEPHONE | |
| Administrative Officer DCS/Operations | | 76505 | |

DD FORM 1 FEB 50 95

Replaces DA AGO Form 895, 1 Apr 48, and AFHQ Form 12, 10 Nov 47, which may be used.

16-71067-2 GPO

| | | | | | | | | | | | | | |
|---|---|--------------------------|-------|--------------------------|-------|-------------------------------------|-------|--------------------------|-------|--------------------------|-------|--------------------------|-------|
| HEADQUARTERS UNITED STATES AIR FORCE | | | | | | DATE | | | | | | | |
| OFFICE OF THE VICE CHIEF OF STAFF | | | | | | 8 Feb 61 | | | | | | | |
| REFERRAL SLIP | | | | | | | | | | | | | |
| TO: | | | | | | | | | | | | | |
| <input type="checkbox"/> | AFCCS | <input type="checkbox"/> | AFCOA | <input type="checkbox"/> | AFPDC | <input checked="" type="checkbox"/> | AFODC | <input type="checkbox"/> | AFXDC | <input type="checkbox"/> | AFMDC | <input type="checkbox"/> | AFDDC |
| <input type="checkbox"/> | AFCAS | <input type="checkbox"/> | SAFIS | <input type="checkbox"/> | AFPMP | <input type="checkbox"/> | AFOOP | <input type="checkbox"/> | AFXSC | <input type="checkbox"/> | AFMPP | <input type="checkbox"/> | AHDRD |
| <input type="checkbox"/> | AFCIG | <input type="checkbox"/> | SAFLL | <input type="checkbox"/> | AFPTR | <input type="checkbox"/> | AFOMO | <input type="checkbox"/> | AFXWH | <input type="checkbox"/> | AFMMP | <input type="checkbox"/> | AFDDS |
| <input type="checkbox"/> | AFCIN | <input type="checkbox"/> | AFAAC | <input type="checkbox"/> | AFPCP | <input type="checkbox"/> | AFOCE | <input type="checkbox"/> | AFXLR | <input type="checkbox"/> | AFMMS | <input type="checkbox"/> | AFDDP |
| <input type="checkbox"/> | AFCJA | <input type="checkbox"/> | AFABF | <input type="checkbox"/> | AFDPD | <input type="checkbox"/> | AFOAC | <input type="checkbox"/> | AFXPD | <input type="checkbox"/> | AFMSS | <input type="checkbox"/> | AFDAP |
| <input type="checkbox"/> | AFCRF | <input type="checkbox"/> | AFASC | <input type="checkbox"/> | AFPGS | <input type="checkbox"/> | AFOAT | <input type="checkbox"/> | AFXPR | <input type="checkbox"/> | AFMTP | <input type="checkbox"/> | AFDRQ |
| <input type="checkbox"/> | AFCSG | <input type="checkbox"/> | AFAMA | <input type="checkbox"/> | AFPDW | <input type="checkbox"/> | AFORQ | <input type="checkbox"/> | AFXAC | <input type="checkbox"/> | AFMLP | <input type="checkbox"/> | AFDFD |
| <input type="checkbox"/> | AFCSA | <input type="checkbox"/> | AFAAF | <input type="checkbox"/> | AFPCB | <input type="checkbox"/> | AFOWX | <input type="checkbox"/> | | <input type="checkbox"/> | AFMME | <input type="checkbox"/> | AFDAT |
| <input type="checkbox"/> | AFCGM | <input type="checkbox"/> | AFAUD | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | | <input type="checkbox"/> | |
| ATTENTION: | | | | | | | | | | | | | |
| FOR: | | | | | | | | | | | | | |
| <input type="checkbox"/> | APPROPRIATE ACTION | | | | | | | | | | | | |
| <input type="checkbox"/> | DIRECT REPLY | | | | | | | | | | | | |
| <input type="checkbox"/> | COMMENT AND/OR RECOMMENDATION | | | | | | | | | | | | |
| <input type="checkbox"/> | COORDINATION | | | | | | | | | | | | |
| <input type="checkbox"/> | CCS, CVC AND CAV HAVE/HAS NOT SEEN | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | PREPARATION OF REPLY TO SAF | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | PREPARATION OF REPLY FOR SIGNATURE OF SAF/E - Mr. McCombe | | | | | | | | | | | | |
| <input type="checkbox"/> | PREPARATION OF REPLY FOR SIGNATURE AFCCS | | | | | | | | | | | | |
| <input type="checkbox"/> | PREPARATION OF REPLY FOR SIGNATURE AFCVC | | | | | | | | | | | | |
| <input type="checkbox"/> | PREPARATION OF REPLY FOR SIGNATURE AFCAV | | | | | | | | | | | | |
| <input type="checkbox"/> | PREPARATION OF REPLY FOR SIGNATURE | | | | | | | | | | | | |
| <input type="checkbox"/> | COPY OF REPLY FOR | | | | | | | | | | | | |
| <input type="checkbox"/> | NOTE AND RETURN | | | | | | | | | | | | |
| <input type="checkbox"/> | INFORMATION AND/OR FILE | | | | | | | | | | | | |
| <input type="checkbox"/> | INFORMATION COPIES HAVE GONE TO | | | | | | | | | | | | |
| <input type="checkbox"/> | ACTION HAS GONE TO | | | | | | | | | | | | |
| <input type="checkbox"/> | SUSPENSE DATE 14 Feb 61 | | | | | | | | | | | | |
| COMMENTS: | | | | | | | | | | | | | |
| Please see Lt Col Houston's remarks on SAFS R/S attached re action. | | | | | | | | | | | | | |
| B/S/SAF/E-15 Feb 61 | | | | | | | | | | | | | |
| AFODC 0441 | | | | | | | | | | | | | |
| FOR THE VICE CHIEF OF STAFF | | | | | | | | | | | | | |
| JAMES M. WATKINS, JR. | | | | | | | | | | | | | |
| Colonel, U.S. Air Force | | | | | | | | | | | | | |
| Deputy Executive To The Vice Chief of Staff | | | | | | | | | | | | | |

AFOCE-E/Col Impson/54622/med/9 Feb 61

FEB 9 1961

AFOCE-E

Ltr to Senator Paul Douglas fr Mr. Phillip Gold Re: "Texas Tower No 4"

SAFLL

1. The following is a draft of a proposed reply to a letter to Senator Paul Douglas from Mr. Phillip Gold:

"I refer to your letter of January 19, 1961 in which you expressed concern relative to the design of Texas Tower No 4.

"Each of the towers was sited to give the best possible radar coverage for protection of our east coast.

"The design agent for these towers was the Bureau of Yards & Docks, U. S. Navy. They employed two competent and experienced Architect and Structural Engineer firms to do the design.

"The records of previous recorded winds and wave actions were reviewed thoroughly. The design of the oil drilling towers in use in the Gulf of Mexico that had withstood numerous high winds and waves was also reviewed.

"Other design factors included minimum interferences to wave passage; protection to icing and corrosion; stability against wind, wave, scour and abrasion; and towing and erection procedures.

"As a result, and verified by eminently qualified consultants, the three legged Texas Tower design was chosen as the most satisfactory design which met construction and operational requirements.

"A thorough investigation is now underway as to the failure. When the causes are actually determined, correction will be made in future designs if and when any additional structures of this type are to be constructed."

"We appreciate the interest that you have shown in the United States Air Force and one of its problems."

2. Action Officer is Colonel Ivan H. Impson, AFOCE-E, Ext 54622. Coordination outside AFOCE is not required.

DANA F. HURLBURT
Lt Colonel, U. S. Air Force
Executive
COORDS: AFOCE-E
AFOCE-3
AFOCE
1 Engineering, DCS/O

1 Atch
Memo fr SAFLL, w/ltr fr
Phillip Gold, 19 Jan 61

AFOCE-E Stybck
AFOCE-E Coord
AFOCE-E R/File

AFOCE-E

1 February 1961

Cadet Sergeant Larry Levy
Staunton Military Academy
Box 382
Staunton, Virginia

Dear Cadet Sergeant Levy:

Your letter of 29 January 1961 indicates a vital interest in the National Defense establishment which I am appreciative.

I will be glad to talk to you during the latter part of March if you have an occasion to visit Washington. My office number is Room 5C-365, the Pentagon. Office hours are from 8:15 am to 5:00 pm.

If you arrive by train, probably the most economical way for you to reach the Pentagon is to proceed to 12th and Pennsylvania Avenue. From 12th & Penn catch an AB&W bus direct to the Pentagon. This will place you in the Concourse where an information desk is available to further direct you to the office.

In case circumstances dictate my being out of town, Mr. Harris, my Deputy Chief, or Lt Col Coffee, Executive Officer, would be very happy to talk with you.

Sincerely,

IVAN H. IMPSON
Colonel, United States Air Force
Chief, Engineering Division
Directorate of Civil Engineering, DCS/O



Staunton

Box 382
Staunton Military
Academy
Staunton, Va.

*Recd
31 Jan 1961*

Chief of Engineering Division
United States Air Force

Dear Colonel Impson;

I want to thank you very much for your letter concerning the Texas Tower. I sincerely appreciated it.

I live in Wilmington, Delaware and have to pass through Washington on my trip home for vacations. I would like to know if it would be possible to visit the Pentagon during such a trip. I would also like to meet and talk to you if it would not be of any inconvenience to you. My next vacation would start on March 24th. I will arrive in Washington around seven o'clock in the morning.

Sir, if you do not have the time please do not feel it is a necessity to write me a reply to this letter. I have inconvenienced you enough already. Thank you.

Sincerely,

Sam Levy
Cadet Sgt. Levy
Staunton Military
Academy

MEMO ROUTING SLIP

NEVER USE FOR APPROVALS, DISAPPROVALS, CONCURRENCES, OR SIMILAR ACTIONS

| | | | |
|---|--|-----------|------------------|
| 1 NAME OR TITLE <i>Col Dupson</i> | | INITIALS | CIRCULATE |
| ORGANIZATION AND LOCATION <i>AFOCE-E</i> | | DATE | COORDINATION |
| 2 | | | FILE |
| | | | INFORMATION |
| 3 | | | NECESSARY ACTION |
| | | | NOTE AND RETURN |
| 4 | | | SEE ME |
| | | | SIGNATURE |
| REMARKS <i>Since this involves design suggest you prepare final reply per previous like type inquiries of this nature.</i> | | | |
| FROM NAME OR TITLE <i>Col. Nichol</i> | | DATE | |
| ORGANIZATION AND LOCATION | | TELEPHONE | |

AFOCE-2
ROUTING SLIP

DATE 2 Feb 61

INIT

| | | | |
|------------------|---------------------------------|--------------|--|
| <u>3</u> | BRIG GEN CURTIN <i>Has seen</i> | COORDINATION | |
| <u>2</u> | MR GIBBENS <i>Has seen</i> | INFORMATION | |
| | COL CONE | ACTION | |
| <u>1</u> | LT COL KOHL <i>Has seen</i> | FILE | |
| | MISS LADUE | SIGNATURE | |
| | MRS POTVIN | APPROVAL | |
| AFOCE | AFOCE-1 | AFOCE-3 | |
| AFOCE-M <u>4</u> | AFOCE-R | AFOCE-P | |
| AFOCE-2F | AFOCE-2L | | |

REMARKS:

DETAILS OF WEEKEND
TT #4 AS IT NOW

LIES.

Soft Clark

ATT: L/C NICHOLS

To: L&L

DRAFT

828
7 Feb

The following is a draft of a proposed reply to a letter to Senator Paul Douglas from Mr. Phillip Gold.

"I refer to your letter of January 19, 1961 in which you expressed concern relative to the design of Texas Tower No 4.

Each of the Towers ^{was} ~~were~~ sited to give the best possible radar coverage for protection of our east coast. In order to arrive at design principles for a feasibility study, four types of structures were analyzed, i. e., platforms supported by a single caisson, platforms supported by unbraced caisson legs, platforms supported on trussed legs and platforms supported by a braced structure consisting of caissons, diagonal bracing, and horizontal truss. Major design factors included minimum interference to wave passage, protection against icing and corrosion, stability against combined wind and wave action, scour and abrasion, minimum erection time ^{and} towing and erection ^{problems.}

Because of the unusual problems connected with the design, many of our large engineering firms and eminently qualified consultants submitted schemes and recommended methods of ^{construction.} analysis. It was determined that the tripod or three legged platformed most completely satisfied the design and operational requirements.

The investigation now underway will include inquiry into basic and detailed structural design and design criteria. The decision to use the tripod design at site 4 will be fully explored.

PERSONNEL MENTIONED IN TT #4 REPORT

| | |
|-------------------|--|
| General Viccellio | Cmdr, 26th Air Division |
| Major Sheppard | Cmdr, 4604th Sup. Sq. (TT) |
| Colonel Banks | Acting Cmdr, BOADS (for Gen Elder on TDY) |
| Captain Phelan | Cmdr, TT #4 |
| Colonel Shields | Vice CMDR, 26th Air Division |
| Major Stark | Acting Cmdr, 4604th Sup. Sq. |

CWO Wier relieved Captain Phelan 16 December to 3 January 1961

DESIGN AND CONSTRUCTION SCHEDULE

Feasibility study contract awarded to MPM&R and Anderson & Nichols on 7 December 1954.

Lump sum contract awarded in September 1955 to J. Rich Steers, Incorporated and Morrison-Kundson Company.

Tower was shipyard constructed December 1956 to June 1957 at South Portland, Maine, by Continental Copper and Steel Industries. Platform and legs towed separately to site beginning 28 June 1957 and placed on site 7 July 1957.

AFOCE-E

30 January 1961

Texas Tower

Mrs. Evelyn Ostergard
43 West Boylston Drive
Worcester, Mass

Dear Mrs. Ostergard:

Your letter of January 16, 1961 has been carefully reviewed. Your suggestion that Texas Towers be made floatable to prevent such a disaster as occurred on January 15, 1961 and your sincere interest in problems of National Defense are appreciated.

The United States Air Force and the United States Navy who acted as design and construction agency for the Air Force, studied many designs for this important radar installation. Renowned and highly qualified civilian engineering and technical firms were also consulted and employed for design.

The records of previous recorded wind and sea conditions were carefully studied and the design of the tower was such to withstand such recorded natural occurrences. In addition, the engineers reviewed the design of oil drilling towers in use in the Gulf of Mexico that had withstood numerous high winds and waves.

The final design that resulted from these studies was the so called Texas Towers. The platforms were floated to the site and then jacked up on the legs to provide clearance for the ocean waves. Due to the precision necessary for the operation of the radar equipment, a fixed and stable platform was essential. These conditions could not be met by a floating platform that would rise, fall and twist with the action of the wind and waves.

The United States Air Force is greatly distressed by the tragedy which occurred. Particularly, when so much conscientious study was made to design against such phenomena of nature. Unfortunately, such phenomena have shown that man cannot always predict the ways of nature. No one is more sorry than I that personnel aboard lost their lives in the disaster.

We are very appreciative of the interest that you have shown in one of the problems that face us.

Sincerely,

IVAN H. IMPSON
Colonel, United States Air Force
Chief, Engineering Division
Directorate of Civil Engineering, DCS/O

AFOCE-3

AFOCE-E

Handwritten signatures and initials

Handwritten mark

Wrtn 30 Jan 61/AFOCE-MO/Lt Col Nichols/fbg/69351

Mrs. Evelyn Ostergard
43 West Boylston Drive
Worcester, Mass.

Dear Mrs. Ostergard:

Your letter of January 16, 1961 has been carefully reviewed. Your suggestion that Texas Towers be made floatable to prevent such a disaster as occurred on January 15, 1961 and your sincere interest in problems of National Defense are appreciated.

The United States Air Force and the United States Navy who acted as design and construction agency for the Air Force, studied many designs for this important radar installation. Renowned and highly qualified civilian engineering and technical firms were also consulted and employed for design. Weather and sea conditions were carefully studied based upon data recorded for the previous twenty years. Due to the long range and precision of radar equipment required, a fixed and stable platform was essential. These conditions could not be met by a floating platform.

The Air Force is greatly distressed by the tragedy which occurred. A conscientious study of nature's past performance was made. Additional safety factors were also designed into the tower structure to provide for other eventualities which could reasonably be predicted. Unfortunately, other serious disasters resulting from hurricanes, tornadoes, earthquakes, etc. have shown that men cannot always predict the ways of nature.

Sincerely,

AFOCE-MO
C.E. Miller
30 Jan 61

AFOCE-2L

Anderson

AFOCE

Miller

DEPARTMENT OF THE AIR FORCE
Washington

Office of the Secretary

SAFOI
IDENT: _____

MEMORANDUM FOR AFOCE-21 ATTN: Mr. Anderson

DATE: 25 Jan 61

SUBJECT: Ltr fm Ostergard, re Texas Towers

1. The attached communication is forwarded for action as indicated in the box marked below.

2. The first addressee of this memorandum has action responsibility for the Air Staff, including necessary coordination with other Air Staff agencies.

- PREPARATION OF A DRAFT OF A PROPOSED REPLY
- INFORMATION UPON WHICH TO BASE A REPLY
- DIRECT REPLY TO WRITER. ~~PLEASE PROVIDE SAFOI WITH COPY OF REPLY.~~
- COMMENT ON OR CONCURRENCE WITH ATTACHED _____

3. SAFOI Action Officer is Major Tomlinson Ext. 79079

4. Suspense date for receipt of completed action in SAFOI is _____.
Please state name and extension of Action Officer on return memo.

Attachments: (Please return)

REMARKS

Per telephone conversation with Colonel Nichols, 25 Jan 61

Arnold Mullins

ARNOLD MULLINS
Lt Colonel, USAF
Chief, Civil Branch
Community Relations Division
Office of Information

ack

Jan 16, 1961

Dear Sirs-

I
After reading about
the Texas Tower which sank,
isn't it possible to make
these Towers floatable to
take care of just such a
disaster? Boats are made
floatable, so to me, it
seems with such valuable
equipment in a Tower, it
would make sense to make
them floatable. These men
lost must have been very
valuable to the Navy, and
other departments.

Even to making certain
sections floatable could
be a saving.

Of course, this is only
my idea & it's very possible
that they couldn't be made
floatable. But why not?

yours truly
Mrs Evelyn Astergard
43 West Boylston
Drive
Worcester, Mass.

P.S. Please don't put this
letter in the waste basket
without giving it some thought
first.

AFTER 5 DAYS, RETURN TO



SAFOI
U. S. Air Force
Washington,
D. C.

File Texas Towers

| MEMO ROUTING SLIP | | NEVER USE FOR APPROVALS, CONCURRENCES, OR SIMILAR ACTIONS | |
|---|---------------------------------|---|------------------|
| 1 | NAME OR TITLE AFOCE-C | INITIALS | CIRCULATE |
| | ORGANIZATION AND LOCATION | DATE | COORDINATOR |
| 2 | AFOCE-E | | FILE |
| | | | INFORMATION |
| 3 | AFOCE-H | | NECESSARY ACTION |
| | | | NOTE AND RETURN |
| 4 | | | SEE ME |
| | | | SIGNATURE |
| REMARKS Subject: Recent Texas Tower Mishap Col McCauley, Special Assistant to DCS/O, has advised that any inquiries pertaining to the recent Texas Tower mishap should be referred to the Air Force Press Desk, Extension 75131. <div style="text-align: right;">75131</div> | | | |
| FROM NAME OR TITLE DANA F. HURLBURT | | DATE 19 Jan 61 | |
| ORGANIZATION AND LOCATION Directorate of Civil Engineering, DCS/O | | TELEPHONE 52889 | |

18 Jan 61

CASE HISTORY
TEXAS TOWER #4

6 July 1957: Tower floated in place and set in position at site. Damage was discovered on A-B side between minus 23 to minus 75 feet below sea level and required contractor to provide field type repairs (under water) to correct damage in this area.

2 November 1957: Tower #4 accepted from First Naval District, Boston Massachusetts, Construction Agency.

28 August 1958: Texas Tower #4 was subjected to Hurricane "Daisy" and was evacuated prior to arrival. First Naval District dispatched divers to conduct underwater inspection of structural members.

1 October 1958: Diver's report received from First Naval District stated Contractor field repair work in July 1957 had failed and Navy people then directed Diving Contractor to make necessary repairs by 15 November 1958.

November 1958: Contractor completed partial repairs to the field connections on Tower Legs "A" and "B" at -76 feet below sea level. before winter

December 1958: - May 1959: No work performed on under water repairs due to weather conditions.

May 1959: Original Contractor (J. Rich Steers - N.Y.) was called back by First Naval District to complete repairs to field connections at -75 feet and work completed during this month.

27 January 1960: Tower #4 Commander reported excessive movement and presence of sounds at Tower to Base Engineers.

9 February 1960: Base received report from diver (Marine Contractors Inc., Boston) engaged to investigate under water structural damage reported.

25 February 1960: Meeting held with Engineering consultants (Moran, Proctor, Meuser and Rutledge, Original design engineers) to review findings of divers and method of repairs. Statement made that repairs must be completed by August 1960, and Ball Park estimate of \$500,000 given.

1 May 1960: Contractor awarded to J. Rich Steers for installation of "X" bracing above water line on all three (3) sides of Tower.

8 August 1960: Repair work completed at cost of \$560,000 (plus or minus) and Tower was inspected by divers and magna flux testing performed. Tower was considered by Engineering consultant to be structurally sound and would withstand 125 M.P.H. winds and 35 foot breaking waves (original design criteria).

12 September 1960: Hurricane Donna destroyed revolving maintenance platform and Tropo dish antennae. Extent of underwater damage could not be determined until maintenance platform could be fabricated and re-installed.

27 September 1960: Contract change order issued to J. Rich Steers to replace maintenance platform, perform magnaflux inspection tests, perform underwater diving inspection and submit report of findings with estimated completion of 1 December 1960.

1 November 1960: Maintenance Platform reinstalled and diving started.

11 November 1960: Base Civil Engineers and 4604th Support Sqdn (TT) handcarried diving report to 26th Air Division. Civil Engineering, and concurrently briefed Commander BOADS. Recommendation made to reduce manning to minimum requirement.

16 November 1960: Texas Tower #4 reduced to 14 caretaker personnel and Contractor crew.

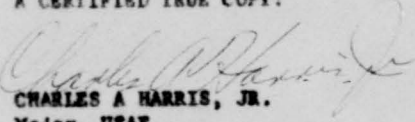
22, 23, 24 November 1960: Meetings held at New York City with Architectural Engineer (MPM&R) and Contractor (J. Rich Steers). Representatives of 26th Air Division (Civil Engineer), ADC (Civil Engineer), Base Civil Engineer, and 4604th Support Sqdn (TT) present. Damage reviewed and method of repair established. Contractor directed to proceed at once with fabrication of materials and on site work. Target date for completion - 1 April 1961. Estimated cost \$400,000.

12 December 1960: Tower subjected to high winds (87 knots) and high seas for 12 hour period. Minor visible damage noted at above water bracing.

7 January 1961: Contractor completed installation of collar connection repair at -77 feet. Contractor then started work to install wire rope bracing at -125 foot level and discovered new structural failure of a diagonal brace, attributed to 12 December 1960 storm. Diving inspection of 11 November 1960 showed no damage in this area.

12 January 1961: Meeting held with contractor AE Firm (MPM&R) in New York City with 26th ADiv Civil Engineer, Base Civil Engineer, and 4604th Support Sqdn (TT) present. Recommendation made by AE and Contractor to complete that portion of the work for which materials were on the Tower. Tower to be completely evacuated not later than 1 February 1961 and work to resume 1 May 1961.

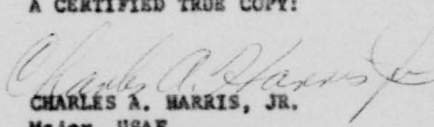
A CERTIFIED TRUE COPY:


CHARLES A HARRIS, JR.
Major, USAF
Administrative Officer
551 AEW Con Wing

ROSTER OF OTIS AFB PERSONNEL
ASSOCIATED WITH TT #4 ACCIDENT INVESTIGATION

| | | |
|--------------------------|-----------------------------|----------|
| Col. Ernest J. White | Base Commander | Ext 600 |
| Col. Franklin W. Horton | Vice Commander | Ext 602 |
| Mr. John H. McConnell | Asst Base Civil Engineer | Ext 2179 |
| Lt. Phillip F. Weaver | 551st IDC Proj Engr (TT) | Ext 2424 |
| Maj. William R. Sheppard | Commander 4604 Suppron(TT) | Ext 504 |
| Maj. Reginald J. Stark | 4604 Suppron C&E Staff Off. | Ext 517 |
| CWO Claude P. Hardy Jr. | 4604 Suppron Util Engr | Ext 2675 |

A CERTIFIED TRUE COPY:


CHARLES A. HARRIS, JR.
Major, USAF
Administrative Officer
551st AEW&Con Wing

1959

1

FROM: Comm, Hq First Naval District (Reply Att'n of: 4280
Summer Street 562ND44)
Boston 10, Mass

TO: Hq 551st AEW&C Wing (ATTN: WMIE)

DATE: 30 November 1959

SUBJECT: ^{Cross} Close Servicing for Texas Tower Maintenance

REFERENCE:

- a. Hq 551st AEW ltr of 16 Oct 59
- b. Conference, 13 Nov 59 - Col Cipolla, Col Evans, Air Force;
Capt White, DPWO IND.

1. Reference (a) proposed that maintenance of three Texas Towers be accomplished by the First Naval District under an official ^{CROSS} close servicing agreement for providing engineering, contract administration, and preventative maintenance service.

2. By reference (b) it was agreed that ^{CROSS} of the close servicing agreement for the District Public Works Officer, First Naval District, to provide these services on a broad and continuing basis would probably not be the most economical nor the most operational feasible method of accomplishing the work. No further discussion of services on this basis is anticipated.

3. It was agreed, however, that the DPWO could probably be of service on specific engineering and contractual problems, especially in connection with the steel super-structures, their support systems and their foundations. In pursuance of this letter agreement, it is understood that the Air Force will restudy requirements for possible discussion at a later date.

/s/ E. H. WHITEHURST
Chief of Staff

Cy to: VuDocks

TO: W/C DR
FROM: WMIC
DATE: 27 May 1959

*Actual copies
are to follow*

SUBJECT: Responsibility for Maintenance - Texas Towers

1. Research as to responsibility for real property maintenance of the Texas Towers relative to letter received from First Naval District cutting off their past assistance in this matter discloses that there is no agreement whereby the Navy is responsible for anything but new construction or modification of the towers. On the other hand the EADF logistics plan for the Texas Towers specifically states that the towers will be handled as though buildings were on Otis.
2. Inasmuch as the Navy has helped us considerably in the past and now must cease, attached message to EADF has been prepared suggesting a close service agreement be initiated so that the First Naval District can continue their past services.

3 Atch

1. WMIE Message to EADF
2. Ltr fr 1st Nav Dist
3. Extract fr EADF Log Plan

Documents to

To Col. [unclear]

Contract with [unclear] original part

*Chf Eng. 18th
Rm 5C 385
AECHE*

1

FROM: WMIE

TO: W/C (551st)

DATE: 25 May 1959

SUBJECT: Repair and Utilities Support - Texas Towers

1. Reference letter, First Naval District, dated 6 May 1959. (This is the letter that you wanted where the Navy stated that they were getting out of Texas Tower maintenance business - WO Hardy doesn't have a copy of subject letter. It was addressed to 551st WMIE.)
2. Referenced policy action of the Texas Tower , First Naval District, Boston, Mass., terminates technical assistance to this Headquarters in support of the three Texas Towers. This action creates the following problem areas: (If you want the rest of the letter, you can call Sgt. Honeycut at WO Hardey's number and he will give it to you.)

Adm -
Letter of 7 Sept
Edward 431

Delong

Pictures of Relong
Stems & model

Stem compliance
Navy + info

Lower boom
w/ defect

8 Paper to Nov 30 did
you offer an alternate
design?

Delong must bracing -
Strangler Loops

1 extend 30 ft below

to bracing at 100 ft
Deep water - hold
below water action
Surfaced at 18 ft
- 25 must be
of great strength
Design w/ pin

Adm. Chasen
Edward

Creery

Albers

2
Must have some
clearance - (over
theory) ^{especially}

Would we weld
structure

X braces - displace
move - contrary
to basic design
doomed tower -
surprised it stood
as long as it did

Mr. Davis 1/8 Del

Would have used

Schem B of the books

float vertically
stave connection
to platform

would have used
temp platform

3
Change in foundation
non use of temp
platform - causing
lowering of braces
High stress when
turning down to better
criticized not
having come in by
during erection

Back to feet to
repair? - yes - no
other way to restore
to orig state.

Would not only need
for temp repairs
trouble accumulated

Ultimate failure
due to pins - even 100
X braces all wrong

short fuse.

Sink entire structure

Chas said we should
have replaced tower

K Bracing design
OK - pins and
teppos - means of
fastening - all wrong

There had only schem B. 10

4
French questions
foundations.

Delong says they were
OK. Will would be
bold to put down 18

See ~~no~~ no point
in going down again
for underwater work

Wouldn't use Kuss jet

Had account on use
of scheme B w/
design error

Delong would have
removed all pins -
not base down.

Circle bracing would
not do any good -
cable stretched

4604⁰⁹ 1st Lt. Ag

5 Mar 1958

Subj: TT4 sway
TO: Comdr 4604th Attw: ^{Major} Capt Philan
FROM: " 551st Lt. Syston

1. Comdr Brazier reported to me that personnel coming from TT4 are ~~reporting~~ complaining of excessive sway in the tower. Request you make the following check each day for one week to allow a check.

a. Every 4 hours during each 24-hour period check:

(1) At a point mid way between A and B leg in the corridor, on the main deck under the radar. Count how many oscillations tower makes in a minute

(2) Check wind direction and velocity and type of sea running.

b. Log the above requested information for one week and send information to Comdr Brazier or Mr. Riccio with information copy to this office

Wilfred B. Skinner
Major USAF
Commander

1954

8

WHIN 20 Apr 54

Not pertinent

(Uncl) Project Temp Towers
Director of Operations, D31/O

21 APR 1954

Directorate of Construction, A31/1

AFCEB-03/14 Col. Cronney/wcl/
71975

1. Request your review and comments on the attached letter from Dept. of the Navy.
2. As this project is presently being designed by the Navy for the Air Force, it is imperative that a decision be made on whether space for material and personnel for the Navy be provided in these structures.
3. The increased cost of design because of the inclusion of this additional space should be negligible and could be covered with our presently available design funds, although the cost of the additional construction may be considerable and it is possible that the Navy will be requested to cite a source of funds if their request for space is approved.
4. Many items must be considered in regard to this request such as prorating of cost of upkeep and operation, command jurisdiction of the site, etc.
5. A meeting was held at Office of First Naval District, Boston, Mass., 12 April 1954, with representatives of this Headquarters, Dept. of the Navy and ADG to resolve problems of design regarding these Temp Towers. It was decided at that time that the Navy should design for 11 AF permanent personnel and 6 AF transit personnel and that criteria to be used in the design such as water, messing, docking, laundry, etc., would be of Navy standards.

COORDINATION

WILLIAM E. LEONARD
Colonel, U. S. Air Force
Director of Construction
Assistant Chief of Staff, Installations

1 Incl
Ltr frn Dept Navy
20Mar54
cc: APOAG

*Smith
6/6/54*

COORDINATION: AFCEB-13

AFCEB-C

AFCEB

AVCS
AFCS
CAF

1
2
3

Coordination
Approval
Signature

Not part

Special Projects Branch
Construction Division
Directorate of Construction
MR. R. L. CROTTY 5663

22 OCT 54

TULSA TOWERS

1. Letter from Department of the Navy (Bureau of Yards & Docks) 20 October 1954, (Tab B), presents two (2) schedules of construction for the five (5) Duna Towers. Schedule "A" -- proposed by Bureau of Yards & Docks calls for completion of all five (5) towers during a period May - August 1956. Schedule "B", submitted at the request of the Air Force, calls for completion of two (2) of the towers during June - August 1955, balance in 1956. The Navy outlines various reasons why completion of any of the towers in 1955 is not recommended.

2. By attached letter, (Tab A), the Navy is requested to adhere to Schedule "B" with periodic reevaluation of all factors to determine if we should proceed as planned. Factors in this decision are as follows:

a. There is an immediate Air Force requirement for a seaward extension of the Air Defense Radar Net to afford coverage of strategic areas not presently covered.

b. The USAF operating program phases personnel into these facilities starting in October 1955 with full occupancy on an operating basis during, July, August and September 1956.

c. Electronic equipment will be available January 1955 for installation as the towers are completed.

d. By building at least two (2) of the towers in 1955, experience will be gained which will permit improvement on the 1956 installations.

e. Two (2) sets of temporary legs, at a cost of \$1/2 million each, required in 1955 can be erected during the 1955 installations.

f. By erecting two (2) of the towers in 1955 and three (3) in 1956, the load on the Air Force in installing and testing of electronic equipment will be distributed.

g. Contingency factors outlined by Bureau of Yards & Docks could just as easily affect Schedule "A" as Schedule "B". For example, if Schedule "A" is used and bad weather prevails during the summer of 1956, the possibility of getting nose of the facilities prior to calendar year 1957 is apparent.

TEXAS STORAGE (Continued)

RECOMMENDATIONS

3. It is recommended that Tab A be signed and dispatched.

2 Incls

1. Prop ltr to BUREAU Tab A
2. Ltr from BUREAU 20 Oct 54 Tab B

COORD: AFCE

AFCS

OSAF

Coord Op
Combase Cg
AFCE-OS
OFF of S1g OSAF
AFCE
AFCS

AFCEC-03

SUBJECT: Schedule of Construction for Texas Towers

TO: Bureau of Yards and Docks
ATTN: C-2794
Department of the Navy
Washington 25, D. C.

1. Reference is made to your letter dated 20 October 1954, subject: "Texas Towers - Design and Construction of", and to Schedules "A" and "B" hereinafter (1 and 2) thereof.

2. The problem areas outlined in your letter in adhering to Schedule "B" for construction of Texas Towers are recognized as probable trouble spots. However, the Air Force has an immediate urgent requirement for construction of at least two (2) of the towers during calendar year 1955. Therefore, after careful consideration of all the factors involved, it is requested that your planning be predicated on Schedule "B" and that every effort be made to complete the towers at Hantscock and George Bank during calendar year 1955.

3. The progress of design, construction, outfitting and erection will be closely followed during the next few months. If at any time it appears that factors beyond your control will make 1955 completion of the two (2) towers and bunnies, the construction schedule may be modified by mutual agreement accordingly.

4. Action is being taken to secure immediate release of funds required to permit advertising and award of contracts for construction of the two (2) towers referred to above, and for completion of design on the remaining three.

FOR THE CHIEF OF STAFF:

C. BRITTON

Assistant Chief of Staff, Installation

COOED: AFCEC

AFCCS

OSAF

Coord By
Comeback By
AFCEC-03
Off of Sig - OSAF
AFCEC
AFCCS

PRIMARY
DESIGN + CONSTRUCTION SCHEDULE



DEPARTMENT OF THE NAVY
BUREAU OF YARDS AND DOCKS
WASHINGTON 25, D. C.

REPORT NUMBER

11

20 Oct 54

From: Chief, Bureau of Yards and Docks
To: Department of the Air Force

SUBJECT: TEXAS TOWERS Design and construction of

Ref: (a) USAF Y&D AFDAF 481 8 Mar 1954
(b) Conference of 19 Oct 54 between representatives of BUDOCKS and
HQHQRS USAF

Encls: (1) Schedule "A"
(2) Schedule "B"

1. By reference (a) the Department of the Air Force requested this Bureau to proceed with the preparation of plans and specifications for construction of the subject project.

2. A feasibility report has recently been completed and tentatively approved by Department of the Air Force representatives. A thorough technical review of this feasibility report, by BUDOCKS in consultation with the Architect-Engineer representatives, has been made. Based upon this review a schedule which follows sound established design and construction procedures has been prepared providing for erection of all towers during the summer of 1956. This schedule is outlined in enclosure 1 forwarded herewith.

3. This schedule (enclosure 1) contemplates the completion of plans and specifications for all towers by 1 May 1955. Lump sum bids for construction of the towers would be received from selected bidders lists and awards would be made on four towers prior to 1 May and on the fifth tower prior to 15 June 1955 under contracts which would stipulate completion dates not later than 1 August 1956. This schedule allows several weeks for partial installation by the Air Force of electronic equipment during the dockside outfitting period, with completion to be accomplished at the sites after the towers have been completely erected and outfitted. The schedule is designed to take full advantage of lower costs resulting from concurrent construction of identical platforms and onshore or dockside outfitting and installation of electronic equipment. The schedule is considered realistic and provides optimum completion dates from the standpoint of economy, thoroughness of design and good construction practice.

4. By reference (b) Air Force representatives expressed desire for a plan that would envisage completion of two towers during the summer of 1955, with the remaining towers to be completed in the summer of 1956.

Accordingly, enclosure 2 has been prepared to indicate maximum time allocations which could be assigned to various phases of work in order to permit erection of two towers prior to 16 August 1951. To attempt to meet this schedule, highly accelerated and unusual design, construction and bidding procedures would be required, with no assurance that they would result in construction completion by the date desired. As examples:

- (a) It would be necessary to immediately advertise for bids on fabrication and installation of the structures on the basis of the limited information contained in the Feasibility Report.
- (b) The fabrication portion of the bid would be based on an estimated tonnage with adjustment at a later date.
- (c) Outfitting might have to be added to the contract by change order upon completion of plans and specifications.
- (d) Contractors, both design and construction, would demand sizeable contingencies for overtime work.
- (e) Additional costs would be involved in the dovetailing of AEC design with the preparation of fabricators shop drawings.
- (f) Contractors would include cost contingencies to cover possible necessity for major outfitting at the sites after erection in lieu of complete outfitting at dockside prior to erection.
- (g) All electronic equipment installation by the Air Force would have to be accomplished at the sites, rather than on shore.
- (h) Thorough review and double checking of the unique design of the structure would not be possible.
- (i) Any number of difficulties such as strikes, unusual weather, transportation problems, etc. could occur and cause delays. The probability of such delays is completely realistic and, even if of only two to four weeks, would make adherence to the outlined schedule impossible. This would result in the payment of premium prices for completion on desired dates with the benefit not being actually realized. That premium is estimated at 30%.

5. The Bureau accordingly considers that it would be extremely unwise to adopt a construction schedule similar to enclosure (2) and feels that it can only accept the responsibility for the full design and construction of this project on basis of a schedule along the lines of enclosure (1). The unusual design and construction requirements inherent in this operation which is completely different in scope and character from any previously undertaken similar marine work dictates engineering prudence and no variation from sound practice.

DEPARTMENT OF THE AIR FORCE
STAFF MESSAGE DIVISION

RR JEPHO/COM JEDWP JEDWP/COM UNCLASSIFIED MESSAGE

SS 73433 12

R 292015Z

FH USAFIRO NEW ENGLAND DIVISION

TO JEPHO/COM USAF WASHDC

INFO JEDWP/COM APO WFI APO COLORADO SPRINGS COLO

JEDWP/COM AIR MATERIEL COMMAND WRIGHT PATTERSON AFB OHIO

JEPGF/COM HOME AIR DEPOT GRIFFISS AFB HOME NY

DEPM/CHIEF NAVAL OPERATIONS DEPT OF NAVY WASHDC

DEPD/BUREAU OF SHIPS DEPT OF NAVY WASHDC

DA GRNC

COM USAF WASHDC/FOR AFCEC-S PD WRIGHT PATTERSON AFB/FOR MCMTG PD
GRIFFISS AFB/FOR HCOR PD USAFIRO MED 2 PD REQUEST THIS OFFICE BE
FURNISHED CYS CORRESPONDENCE & DATA REFERRED TO IN PAR 1A CMI 12 AND
BE OF YOUR LTR SUBJECT CDM QUOTE FY 55 ADVANCE PLANNING DIRECTIVE
TEXAS TOWERS UNQUOTE DTG 13 MARCH 54 PD PRELIMINARY RPT PREPARED BY
LINCOLN LAB DTG 1 AUG 52 IS AVAILABLE TO THIS OFFICE PD UPON RECEIPT
OF REFERENCED DATA WE INTEND TO ESTABLISH JOINT CONFERENCE TO PERMIT
INITIATION OF DESIGN PD YOUR COMMENTS AND/OR CONCURRENCE IS REQUESTED
VVEDAR 3-1714

ACTION COPY

CFM USAFIRO MED 2 1A 1B 3B 55 18 54 1 552 VEDAR 3-1714

29/2114

ACTION: CLE

AF IN 1 20265 (30 Mar 54)

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|---------------------------------|
| FROM AFCEC CABLE DESK |
| TO: |
| SUSPENSE DUE DATE: 4/6/54 |
| ACTION TAKEN: |
| answered by Rtd #1 with copy |
| McCarthy copy |
| SECRETARY |

FORM 10 1-51 0-309d

PREVIOUS EDITIONS OF THIS FORM MAY BE USED

2706

Duplicate

Nov 20 54

MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY
SPECIAL ASSISTANT FOR FACILITIES

SUBJECT: Schedule of Construction for Texas Towers

1. Reference is made to a discussion held in my office on 23 November 1954 with Admiral J. N. Perry of BuAerNav concerning the schedule of construction for Texas Towers.

2. By letter of 22 October 1954 on this subject, the Air Force requested, as an immediate urgent requirement, the construction of two (2) towers during CY 1955. Following a discussion of the Air Force requirement for Texas Tower type facilities during CY 1955 and anticipated design and construction difficulties, enumerated by Bureau of Yards and Docks representatives, it was concluded to be in the best interest of the services and agreed by those present (subject to telephone confirmation by Department of the Navy which was received on 24 November 1954) that:

a. The Air Force accepts a design and construction schedule which will provide one (1) completed facility in CY 1955 with four (4) additional towers to be completed in CY 1956.

b. The Air Force recognizes the difficulties that may arise in maintaining this schedule in an unproven construction development field, however, the Air Force is prepared to accept the additional cost incurred in attempting to maintain this priority schedule.

3. A construction directive covering the construction of this facility will be issued prior to 3 December 1954. The Air Force will procure and install all technical and communications equipment, less generators. Generators will be procured by the Air Force and installed by the construction agency. All other construction for the facility will be provided by the construction agency.

Coord Cy
Coord Cy for AFOTR

AFMME
AFMME
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AFMME

Comback
Stajack

2552-54

Not pertinent

SUBJECT: Supply Ship for Texas Towers

TO: Assistant Chief of Staff, Installations
ATTN: AFCEB-CS
Director of Transportation
ATTN: ARMTP-PD
IN TURN

MEMO NO. 3

ANMLP-PL-38/Lt Col Bradley/dm/78528

1. This office recommends that Texas Tower personnel be transported by helicopter. Further, we recommend that airlift be used for resupply of cargo other than water and diesel fuel to the first Tower (one Tower 1 Sept 1955 - 1 Sept 1956). The two H21B's mentioned in Memo 2 can carry this cargo as well as the personnel.

2. It is understood that diesel fuel storage will be increased by 100-120,000 gallons, and that equipment for routine distillation of water is being installed. This will permit occasional resupply (of fuel, and perhaps some water) by a standard commercial tanker.

3. During the first 6-8 months of supporting the first Tower, the helicopter operation will be thoroughly tested. The operation can then be evaluated and compared with surface resupply of dry cargo in order to decide on providing a ship, or about four additional H21B's (10 instead of 6) to continue air resupply to all five Towers.

1 Incl
n/c

CHARLES B. HARVIN
Colonel, USAF
Chief, Plans Division
Assistant for Logistics Plans
Office, JCS/ateriel

2034
2034

Revised Apr 55

Not pertinent

SUBJECT: Supply Ship for Tams Towers

TO: Director of Transportation, AFTR: AFTR-55 DATE: 5 APR 55
MEMO NO. 4
AFGIB-08/14 Col Greasy/sal/71975

1. It is believed that representatives from your office and the Directorate of Logistics Plans have visited the Navy Construction Office and obtained all necessary information since your memorandum was written.
2. Fuel storage has been increased by 100-120,000 gallons, and the vertical distance between low water and the main deck is approximately eight-five (85) feet.
3. The proposed use of helicopters to logistically support these towers appears to be the most favorable and economical.

1 Incl
N/c

GILBERT T. PERRY
Colonel, U. S. Air Force
Executive
Construction Division
Directorate of Construction, AFTR/X

COORD: AFGIB-08

AFGIB-08

G. T. PERRY
Col USAF

Coord: Gy
Comback
AFGIB-08
Stayback

FEB 17 1955

AFM7-10

MEMORANDUM FOR DIRECTOR OF OPERATIONS, HQA/O
ATTN: AFM7-10
SUBJECT: PROPOSAL FOR LORRY'S PLAN, HQA/M
ATTN: AFM7-10-10
SUBJECT: SUPPLY SHIP, INSTALLATION
ATTN: AFM7-10-10

SUMMARY: Supply Ship for Texas Tower

1. A review of the attached correspondence indicates that some thought is being given to the use of helicopters for transporting personnel between the Texas Tower and shore points. The AFM operations plan calls for the use of surface transportation for this job.
2. The provision of an ocean vessel capable of lifting the current assets and types of cargo and personnel between the shore and the Texas Tower will be a lengthy process. If we are to have a suitable vessel ready by the time the Flight Tower becomes operational we must develop a specific requirement in the immediate future.
3. We would like to know whether or not the supply ship should be equipped to handle passengers. If so, then we would like to know the number of passengers to be carried at any one time so that adequate accommodations may be provided.
4. We would also like to know the vertical distance between low water and the main deck of each tower so that adequate liquid cargo jacking facilities may be provided aboard the supply ship.

2 Encl
1 Encl for HQA/O, HQA/M, HQA/N
1 Encl for AFM7-10-10
1 Encl for AFM7-10-10

DAVID E. DARIEL
Colonel, USAF
Chief, Program Div, D/Transportation
Office, Deputy Chief of Staff/Material

Not pertinent

8 FEB 55

Rear Admiral N. F. A. Studis
U S Coast and Geodetic Survey
Department of Commerce
Washington 25, D. C.

Dear Admiral Studis:

Reference your letter of 10 January 1955, requesting information as to the possibility of using the "Texas Tower" to obtain data on behavior of tides.

The U S Navy Hydrographic Office has also requested the use of these towers to acquire data on various oceanographic parameters. The Air Force has given approval to the Hydrographic Office indicating that sufficient space and power would be available to support their requirements. It was indicated by the Hydrographic Office that contact would be made, by that office, with various other government agencies who would be interested in this type of data. A cooperative program where the various participating agencies could combine their requirements would result in a more economical investigation.

It is suggested that your office contact Commander I. Robinson, U S Navy Hydrographic Office, Washington 25, D. C., Suite 153, Extension 273, in order that your requirements may be included in this program.

When all the requirements are known for this program they will be submitted to the USAF Installation Representative, New England Region, 857 Commonwealth Avenue, Boston 15, Massachusetts, by the U S Navy Hydrographic Office.

Sincerely,

LEE D. BROWN

COORD: AFMIB-03

AFMIB-3
4/1/55

AFMIB-3

Coord by
AFMIB-03
Cantack
Stayback

U S Navy Hydrographic Off
AFMIB 033

[Handwritten signatures]