



UNITED STATES MARINE CORPS  
MARINE CORPS BASE  
CAMP LEJEUNE, NORTH CAROLINA 28542

11000  
MAIN  
29 JUN 1984

From: Commanding General, Marine Corps Base, Camp Lejeune  
To: Commanding Officer, Marine Corps Air Station (Helicopter),  
New River, North Carolina 28545

Subj: REPORT OF FIRE PROTECTION ENGINEERING SURVEY

Ref: (a) CO MCAS(H) NR first end 204/FEA/jw of 23 Apr 84 on  
CMC ltr LFF-2/AGK/cvm of 6 Apr 84  
(b) CG MCB CLNC ltr FAC/ACA/hf 11000 of 21 Dec 83  
(c) CMC ltr LFF-2/PCH/cvm 6280 of 14 Feb 84

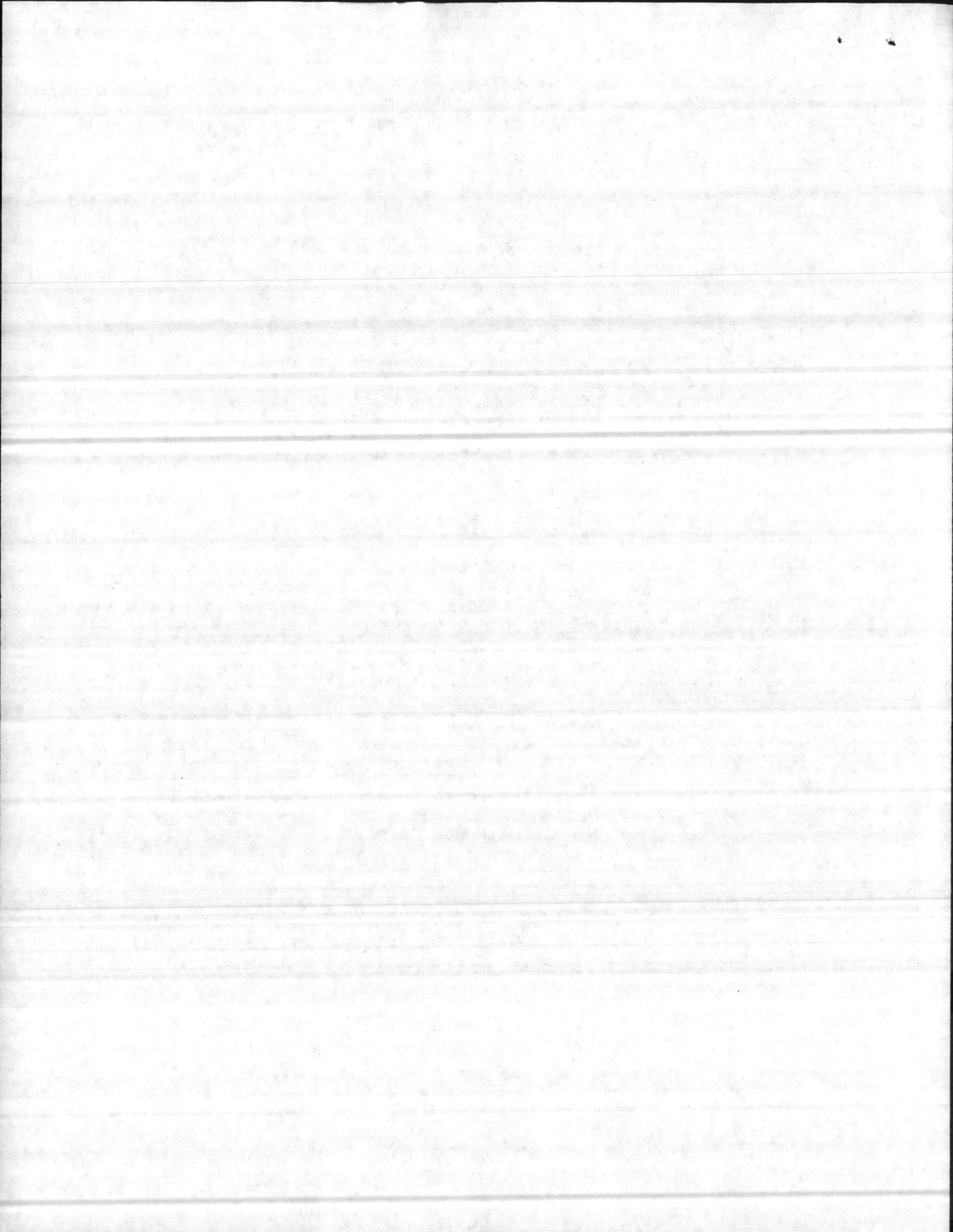
Encl: (1) Engineering Service Request - Investigate Water Distri-  
bution System at MCAS(H), New River

1. As requested by reference (a), the following comments are  
provided regarding water distribution problems at MCAS(H), New  
River:

a. The inadequate water distribution system in the vicinity  
of Hangar AS-840 is only one of many problems associated with the  
distribution systems at Camp Geiger and MCAS(H), New River. Because  
of poor design and system modifications, operational problems such  
as low water pressure, stagnant water, and recirculation between  
pumping stations are occurring throughout the system.

b. Due to the number of problems associated with the water  
distribution system and the interrelationship of solutions to  
these problems it is our opinion that a complete study of the  
water distribution systems at Camp Geiger and MCAS(H), New River  
should be accomplished. Accordingly, a request for a complete  
study of the distribution system was submitted in reference (b),  
for funding under the Marine Corps' Special O & M Program Funding  
for fiscal year 1984. However, due to lack of funds, the study  
will not be funded under this program as noted in reference (c).

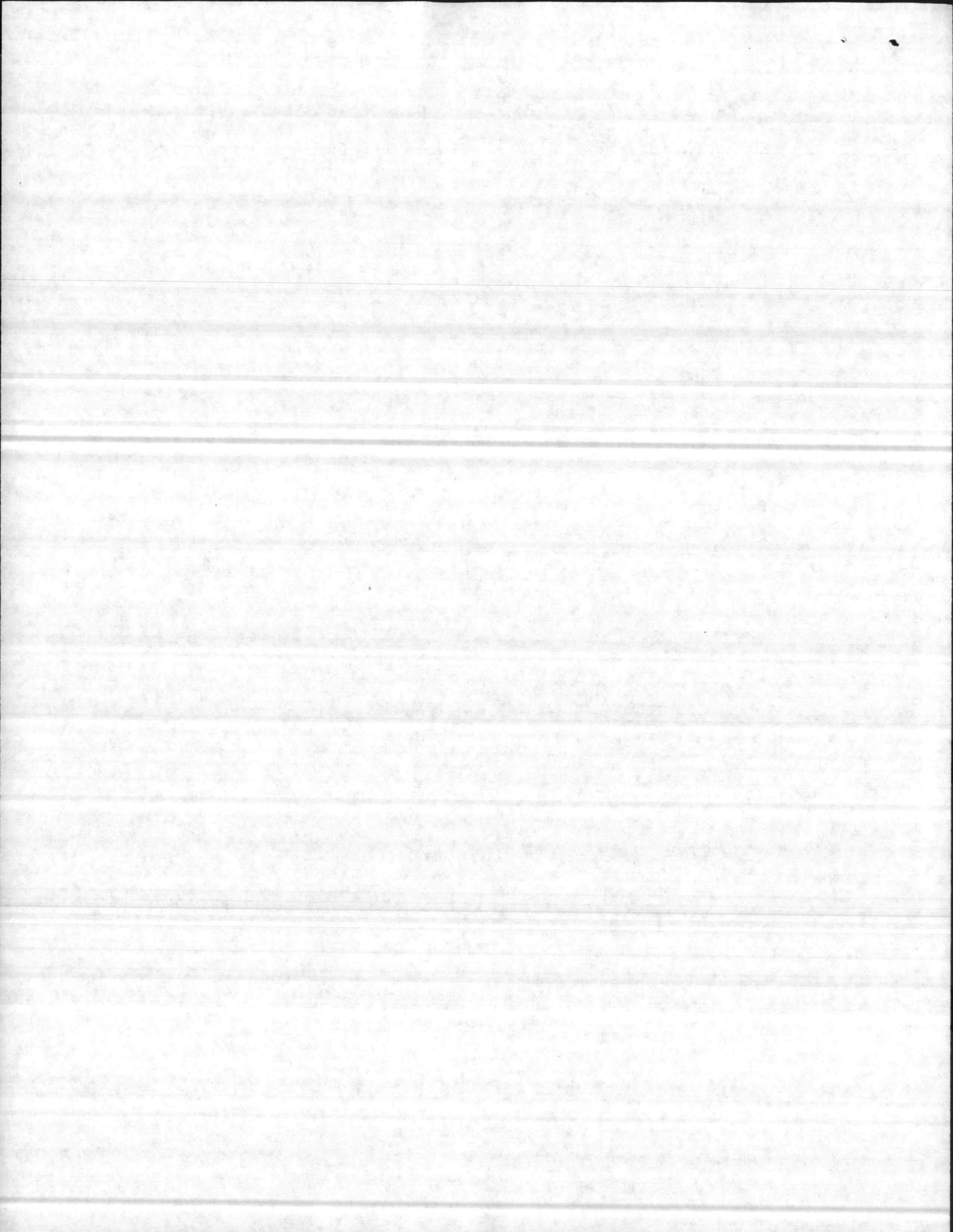
c. Based on the above, an Engineering Service Request has been  
submitted to LANTDIV to investigate various problems regarding the  
distribution system, including those related to Hangar AS-840. A  
copy of the ESR is attached as the enclosure. Local funds will be  
provided for the study.



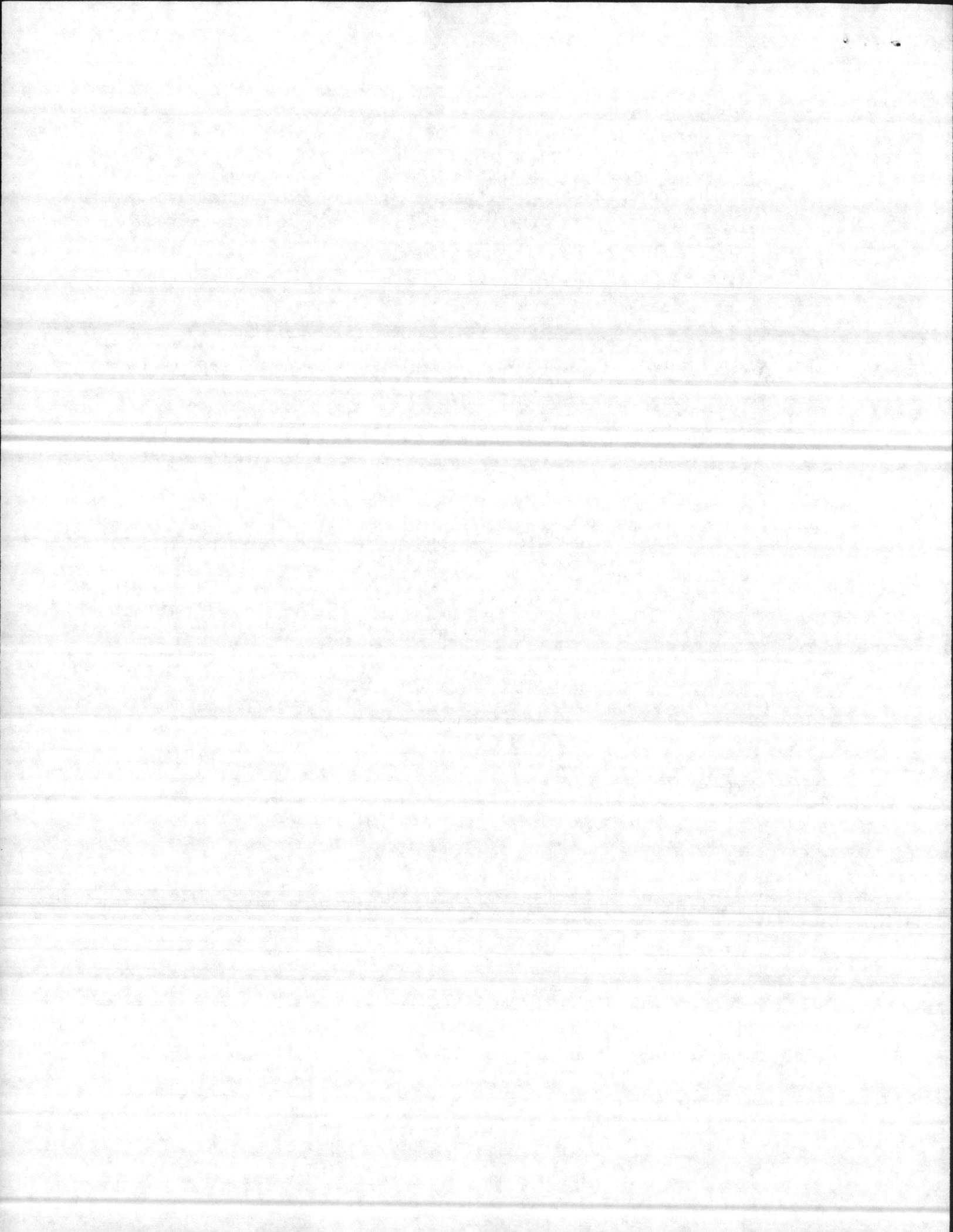
Subj: REPORT OF FIRE PROTECTION ENGINEERING SURVEY

2. The point of contact for additional information is Mr. F. E. Cone, extension 2511.

B. W. ELSTON  
Acting







emergency pumping station with a 300,000 gallon ground storage reservoir for emergency fire protection. This station is considered inadequate for a potable water source. Presently, water is wasted by overflowing the reservoir to maintain the minimum chlorine residual.

b. Presently, the whole Camp Geiger area is served by an 8-inch line. If the demand is not met by Marine Corps Air Station, it is assisted by TC-501 pumping station at Camp Geiger. TC-501 contains a ground water storage tank with a capacity of 872,000 gallons. If too much water is delivered through this line, the nearest elevated tank at Camp Geiger (TC-1070) will overflow while the other elevated tank (TC-606) will decline. The controls for the distribution pumps located in TC-501 are controlled from TC-606 elevated tank.

c. The only method of filling the 872,000 gallon reservoir is through a gate valve located in the distribution line at TC-501. If the valve is opened too much, the water being pumped from TC-501 will recirculate through the distribution line and return to the reservoir. As this occurs, the distribution pressure continues to drop since no water is being delivered except from MCAS. If this continues, the elevated tank (TC-1070) will overflow.

### III. DETAILS OF WORK:

a. Investigate water distribution system for Camp Geiger and MCAS(H), New River, including delivered water pumps and water tanks.

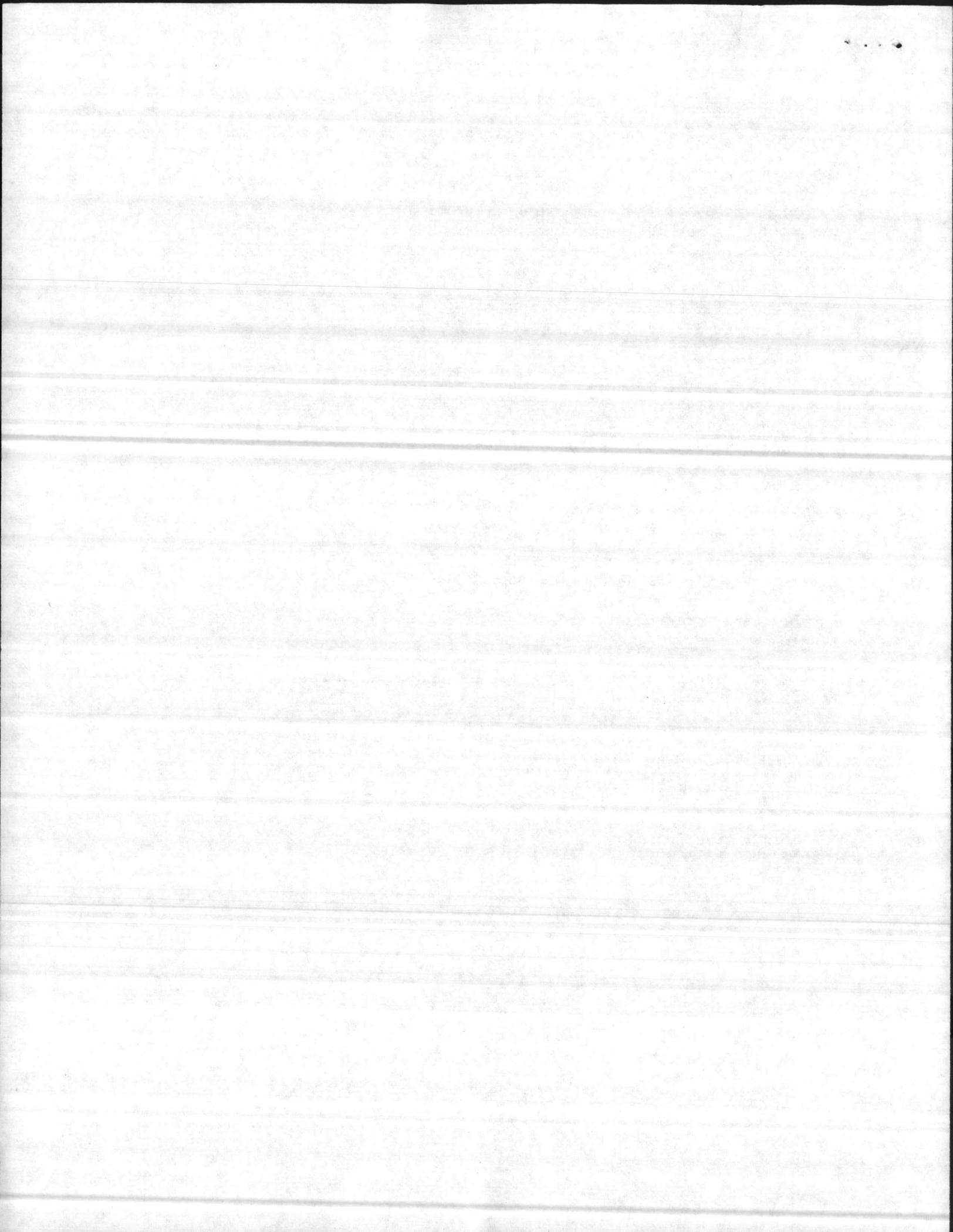
b. Determine the size of distribution lines, pumping systems, and storage tank capacities.

c. Provide preliminary drawings and a cost estimate to develop a project to correct deficiencies.

IV. TIME REQUIREMENTS: Completion of study is required by January 1985 to maintain fire protection system.

V. FUNDS AVAILABLE: This Command will furnish O&MMC funds on request.

VI. POINT OF CONTACT: Mr. G. S. Johnson or Mr. David Southerland, Base Maintenance Division, AV: 484-5161; FTS: 676-5161.



UNITED STATES MARINE CORPS  
Marine Corps Air Station  
(Helicopter)  
New River, Jacksonville  
North Carolina 28543

204:FEA:jw  
11000

OCT 14 1983

From: Commanding Officer  
To: Commanding General, Marine Corps Base, Camp Lejeune, North Carolina  
28542 (Attn: Assistant Chief of Staff, Facilities)

Subj: Fire Protection Engineering Survey

Ref: (a) LANTDIV ltr 408:EPT:jmf over 11320/NEW RIVER dtd 27 Sep 1983  
(b) Marine Corps Air Bases East/Marine Corps Base, Camp Lejeune  
Logistic/Support Services Agreement dtd Mar 1977 with revisions

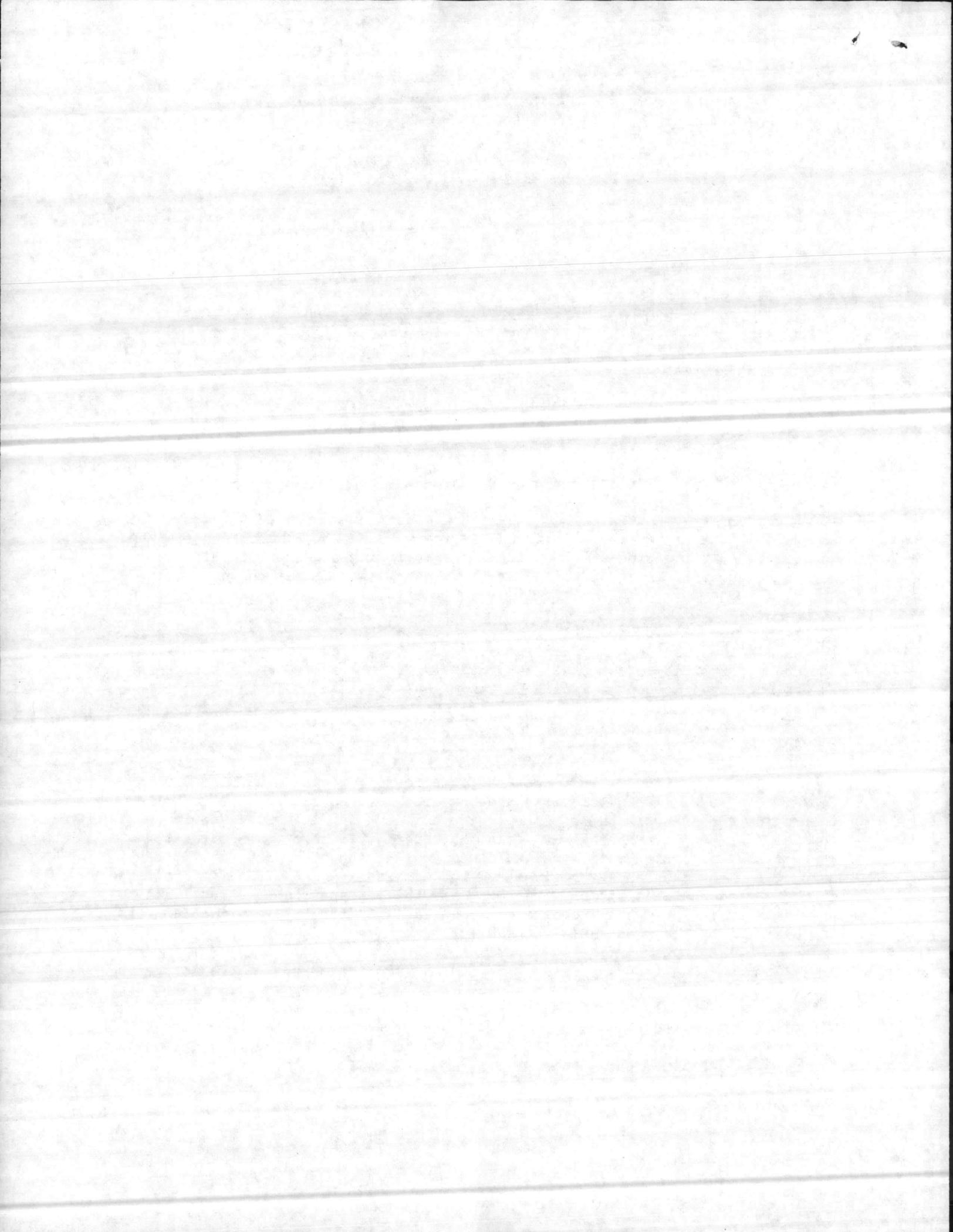
Encl: (1) Fire Protection Engineering Survey Report

1. Enclosure (1), initiated because of an inspection conducted between 22 August and 1 September 1983, is forwarded for your action in accordance with agreements contained in reference (b). The following comments are offered regarding specific areas contained in the report which impact on any resolutions.

a. Hangar AS-840 currently houses two Beach "Super King Air" 200C aircraft (C-12) and their supporting facilities. New River is currently developing a minor construction project (R-2) to provide a Sprinkler Fire Protection System. We are concerned about the apparent lack of water volume indicated by Enclosure (1). Fire Protection personnel indicate that the Loop Feeder Line servicing the hangar could be upgraded to provide the additional coverage required.

b. Recommendation P-2-83. We are planning to relocate the Child Care Center to AS-232. Technical assistance has been requested from Public Works to provide a cost estimate to renovate the building. Your assistance is requested to expedite that estimate. In the interim, we have taken steps to correct the inspection deficiencies. During a meeting of 5 October 1983 between New River S-4 representatives and the Assistant Chief of Staff, Facilities, it was agreed that Facilities would expedite the preparation of an estimate to provide a sprinkler system for the existing facility (AS-604) and initiate its installation by the most rapid means available.

c. Recommendation P-4-83 and P-5-83. Military construction project P-358 scheduled for FY-85 and presently under design will satisfy Recommendation P-5-83. However, since anticipated construction is still one to two years away, it is requested that Recommendation P-4-83 be pursued. Due to existing warehouse deficiencies, we can anticipate the loading dock area in question to be routinely utilized for temporary storage even after P-358.



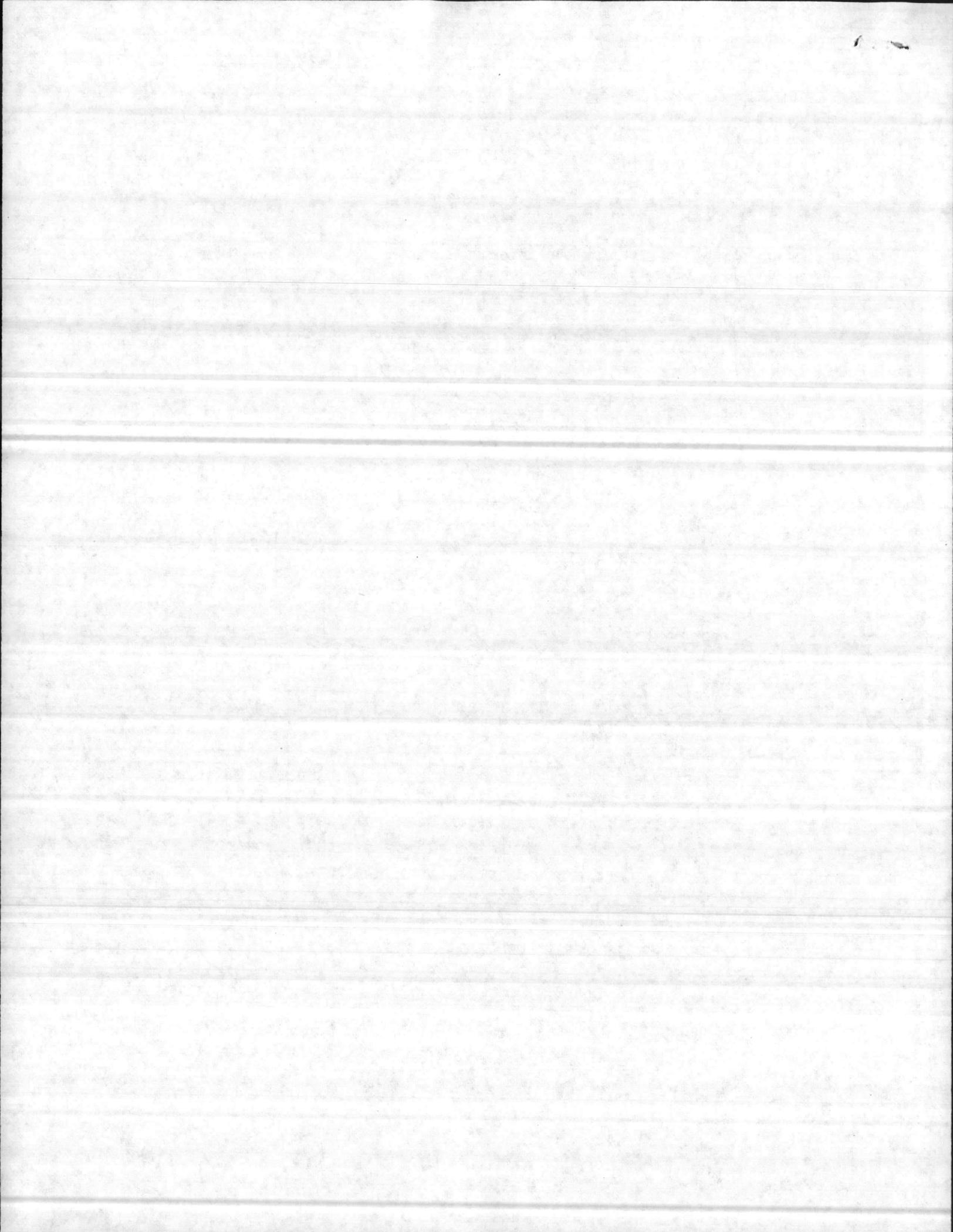
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OCT 14 1963

Subj: Fire Protection Engineering Survey

2. Point of contact for further information is Mr. F. E. Acosta, MCAS (H),  
New River, S-4, telephone 455-6506/6518.

G. W. RUSSELL, JR.  
By direction



MARINE CORPS AIR STATION (HELICOPTER)

NEW RIVER

JACKSONVILLE, NORTH CAROLINA

FIRE PROTECTION ENGINEERING SURVEY REPORT

1 JUNE 1977

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ENCLOSURE (1)

FIRE PROTECTION ENGINEERING SURVEY REPORT

Date of Report: 1 June 1977...

1. ACTIVITY: Marine Corps Air Station (Helicopter)

Location: New River, Jacksonville, North Carolina. About 6 miles south of the center of the city.

2. DATES OF SURVEY: 9 - 20 May 1977 (20 Man-Days)

DATE OF LAST REPORT: 23 February 1973

3. SURVEYED BY: E. P. Thomas, Fire Protection Engineer, Atlantic Division, Naval Facilities Engineering Command

APPROVED BY: W. H. Miller, Jr., Head of Fire Protection Branch, Atlantic Division, Naval Facilities Engineering Command

4. SURVEY DISCUSSED WITH:

COL B. R. Wilkinson, Commanding Officer, New River  
COL J. Kovacks, Asst. Chief of Staff-Facilities,  
Camp Lejeune  
Mr. E. Padgett, Deputy Fire Chief, Camp Lejeune  
Mr. S. Wells, Chief Fire Inspector, Camp Lejeune

5. SUMMARY OF CONDITIONS:

This activity, an adjunct to the Marine Corps Base at Camp Lejeune, North Carolina, is a moderately sized helicopter air station located about six miles from the City of Jacksonville, North Carolina. Although the majority of the buildings are of noncombustible construction, a number of quonset huts and other combustible structures of World War II vintage remain in use. Most important buildings are equipped with interior fire alarm systems, although a large percentage of these systems are out of service due to both vandalism and inadequate maintenance. Water supply and distribution is generally adequate except in the 800 Area, across the runway from the principal areas of the station.

Water distribution system consists of 16-inch to 6-inch, generally looped, mains. A 300,000 gallon and a 350,000 gallon elevated tank floats on the system. Water is supplied from a number of wells to the Water Treatment Plant, which includes a 400,000 gallon aboveground reservoir.

Fire alarm system is a Gamewell 0.50 milliamp shunt non-interfering system, using telephone pairs as conductors. Trouble is being experienced with grounds on this system.

Alterations to buildings by building occupants, including the use of combustible materials, continues and, in the hangars, these alterations have succeeded in negating important fire protection features of construction that were initially provided.

6. COMPOSITE FIRE PROTECTION ENGINEERING EVALUATION: POOR

a. Comments: The grading of "Poor" (formerly "Good") is assigned due to the overall disregard of the basic rudiments of fire prevention and protection. Flammable liquids, such as Methyl Ethyl Ketone, lacquer thinner, acetone and gasoline, are used indiscriminately without any precautions in numerous important buildings. Although flammable liquid lockers are generally available, it appears to be more common to store paints and thinners in the janitors' closets within the buildings. No safety cans are provided for flammable liquids when they must be stored or used within buildings. In general, these hazardous fluids are also being incorrectly used. Partitions, enclosures, and offices have been constructed and continue to be constructed in many areas, notably the hangars, using plywood on wood stud. In several areas, "self-help" construction has resulted in rendering required exits unusable, or is so arranged that additional exits are required. Maintenance of fire alarm systems and emergency lights within buildings is inadequate and unsatisfactory, and a high percentage of building alarm systems are out of service. Some of these systems have been out of service for over four years. Emergency lights, particularly in barracks, are not being maintained. Electrolyte levels in batteries of these lights are generally near zero. In many emergency lights, batteries have been removed or stolen and never replaced. One sprinkler system, controlling an office/shop area at one hangar was damaged by freezing in January 1977. The 4-inch O.S. & Y. valve was cracked during this freeze-up. Although such parts are normally readily available, this system remains out of service (over 4 months) "awaiting parts". Fire doors at stair enclosures in most hangars have had their latch sets removed and have been converted to "free swinging" types by the installation of push and pull plates. This is a violation of the requirement that fire doors must positively latch in the closed position. Roll-up type steel fire doors in these hangars have also been damaged by boring or cutting through the steel to create "peep holes" for use when the doors are in closed position. Considerable difficulty is being experienced with the station fire alarm system, primarily due to cable problems inherent in the telephone-guage wire used with this system. No emergency power supply is now provided for this system and the system is out of service whenever AC power is lost. ~~The time/date stamp on the print-out recorder of the~~ fire alarm system, located in the fire station, has been out of service

for many years. Fire prevention inspections by fire department inspectors are being properly made, but compliance with recommendations resulting from these inspections is lacking.

7. RECOMMENDATIONS: (In descending order of priority)

Note: Cost data included in these recommendations represent only a probable range of expenditure and are not intended as an exact estimate of the cost of correction.

a. Category "A" - Critical

(Recommendations for the correction of conditions which involve serious life safety hazards or which have a serious impact upon the ability to perform vital missions.)

A-1-(77): Initiate a campaign of education and enforcement in the requirements, precautions and hazards of flammable liquid use, storage, and dispensing.

Justification: Dangerous flammable liquids are used, dispensed, and stored throughout much of the station (notably in and around the hangars) without even the most elementary safety precautions. In one instance, an individual was found to be hand-brush painting the interior of a room in a hanger with white lacquer thinned with Methyl Ethyl Ketone, without any ventilation, and with ordinary electrical and electronic gear in operation in the same space. Open two and five gallon ordinary stock cans of such hazardous flammables as MEK, acetone, lacquer thinner, flammable paint thinners, lacquer, and gasoline abound. Although flammable liquid lockers and buildings are generally in evidence near the hangars, it appears to be general practice to use these structures for miscellaneous storage and to leave the paints and flammable liquids within the various shops or, occasionally, in janitors' closets. Spray painting is routinely accomplished in areas not designed nor intended for such operations. Long-standing criteria requires that flammable liquids shall be stored and dispensed from only UL-listed safety containers within any building, that spray painting shall be accomplished only in areas properly designed and equipped for such uses, and that the quantity of flammables within any building shall be limited to that necessary for one day's operation.

(1) Approximate Cost: Limited largely to the purchase of safety cans where needed.

(2) Monetary Justification: If left uncorrected, present conditions could result in major damage to a hangar and the aircraft and other contents of the structure. It is estimated that such damage could reach or exceed \$1.5 million.

(3) Life Safety: Severe. The flash fire and explosion hazard of the liquids involved, coupled with the overall careless use, is such that anyone in the immediate area of ignition would have little, if any, chance of survival.

(4) Strategic Importance: Not a direct factor.

A-2-(77): Remove the prohibited restrictive hardware on required exit doors and restore exit doors to their designed operational function as follows:

(a) BEQ 4010: Remove throw-bolts on door at end of south-east corridor, first floor; northeast corridor, second floor; north-west corridor, second floor; southeast, southwest, northeast and northwest corridors, third floor.

(b) Mess Hall 4012: Remove crossbar from rear exit door of dining room (in place during noon meal).

(c) Training Building 4120: Remove the concrete block wall near the north end of the cross-corridor, which was erected to form the "Armory", and restore this area to full use as an exit facility.

(d) Exchange Building 4126: Restore the rear exit door from the Sales Area to service as an exit.

(e) Hangar 4108: Remove the "Coffee Mess/Snack Bar" table from the south end stair tower area. Table is too large and blocks the exterior exit door.

(f) Hangar 4108: Shorten the counter in the Maintenance Control Shop of the east end lean-to to permit the required 44-inch clearance between the exit door from the hangar bay and this room.

(g) Hangar 4108: Remove throw-bolts on both rear exit doors to outdoors from Maintenance Control Office of HML-268.

(h) Gymnasium: Discontinue chaining and padlocking exit doors. All exits from the playing floor (except main entrance) were found locked although the playing floor was in use.

(i) Gymnasium: Remove the steel bar securing the rear exit from the Weight Lifting Room. This door found secured while the room was in use.

(j) Building 216: Either make the first floor exit door at easterly end of the Law Center available to all occupants under all conditions and remove the throw-bolt from this door on the inside and padlock and hasp from the exterior (located in an office), or provide a separate exit to outdoors, accessible directly from the

central corridor, at the easterly end of the Law Center.

(k) Building 216: Remove the throw-bolt and padlock hasp on the inside and the padlock and hasp on the exterior of exit door from the westerly end of the Courtroom in the first floor Law Center.

(l) Building 216: Remove the throw-bolts from the exit doors at both ends of the second and third floors.

Justification: While the necessity for physical security is recognized and understood, it is, in the majority of instances, essentially a problem of personnel control and cannot be permitted to abrogate considerations of life safety. DOD criteria requires that any required exit door shall be available and operable from inside under all conditions by either turning a single knob or by depressing a single bar. The use of unauthorized restrictive hardware assumes that no emergency will ever occur or that, in the event of an emergency, personnel can readily unlock these devices and use the exit. This is fallacious since it does not take into account panic, reduced visibility and smoke inhalation. For example, a simple crossbar, normally easily removed, was directly responsible for six deaths in one fire in recent years. Readily available door operating hardware, such as 2-point (top and bottom) latching panic hardware, without exterior door operating hardware, can often be effective in solving both the life safety and physical security problems, when properly installed and maintained.

(1) Approximate Cost: About \$250 per door leaf for removing present restrictive hardware and providing proper panic hardware. It is estimated that about \$1,000 will be required, plus relocation of the "Armory", to correct the condition in Training Building 4120.

(2) Monetary Justification: Not a factor.

(3) Life Safety: Moderate to Severe.

(4) Strategic Importance: Not a factor.

A-3-(77): Overhaul, repair and replace missing latch sets, door closers and door operating hardware on the following fire doors:

(a) Hangar 4108: Latch assemblies and door operating hardware have been removed from all fire doors to stairways on second floor of "lean-to".

(b) Hangar 4108: Door to janitor's closet, second floor of "lean-to" near Room 239, must be properly rehung.

(c) Hangar 4108: Door closer inoperable on fire door between easterly end of hangar bay and east end stair vestibule, first

floor.

(d) Hangar 4108: Panic hardware and latch set on fire door at entrance to stair, first floor, adjacent to HML-268 Avionics is inoperable.

(e) Hangar 4108: Replace panic hardware and latch set on fire door between stairwell and exterior vestibule, second stair tower from west end, first floor.

(f) Hangar 4108: Panic hardware and latch set inoperable on fire door between hangar bay to stair tower, first floor, second from west end stair.

(g) Hangar 4108: Latch set has been removed from fire door between hangar bay and HML-269 head.

(h) Hangar 4108: Latch set and panic hardware has been removed from fire door between hangar bay and west end stair.

(i) Hangar 518: Door closers on all fire doors between hangar bay and shop areas are inoperative or have been removed.

(j) Hangar 518: Repair or replace all roll type steel fire doors and shutters in fire wall between hangar bay and shops which have had "peep holes" (1" - 1½" dia.) cut in them.

(k) Hangar 518: Replace door closer on fire door from shop area to center stair enclosure on first floor.

(l) Hangar 518: Replace the fire door between hangar bay and "Armory" which has been damaged by cutting in a homemade "peep hole".

(m) Hangar 518: Repair the fire doors at the south end stair tower, first and second floors, which will not latch closed.

(n) Hangar 518: Replace the missing latch set and door operating hardware on the fire door at the second floor entrance to the center stair.

(o) Hangar 518: Repair or replace the door closer of the fire door at the second floor entrance to the northerly stair tower, and replace the latch plate.

(p) Hangar 515: Replace the missing latch set and hardware on the fire door between hangar bay and stair, first floor, adjacent to Mechanical Room 111.

(q) Hangar 515: Repair and restore to full operating condition the fire door on second floor at entrance to end stair (261 Area).

(r) Hangar 515: Replace missing panic hardware and latch sets on the fire doors to stairways, second floor, near Room 326 and Room 226.

(s) Hangar 504: Provide positive-latching hardware on the stairway fire doors, both floors of both lean-to areas.

(t) Hangar 504: Provide UL-listed Class B (1½ hour) fire doors in the existing frame between the hangar bay and Sqdn. 461 Hydraulic Shop.

Justification: Rated fire doors are provided as a means of preventing, or delaying, the spread of flames, smoke and toxic gases from the area of fire origin. Vertical openings, such as stairways, form ideal flues or chimneys for the rapid upward spread of fire and toxic gases. Without properly operating, properly maintained fire doors at the entrance to such vertical shafts, a fire originating on a lower floor will very rapidly spread smoke and toxic gases up to the upper levels, rendering stairways untenable as exits, trapping occupants of upper levels and substantially increasing the potential for severe injury and death. It is equally essential that high-hazard areas be separated from other areas and that properly arranged and operating fire doors be provided in communicating openings not only to prevent fire spread but also to protect occupants of areas outside of the area of fire origin until they may safely exit. It is essential that fire doors be arranged to be self-closing and to latch positively in the closed position. Without positive latching capability, heat pressure and drafts experienced in fires will force fire doors open, completely negating their intended function.

(1) Approximate Cost: An overall average of \$250 per door leaf is estimated for restoration of panic hardware and latch sets. Replacement or provision of new fire doors is estimated at \$350 per single leaf and up to \$1,500 for a large size roll-up type.

(2) Monetary Justification: A major fire in a hangar bay without the subdivision by fire doors between hangar bay, shops, and stair towers could result in damage in the above \$2 million range.

(3) Life Safety: Severe

(4) Strategic Importance: Probably slight.

A-4-(77): Either strictly prohibit spray painting in the various shops of the hangars or provide properly arranged spray painting areas, fully complying with NFPA-33, "Spray Application", and confine all spray painting to these areas.

Justification: Sheet metal shops and hydraulic shops appear to be the areas in which spray painting is done most frequently. However, painting of various items was found being accomplished in most shop spaces of the various hangars. Little or no attention is being given to the need for adequate, properly arranged mechanical ventilation, explosion-proof electrical equipment, or to the care of flammable liquids. An attempt has been made to create a paint spray room in Hangar 4106, but the exhaust fan does not draft from floor level as is necessary to remove the heavier-than-air flammable vapors. The extremely hazardous arrangements now in use, coupled with the excessive amounts of improperly cared for flammable paints, solvents, and thinners, can easily result in a major fire or explosion. Should this occur, serious injury to personnel, or death, should be anticipated.

(1) Approximate Cost: \$10,000 per area.

(2) Monetary Justification: With the present deficient state of fire doors and lack of separation between spray painting operations and other areas, a fire originating in, or adjacent to, spray painting could result in a loss in excess of \$100,000.

(3) Life Safety: Severe

(4) Strategic Importance: Not a direct factor.

A-5-(77): Improve the maintenance and service of fire evacuation alarm systems in all buildings where such systems are provided. To improve required maintenance to an acceptable level, it may be necessary to either employ a full-time civilian fire alarm electrician or to contract this work out to a qualified firm. The following are typical deficiencies noted:

(a) BEQ 4020: System out of service. Batteries discharged. Manual pull stations missing on third and first floors of southerly stair tower.

(b) BEQ 4015: Fire alarm annunciator in Mechanical Equipment Room will not restore to normal. Fire alarm bell gong shell missing in lounge, west end of first floor. Smoke detectors in lounges have been relocated from center of ceilings to side walls on second and third floors. Detectors now mounted so close to ceiling that outer shell cannot be properly placed on the detectors. Detectors must be either relocated to center of ceiling or lowered

to provide at least 6-inch clearance between ceiling and upper edge of detectors.

(c) BEQ 4010: System out of service. Batteries discharged. Manual pull station near main entry on first floor missing. Alarm bell in northwest corridor on first floor damaged.

(d) Hangar 4106: Batteries dead. Trouble bell gong shells missing.

(e) Hangar 518: Batteries nearly dead. Charger in "high-rate" position. Trouble bells out of service.

(f) BOQ 705: The original key-operated reset switch has been removed from the Simplex panel and an unenclosed light switch hung on the outside of the panel to replace it.

(g) BEQ 211: Alarm bell gong shells missing on first and third floors. Striker mechanisms damaged. Manual pull station missing at East end of first floor. Fire alarm relay panel removed. System direct-wired to coded transmitter. (Appears to be 120V AC system wired to 24V DC transmitter.)

(h) Dispensary 302: System out of service. Step-down transformer missing from control panel.

Justification: Fire evacuation alarm systems provide the means of simultaneously alerting building occupants of the need to vacate the building and to alert the fire department to respond to a fire emergency. Not only is the response time of fire fighters critical in minimizing property damage and reducing the potential for loss of life, but the evacuation of all occupants of the building is of even greater importance. In sleeping occupancies and in buildings where there may be moderate to large numbers of people, the problem of occupant notification of emergency situations is increased. For these reasons, DOD has established requirements for the provision of these systems. Maintaining these systems in full operating condition is at least as important as their initial provision. An inoperable or unreliable system is false security and dependence upon it can lead to injury or death. At present, maintenance is the responsibility of military telephone repairmen from Camp Lejeune. Unfortunately these repairmen are subject to transfer before gaining sufficient expertise in the several makes of fire alarm systems installed.

(1) Approximate Cost: \$250 per building.

(2) Monetary Justification: Not a direct factor, although speed of response by fire fighters is essential in minimizing loss due to fire.

(3) Life Safety: Moderate to Severe.

(4) Strategic Importance: Not applicable.

A-6-(77): Remodel at least one bedroom window in each bedroom of each living unit in the MEMQ area to comply with DOD and HUD requirements.

Justification: Most serious fires, from a life safety standpoint, occur in family housing during the nighttime hours. Frequently, normal paths of egress from bedrooms are untenable due to smoke and fire. The only other means of egress, or for entry by would-be rescuers, is bedroom windows. For these reasons, the "Life Safety Code" and HUD requirements, both a part of DOD criteria, have established the following requirements for housing units:

(a) Each bedroom shall have at least one window in an exterior wall.

(b) At least one window in each bedroom shall:

(1) Be operable from inside without the use of tools.

(2) The bottom of the window shall not be more than 4-feet above the floor.

(3) The window shall be openable to provide a clear opening of not less than 20-inches in width and 24-inches in height and not less than 5.7 square feet in total area.

(1) Approximate Cost: \$200 per bedroom.

(2) Monetary Justification: Not applicable.

(3) Life Safety: Severe

(4) Strategic Importance: None

A-7-(64)(Revised): Construct and equip in accordance with NFPA-33, "Spray Finishing", a well detached building to house all spray painting operations for the facility. Until such a building is provided, properly arrange the paint spraying operation in Building 116 as follows:

(a) Enclose both windows with masonry units the same thickness as the wall.

(b) Replace the combustibile ceiling material with a noncombustible material.

(c) Install an exhaust system with metal ducts terminating approximately 6-inches above the floor. The exhaust duct should discharge through the side wall of the building and extend above the roof.

(d) Replace all electrical wiring and fixtures outside of the spraying area with that approved for Class I, Division 2 hazardous locations.

(e) Remove all electrical wiring and equipment from the adjoining 1-story wood frame lean-to. The wiring in this area is extremely poor and completely unsafe.

Justification: The ordinary electrical systems and improper exhaust system for the spray painting operation present life safety hazards to all personnel in or around the building.

(1) Approximate Cost: \$30,000

(2) Monetary Justification: Building original cost is \$1,501.

(3) Life Safety: Severe

(4) Strategic Importance: None

A-8-(77): Provide complete, or extend to cover throughout the building, fire alarm systems in the following buildings:

Building	Approximate Cost	Remarks
"O" Club 710	\$3500	Complete system required
Commissary 414	\$2500	Complete system required
Exchange 232	\$1500	Extend existing
Service Club 208	\$1000	Extend existing

Justification: Fire alarm systems are required in buildings as a means of alerting occupants rapidly and reliably of the need to leave the building due to fire or other emergency. When properly connected to the station fire alarm system, they also alert the fire department, reducing response time with consequent minimization of loss due to fire. Current DOD criteria requires such systems in other than sleeping occupancies where 50 or more persons may normally be expected to be present during normal hours of operation.

(1) Approximate Cost: See table.

(2) Monetary Justification: Not a direct factor.

(3) Life Safety: Moderate

(4) Strategic Importance: None

A-9-(77): Rework all LP gas heating system installations and fuel cylinder arrangements throughout the station to comply with the pertinent requirements of NFPA-54, "National Fuel Gas Code", and NFPA-58, "Liquified Petroleum Gases". Important items which should receive priority attention are as follows:

(a) All LP gas cylinders must be mounted on a firm, level foundation (preferably concrete or masonry) free from the possibility of settlement and so situated as to not be subject to the possibility of mechanical injury from vehicles or other causes.

(b) All LP gas cylinders must be located and arranged so that the discharge of the safety relief device is at least 3-feet horizontally from any building opening below the relief device and at least 5-feet in any direction from any ventilation system intake.

(c) Regulators on all LP gas cylinders must be securely attached to the container valves or containers, or to supporting standards or building walls.

(d) All piping between cylinders and appliances should be as short as practicable, consistent with considerations of possible settling and location. The present practice of leaving a coil of 3 to 10 feet of copper tubing between the cylinders and the exterior of the building is undesirable and potentially hazardous.

(e) All supply piping between cylinders and exterior of building must be protected against mechanical injury either by location and support or by housing the existing copper tubing inside of 1/2-inch steel pipe. Protection by steel pipe should also be provided wherever it is necessary to run copper supply lines exposed on floors within buildings.

Justification: While it is not known what, if any, local codes exist in the Jacksonville area, it would appear that the local LP gas supplier is not adhering to the practices required on Government installations. The large LP gas cylinders are installed wherever convenient without adequate regard for land condition or contour. Regulators attached to cylinders are frequently without support other than that furnished by the 6 to 10-inch length of 3/8-inch copper tubing between shutoff valve and regulator. Supply tubing between regulator and exterior of building is generally excessive and left in a loose coil, subject to and experiencing mechanical injury. Complaints of gas leaks are common.

(1) Approximate Cost: Undetermined. It is not known to what extent the local supplier has control of each installation. An examination of the supplier's contract should fix the extent of his responsibility. Interior correction of deficiencies is expected to average less than \$100 per installation.

(2) Monetary Justification: Gas leakage, cylinder tip over, and supply line breakage can result in the formation of an LP gas cloud either inside a building or exterior to the building. The numerous, ever-present sources of ignition, particularly within a building, can result in ignition and explosion. Dependent upon the precise building under consideration, a loss of up to \$100,000 could be anticipated.

(3) Life Safety: Moderate

(4) Strategic Importance: Undetermined

A-10-(77): Where BEQs have been remodeled from open squad bays to individual 2-4 man rooms by the erection of concrete block walls, creating a central corridor, extend the corridor walls to tight against the floor or roof deck assembly above with materials which will provide at least a one hour fire resistance rating. BEQs 212, 213, 214, and 4010 are examples.

Justification: Current DOD criteria requires corridors in BEQs and similar occupancies to have 1-hour fire resistance ratings. In the event of a fire in one of the sleeping rooms, the central corridor must stay free of flame, smoke and toxic gases to permit the occupants of the building to escape. The existing construction stops just above the suspended ceiling. The concealed space above the suspended ceiling is approximately 2-feet deep, adequate to permit occupants to move from their own room to above the ceiling, across the corridor, and into rooms of other occupants. As a result, many ceiling panels have been removed, completely negating even the minimum protection afforded the suspended ceiling (which has very little fire resistance rating).

(1) Approximate Cost: Continued use of concrete block is desirable because of its permanency. It is estimated that the work could be accomplished in BEQs 212, 213, and 214 for about \$5,000 per building and for about \$15,000 in BEQ 4010. The use of 5/8-inch gypsum board on metal studs would reduce this cost approximately 50%.

(2) Monetary Justification: Slight. Some reduction in smoke and water damage due to fire should be anticipated due to improved confinement.

(3) Life Safety: Moderate

(4) Strategic Importance: None

b. Category "B" - Important

(Recommendations for correction of conditions which involve important life safety hazards, which present significant monetary loss potentials, or which affect mission capabilities of a noncritical nature.)

B-11-(77): Replace sprinkler heads, which have been removed and outlets plugged, in the following areas:

(a) Hangar 4100 (VMO): All outlets in the Air Receiver/Transformer Room, first floor to lean-to. The use of 286°F sprinkler heads is recommended.

(b) Hangar 518: All outlets in Electrical Switchgear Room, first floor of lean-to. 212°F sprinkler heads are recommended.

(c) Hangar 515: Replace sprinklers and branch line piping which have been removed from Electrical Room 211, first floor of lean-to. 212°F sprinkler heads are recommended.

(d) Hangar 504: Extend sprinkler protection to cover throughout the presently unsprinklered spaces within the Communications Center on second floor. Replace sprinkler heads which were removed from both electrical switchgear rooms on the first floor of both lean-tos. 212°F sprinkler heads are recommended.

Justification: In each of the above locations, sprinkler protection was originally provided. The unjustified and unwarranted fear of water discharge onto electrical apparatus and the equally unwarranted fear of electrical shock to personnel from such water discharge resulted in the removal of the required protection from these rooms and areas by station forces. It is worthy of mention that one of the most reliable and effective means of protection for large industrial transformers, for many years, continues to be automatic water spray systems. The order of failure, with consequent discharge of water, of modern sprinkler heads, except when damaged through mechanical injury, is so low that it is practically nonexistent. The removal of sprinklers from these areas has failed to consider the fact that the rooms involved are not constructed as transformer vaults and that, without the required sprinkler protection, a fire occurring in the electrical room can jeopardize the entire building.

(1) Approximate Cost: \$25 per sprinkler head.

(2) Monetary Justification: The absence of automatic alarm transmission and consequent delay in discovering, coupled with the

absence of water discharge, could result in severe structural and operational damage to a multi-million dollar building.

(3) Life Safety: Not a direct factor.

(4) Strategic Importance: The critical effect of the loss of one hangar upon the mission of the activity is not known.

B-12-(77): Remove the combustible partitions (generally plywood on wood stud), enclosures and interior wood or wallboard combustible paneling in the following areas:

(a) Exchange Building 4126: Plywood wall paneling, tempered hardboard and pegboard used as interior finish.

(b) Hangar 4108: Plywood partition in Avionics Shop of enclosed 1-story lean-to at easterly end. Plywood partitions subdividing former heads on first of 2-story lean-to, now occupied as HML-268 Avionics, and HML-269 Avionics.

(c) Hangar 4106: Plywood partitions in GSE Area, first of lean-to. Plywood walls of Production Control Office. Plywood exterior wall at east end lean-to.

(d) Hangar 515: Plywood partitions in shops of Sqdn. 261. Plywood partitions in Room 120, second floor.

(e) Hangar 504: Wood paneling in the undercab level of the control tower. The high percentage of highly combustible low density cellulose acoustic tile on walls and ceilings of the Communication Center on the second floor. All plywood partitions and enclosures in the many shops.

(f) Ground Electronics Building 849: The numerous plywood enclosed shop and office partitions.

(g) Flying Club 831: The combustible enclosure for the gas-fired heating furnace. (Note: This building is entirely sheathed on the interior with combustible material and technically should be 100% sprinklered. However, the value and importance of the structure is inadequate to warrant the expense.)

Justification: Combustible materials not only increase the fire potential of any building by providing materials very susceptible to ignition, but also are a major factor in the spread of any fire. Many materials burn with extreme rapidity and many generate dense quantities of smoke and/or toxic gases under heat or during combustion. In addition to the obvious potential toward increasing the physical damage to the building, the severe adverse life safety characteristics of many materials have resulted in very specific criteria relating to

permissible flame spread and smoke development characteristics being issued by DOD. It is recognized that much of the criticized construction is in the "self-help" category. However, the "self-help" program does not permit violations of any construction or life safety criteria. Further, no alteration should be undertaken without the specific approval of the station Facilities Engineer.

(1) Approximate Cost: Removal of material involves principally labor only. Replacement with acceptable materials, in those relatively few areas where actually essential, is dependent upon the specific materials purchased.

(2) Monetary Justification: Direct monetary considerations are indeterminate, but the removal of the combustible materials cited could reduce fire spread up to 50%.

(3) Life Safety: The removal of the combustible material, with the consequent decrease in the ability of fire to spread, can have an important, although indeterminate, effect upon the life safety potential.

(4) Strategic Importance: Although there is no definite overall strategic importance, the increased fuel loading represented by the cited materials could have an important bearing upon the ability of the station to perform its assigned mission in the event of a serious fire.

B-13-(77): Repair or replace all damaged emergency light units and establish a schedule of maintenance to insure that batteries are properly serviced and the lighting units are maintained in reliable operating condition. Damaged, out of service, and vandalized emergency lights were noted as follows:

(a) BEQ 4010: Southwest corridor, first floor. Northwest corridor, first floor. Center corridor, first floor. Northeast corridor, first floor. Southeast, northeast, and northwest corridors, second floor. North end of center corridor, third floor.

(b) BEQ 214: All emergency lights on the second and third floors.

(c) BEQ 213: All emergency lights on the second and third floors.

(d) Hangar 4100 (VMO): Emergency light in the Pump Room is wired into the room lighting circuit so that when lights are turned off the emergency light turns on. This unit must be wired between the panel and the light switch so that it comes "on" only upon power failure. Batteries are constantly discharged at present.

Justification: Emergency lighting units and systems are required by NFPA-101, "Life Safety Code", to be provided in buildings and areas where, when normal illumination is lost, the pathways to the exits are no longer visible. Such units are also provided in operationally critical areas so that essential functions can continue. In sleeping occupancies, nighttime fires, coupled with loss of AC power and obscuration due to smoke, can result in panic, injury, and death due to panic and confusion generated by the lack of visibility.

- (1) Approximate Cost: \$250 per unit.
- (2) Monetary Justification: Not applicable.
- (3) Life Safety: Moderate
- (4) Strategic Importance: None

B-14-(77): Provide UL-listed, pre-engineered, automatic and manual, dry chemical extinguishing systems in the range exhaust hood and exhaust duct systems in each of the following areas:

- (a) Exchange Building 4126: Over the grill and deep fat fryer in the Snack Bar.
- (b) Officers' Club Building 710: In range exhaust hood system of main Kitchen.
- (c) Service Club Building 208: Range hood system in Snack Bar.
- (d) Bowling Alley Building 205: Range hood system in Snack Bar.

Justification: Commercial-type cooking fires have been a matter of major concern and frequency for many years. The preponderance of grease-producing types of cooking appears to be increasing rather than the reverse, with emphasis on hamburgers and french fries. When fires occur, the grease accumulation in hoods, filters, and exhaust ducts is usually ignited, producing an intensely hot fire which is difficult to extinguish. Current DOD criteria requires range and filter systems to be provided with approved extinguishing systems. The pre-engineered type is recommended as being the most economical, fully effective system available.

- (1) Approximate Cost: About \$1,000 per system.
- (2) Monetary Justification: While it is not anticipated that a grease fire in any of the building in question would result in a total loss to the building, it is anticipated that upwards of \$15,000

worth of equipment would be damaged and the station deprived of the use of the facility of 3 months or longer.

(3) Life Safety: Not a direct factor.

(4) Strategic Importance: Not a factor.

B-15-(77): Remove, and prohibit further use of, the damaged, unguarded and unsafe small, bottled gas-fired space heaters used to heat "line shacks" and numerous other buildings throughout the station.

Justification: The small space heaters in question are not supported or attached to prevent accidental movement, and are attached to the fuel supply cylinder by soft copper tubing which is easily kinked or broken by repeated accidental movement of the space heater. Even more hazardous is the lack of a guard, or screen, on the radiant face of the heater to prevent accidental contact with combustible material. Mostly located in structures lined with combustible material and in areas subject to poor housekeeping, their continued use involves a high potential for fire.

(1) Approximate Cost: \$750 to replace present unit by an acceptable heating device, per location.

(2) Monetary Justification: In most locations, total destruction of the containing building, averaging \$8,000, should be anticipated.

(3) Life Safety: Light

(4) Strategic Importance: None

B-16-(64)(Revised): Provide a water supply system in the 800 Area capable of delivering the fire flow requirements established by NAVFAC DM-8. One method of accomplishing this is to make the existing fire pumps in Building 2003 available to the 800 Area by the following means:

(a) Remove the present check valve in the 8-inch main near southwest side of the Pump House, Building 2003.

(b) Provide a post indicator valve to control the fill line for the 300,000 gallon aboveground water reservoir, Building 2002. Valve to be normally kept closed and opened only to fill reservoir.

(c) Provide ~~audible~~, properly identified signals at the Water Treatment Building 110 to indicate when the fire pumps in

Building 2003 are operating.

(d) Overhaul and restore to full operation the controller for the electric motor driven fire pump, which has been out of service since early 1973.

(e) Complete the control wiring for the new gasoline engine controller and place this auxiliary drive system into full automatic operation.

Justification: Present arrangement of the pumping facility at Building 2003 permits these pumps to supply only the MOQ area and the area immediately adjacent to the recently completed MABS Warehouse 3525. The recommended alterations would permit the pumps to supply the 800 Area, which includes several important buildings, where the available water is currently approximately 50% deficient.

(1) Approximate Cost: About \$7,500.

(2) Monetary Justification: Recommended changes would provide substantial fire fighting water supply improvement to an area where values may reach as high as \$900,000.

(3) Life Safety: Not a direct factor.

(4) Strategic Importance: Not a direct factor.

B-17-(77): Remove unit air conditioners in fire walls and brick up the openings to full wall thickness in each of the following locations:

(a) Hangar 4106: In stair tower fire wall, first floor of west end stair tower.

(b) Hangar 504: In fire wall between hangar bay and both lean-to areas.

Justification: It is essential that penetrations of any fire wall be kept to a minimum in order to confine fire and smoke to the area of origin. When openings must be made, it is essential that these openings be protected by automatic closing fire doors or fire shutters in order to maintain the integrity of the protection afforded by the fire wall. Unit air conditioners afford no fire resistance. When installed so that they take in air from the hangar bay to cool shops and offices, they can actually suck heat, smoke and flames into the spaces they are intended to cool.

(1) Approximate Cost: \$50 per unit.

(2) Monetary Justification: As installed, the units violate the fire integrity of buildings valued in excess of \$2.5 million.

(3) Life Safety: The unit air conditioners can contribute to flooding shops and offices with smoke and toxic gases which could be a contributing factor in a loss of life.

(4) Strategic Importance: None

B-18-(77): Replace all missing sections of balcony guardrail on the second and third floors of BEQ 4015.

Justification: Guardrails and their accessories and appurtenances are provided on balconies, stairways, landings, etc. for the sole purpose of preventing injury and death. The stainless steel mesh sections, each approximately 3' X 4', are not solely a decorative device, but are required by the "Life Safety Code" in order to prevent personnel from falling, or being pushed, through the space between the balcony deck and the upper guardrail. There appears to be a possibility that the missing sections are the result of a type of vandalism.

(1) Approximate Cost: \$3,000

(2) Monetary Justification: None

(3) Life Safety: Light

(4) Strategic Importance: None

B-19-(77): Repair or replace the time/date stamp unit for the base fire alarm system recorder in the fire alarm headquarters of the fire station. Present unit no longer advances and "year" wheel ran out several years ago. All alarms over the telegraphic system are now automatically dated "May 37, 11:55 P.M., 1958".

Justification: NFPA-72D, "Proprietary Signaling Systems", is the governing standard for the type of base fire alarm system provided at this activity. One of the several requirements of this standard is that the alarm recording device shall be arranged to automatically record the time and date of each alarm. In the event of a serious fire, it is oft-times essential to the investigation to pinpoint the precise time of alarm transmittal. Further, this automatic record may be very important in pinpointing equipment malfunctions, delayed transmissions or similar maintenance-type incipient problems.

(1) Approximate Cost: \$250

(2) Monetary Justification: Not a direct factor, although proper recording may be a very useful tool in the investigation of the

increasing incidence of incendiary fires.

(3) Life Safety: Not a factor.

(4) Strategic Importance: Not a factor.

B-20-(77): Provide an automatic emergency power system for the station telegraphic fire alarm system and fire alarm headquarters radio, either by wet cell battery stand-by or by connection to two or more automatic emergency generators, as is required by NFPA-72D, "Proprietary Signaling Systems".

Justification: At one time, a secondary power supply for the base fire alarm system was available from an automatic engine-driven generator. Due to the failure of a component in the electrical system from the generator, a number of years ago, the generator output became incompatible with fire alarm system requirements and the connection was discontinued. As a result, the entire base fire alarm system and fire department radio is out of service during any power outage. It is for this reason that NFPA-72D requires automatic stand-by power to be instantly available. If battery stand-by power is provided, it must have sufficient capacity to operate the system for 24 hours.

(1) Approximate Cost: It is estimated that sufficient batteries, recti-charger, controls and installation would be in the \$5,000 range.

(2) Monetary Justification: Failure to provide the stand-by power system could result in a \$100,000 loss due to delayed alarm.

(3) Life Safety: Not a direct factor, but failure to transmit an alarm and consequent delayed response by fire fighters could be a contributing factor in loss of life in certain types of fires.

(4) Strategic Importance: Not a direct factor.

B-21-(54)(Revised): Provide complete automatic sprinkler protection throughout each of the following buildings, and connect the systems electrically to the station fire alarm system:

Building	Approximate Contents Value	Acquisition Cost of Bldg.	Approx. Cost of Compliance
Hangar 840	\$900,000		
"O" Club 710	Not a factor	\$88,000	\$35,000
Exchange 232	\$400,000	\$188,000	\$25,000
Commissary 414	\$90,000	\$165,000	\$40,000
Warehouse 416	Variable	\$45,000	\$17,000
		\$11,000	\$9,000

Justification: Sprinkler protection continues to be one of the most effective means of fire detection and loss minimization. Where substantial amounts of combustibile wood paneling and similar highly combustibile interior finish materials exist, good sprinkler protection appreciably reduces the life safety hazard present in such materials. Current DOD criteria requires sprinkler protection throughout aircraft hangars, warehouses, and combustibile morale, welfare and recreational facilities as well as in structures representing high monetary values or housing critical materials.

(1) Approximate Cost: See table.

(2) Monetary Justification: See table.

(3) Life Safety: Deemed potentially moderate in "O" Club 710. Not a major factor in the other buildings.

(4) Strategic Importance: None

B-22-(77): Either completely clean out and cleanup Auto Hobby Shop Building 828, bringing wiring, heating and conditions of use up to current acceptable good practice, or prohibit further use of this building until such time as it can be demolished.

Justification: Building 828 is a very old, mostly 1-story wood frame structure. It is termite-ridden, dilapidated, grease-saturated in part, trashy, and with little or no consideration given to fundamental housekeeping or trash and junk removal. In the condition in which it was found during this survey, it constitutes one of the more severe fire hazards on the station.

(1) Approximate Cost: Built in 1952 as a temporary structure, the initial acquisition cost was \$27,757. It is estimated that to restore the building to acceptable condition would cost in the \$35-50,000 range.

(2) Monetary Justification: Building acquisition cost is \$27,757.

(3) Life Safety: Due to the generally "open" status of the structure, life safety potential is deemed slight. However, the possibility of fire fighters or spectators being seriously injured in the event of a fire should not be discounted.

(4) Strategic Importance: None

B-23-(77): Prepare a project to replace the telephone pairs used as conductors in the station exterior telegraphic fire alarm system by heavier gauge wire with heavier insulation.

Justification: Numerous problems are being experienced with continuing grounds in the telegraphic fire alarm cable system. The telephone pairs used in this system are very susceptible to grounding due to moisture and to mechanical injury because of the small gauge wire and lightweight insulation. It appears that cable replacement is the only long-term solution.

(1) Approximate Cost: \$75,000

(2) Monetary Justification: The telegraphic fire alarm system is the "first line" means of notification in many important buildings where values exceed \$1,000,000.

(3) Life Safety: Moderate

(4) Strategic Importance: None

8. MAJOR CHANGES:

A noncombustible, sprinklered Ground Support Equipment Building is nearing completion in the 4000 Area of the station. This facility is intended to serve as a maintenance and storage facility for all ground support equipment used on the station.

Hangar 4100, a single-module hangar, previously reported as under construction has been completed. This hangar is provided with a foam/water deluge system and a fire evacuation alarm system. Two 2000 GPM diesel engine driven automatic fire pumps, rated at 120 PSI, supply the necessary water for sprinkler protection.

A new noncombustible Flight Simulator Building is under construction near Dispensary 302. This building will be sprinklered and be provided with a fire evacuation alarm system. CO<sub>2</sub> hose reel and underfloor flooding systems are being provided for electronics areas.

The station Water Treatment Plant has been enlarged to also handle the needs of adjoining Camp Geiger.

9. WATER FLOW TEST DATA:

Area	Static PSI	Residual PSI	Flow GPM	Required @ 20 PSI	Available @ 20 PSI
3000	60	(See Note 1 Below)		1000 GPM @ 40 PSI	
4000 BEQ's	62	52	1125	750	2400
100 BEQ's	65	60	1240	750	4000
MEMQ	67	37	860	500	1100



DEPARTMENT OF THE NAVY  
ATLANTIC DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
NORFOLK, VIRGINIA 23511

TELEPHONE NO.  
444-9949  
AUTOVON 564-9949  
IN REPLY REFER TO.  
408:EPT:jmf  
11320/NEW RIVER  
27 SEP 1983

From: Commander, Atlantic Division, Naval Facilities Engineering Command  
To: Commandant of the Marine Corps  
Via: (1) Commanding Officer, Marine Corps Air Station (H), New River, North Carolina 28545  
(2) Assistant Chief of Staff for Facilities, Marine Corps Base, Camp Lejeune, North Carolina 28542

Subj: Report of Fire Protection Engineering Survey; forwarding of:

Ref: (a) NAVMATINST 11320.6B  
(b) MCO P11000.11

Encl: (1) Subject Report (3 copies)

1. Subject survey was conducted in conformance with the requirements of references (a) and (b). The report is forwarded as enclosure (1).

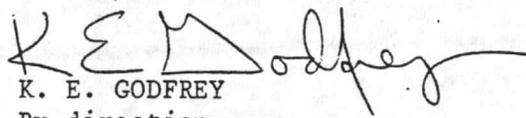
2. Action required of addressee:

Reference (a) establishes the following procedures:

a. Appropriate action relating to the recommendations in the report should be initiated in accordance with normal command support and funding procedures.

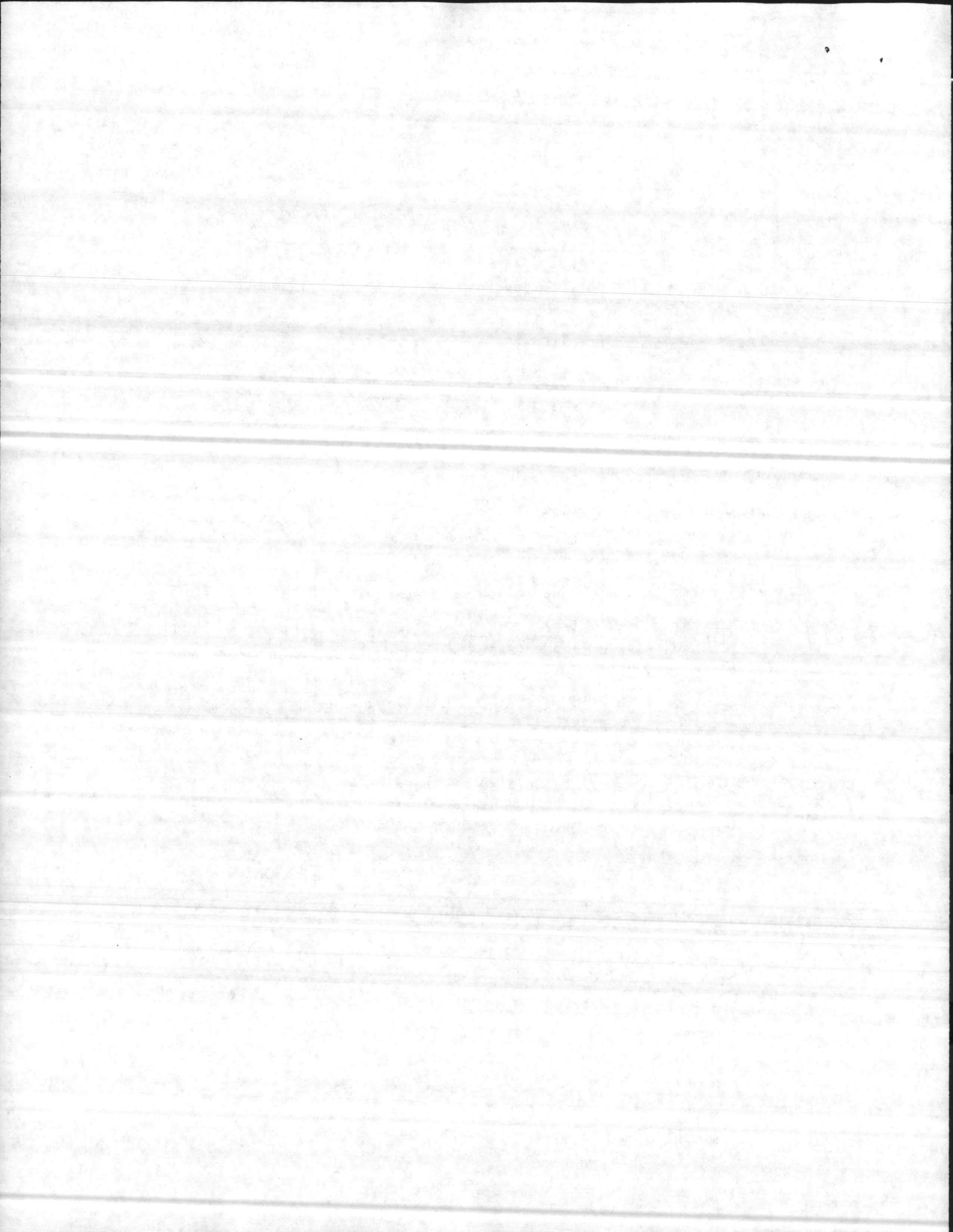
b. The originator of the report shall be advised of the action taken or proposed on the Engineering Priority Recommendations within 60 days of receipt of the report.

3. Any questions or comments concerning the subject report should be directed to Mr. E. P. Thomas, Code 408, telephone (804) 444-9949.

  
K. E. GODFREY  
By direction

Copy to: (w/encl)  
CNO  
CHNAVMAT  
NAVFAC (04F)  
CMC (LFF)

Encl: (1)



MARINE CORPS AIR STATION (HELICOPTER)

NEW RIVER

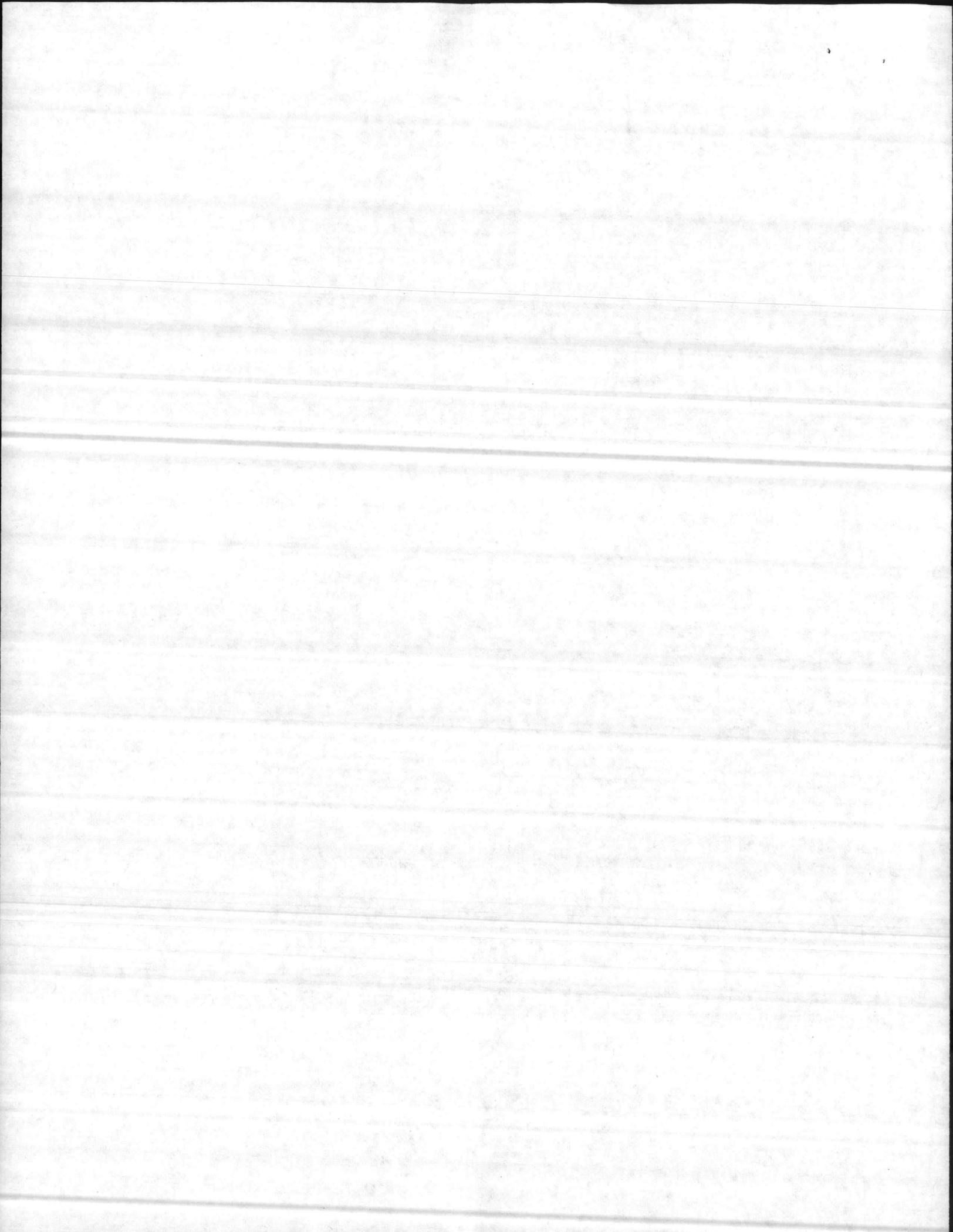
JACKSONVILLE, NORTH CAROLINA

FIRE PROTECTION ENGINEERING SURVEY REPORT

15 SEPTEMBER 1983

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Enclosure (1)



# FIRE PROTECTION ENGINEERING SURVEY REPORT

DATE OF REPORT: 15 September 1983

1. NAVAL SHORE INSTALLATION/ACTIVITY: Marine Corps Air Station (Helicopter)

LOCATION: New River, Jacksonville, North Carolina

2. DATES OF SURVEY: 22 August - 1 September 1983 (72/24)

DATE OF LAST REPORT: 15 September 1980

3. SUMMARY OF CONDITIONS

A moderately sized helicopter air station located about six miles from the city of Jacksonville, North Carolina. This activity supplies all helicopter support for the Marine Corps Base, Camp Lejeune, North Carolina and is an adjunct to that base.

Although the majority of buildings are non-combustible a number of World War II combustible structures remain in use. With the principal exception of the Child Care Center, life safety features are generally well arranged.

4. MAJOR CHANGES

a. A new Marine Corps Exchange, a large Combat Vehicle Maintenance Shop, and a fair sized lean-to addition to Hangar 4108 have all been constructed since the last survey. All of these structures are sprinklered and provided with fire/evacuation alarm systems.

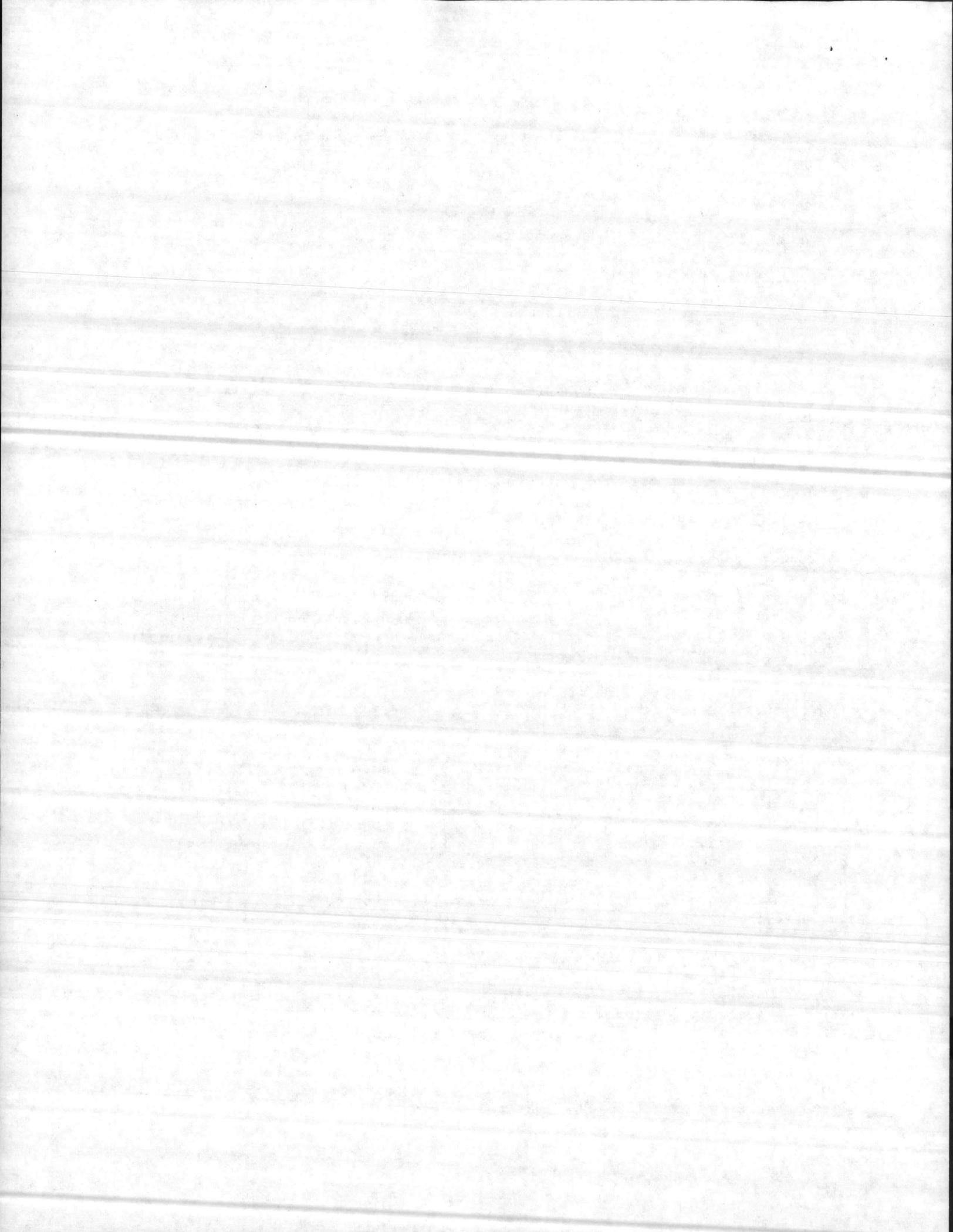
b. A new enlisted club is nearing completion. This 1-story non-combustible structure is sprinklered and provided with a fire/evacuation alarm system.

c. A new Seaboard radio-type, station-wide, exterior fire reporting system is nearing completion. All alarms will be transmitted to Fire Alarm Headquarters, Marine Corps Base, Camp Lejeune and all fire apparatus is dispatched from Fire Alarm Headquarters. As a part of this contract, new building fire/evacuation alarm systems are being installed in about 26 buildings (to the limit of funds available). The old type systems which previously existed in these buildings used individually coded manual stations, etc., which did not lend themselves to conversion for compatibility with the new exterior system.

5. FIRE PREVENTION PROGRAM - COMMENTS AND RECOMMENDATIONS

a. One full time fire prevention inspector is assigned to this activity. This has resulted in improved housekeeping, better care of flammable liquids, and improved attention to the proper types of interior finish materials. Building inspections are being conducted at the prescribed frequencies. Not all fire protection deficiencies are being brought to command attention however. This is due, in part, to the fact that a number of years ago the fire prevention inspectors were directed to stop writing up certain conditions, despite their serious nature.

*who directed  
inspector to  
stop writing  
up discrepancies?*



b. Recommendations:

(1) Fire prevention inspectors should document all fire prevention discrepancies and forward these, together with appropriate recommendations, to the individual in responsible charge. In those instances where corrective action is beyond the capability of the individual in charge of the particular space or building, the discrepancy and recommendation should be brought to the attention of higher authority for appropriate action. The storage on the loading dock of Group Supply Warehouse 424 is a case in point. P-358

(2) The fire prevention inspector assigned to this activity should attend the National Fire Prevention Association (NFPA) "Life Safety Code Seminar" during the next year.

6. MAINTENANCE OF FIRE PROTECTION SYSTEMS - COMMENTS AND RECOMMENDATIONS

a. For all practical purposes the maintenance of sprinkler system, fire alarm system, and other fire protection systems at this activity is non-existent. Preventive maintenance and routine testing is not being accomplished and repairs, when done, are being done by personnel unskilled in the repair of fire protection systems and with the use of improper parts and components. This condition has reached serious proportions in that, currently, sprinkler systems in nearly all of the six principal aircraft hangars are either out of service in part or in obvious unreliable condition. NROOBM  
NEED to Address THIS TO BMO

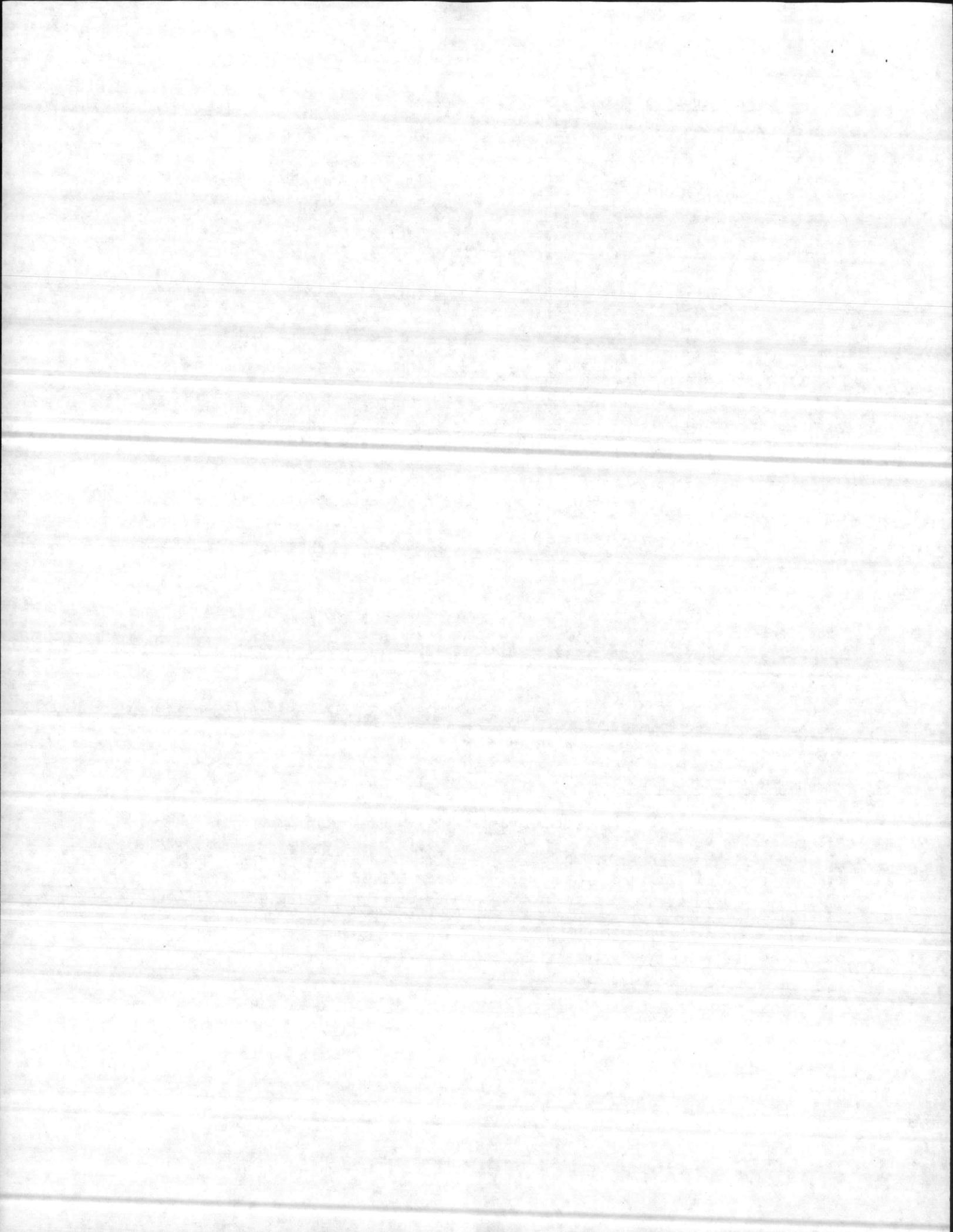
b. Recommendations

(1) Either establish the necessary position and employ a full-time experienced sprinkler mechanic, or contract with a reliable, responsible sprinkler firm to provide the required repair, maintenance, and testing services. RMO

(2) Establish a maintenance program on all fire protection systems, following the guidelines set forth in MO-117, "Maintenance of Fire Protection Systems." Five Dept  
BMO

7. WATER SUPPLY SYSTEM

The water distribution system consists of 6-inch to 18-inch mains which are generally well-looped in the industrial area. Two elevated tanks (one 300,000 gallons and one 350,000 gallons) float on the system. Water source is by a series of wells feeding the Water Treatment Plant which includes a 200,000 gallon aboveground reservoir. A booster pump station, Building 2003, located not far from old Hangar 840, has two 750 GPM booster pumps to boost pressure and volume in the MOQ area, but is not arranged to affect the area around Hangar 840 where volume and pressure have always been seriously deficient.



WATERFLOW TEST DATA

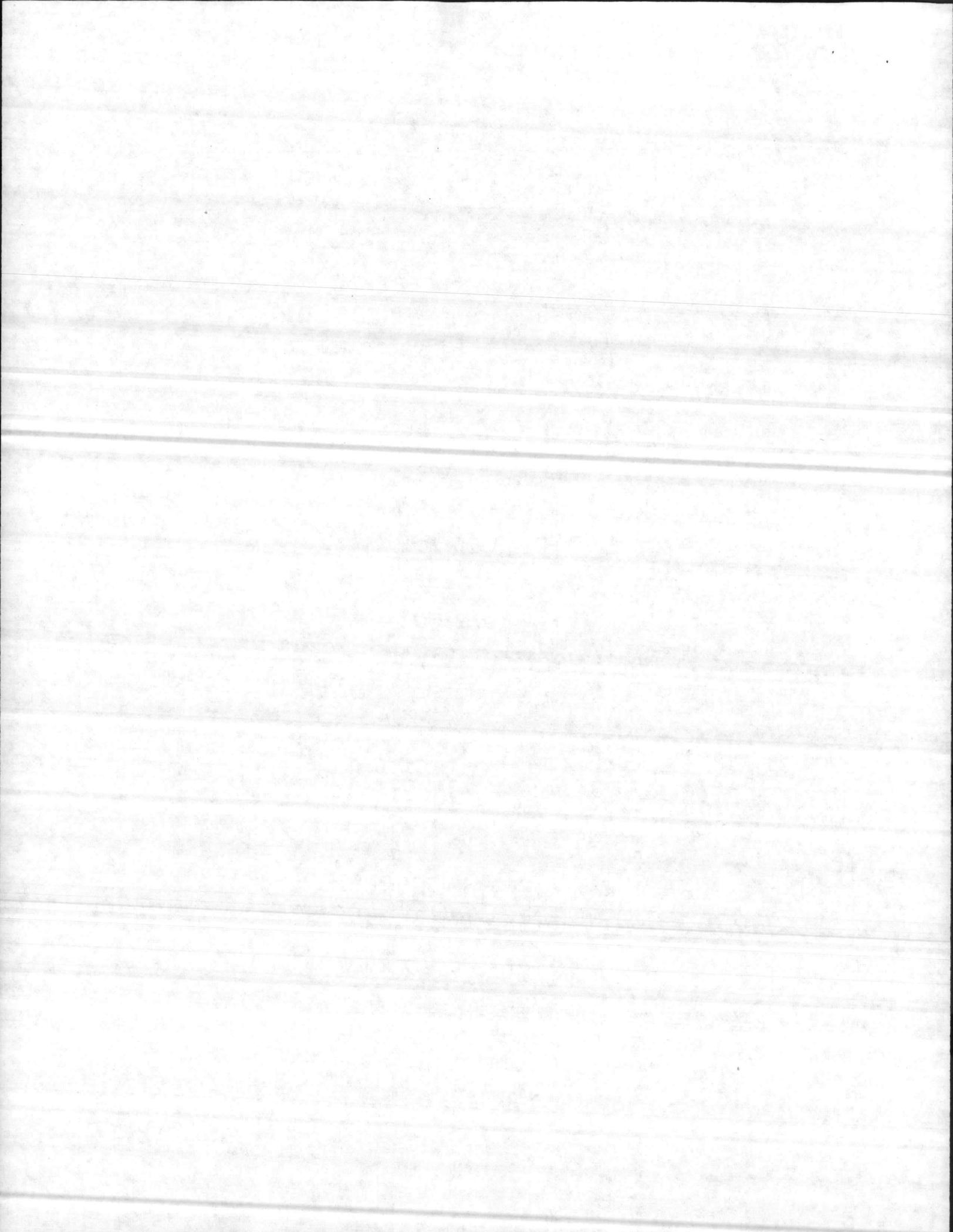
LOCATION	MEASUREMENTS:				
	STATIC PSI	RESIDUAL PSI	FLOW GPM	AVAILABLE GPM @ 20 PSI	REQUIRED GPM @ PSI
New Exchange	70	50	965	1600	1100 @ 20
Vehicle Shop 4157	62	60	1230	6000	1250 @ 20
MOQ Area	63	12	200	180 *	500 @ 20
Warehouse 3525	60	12	150	135 *	1800 @ 40
Hangar 840	64	10	380	340	2500 @ 20
O-Club	70	20	630	630 *	1000 @ 20

\* These areas depend upon the two 750 GPM @ 85 PSI booster pumps in Building 2003 to provide the required pressure and volume. Only one of the two pumps is operational and this pump is set on "manual" rather than automatic. Tests were conducted on the basis of "normal" conditions.

8. ENGINEERING RECOMMENDATIONS

a. Priority:

These recommendations involve major life safety hazards or conditions which could severely impact on the activity's ability to accomplish vital missions, and are those for which attention and resources should be directed.

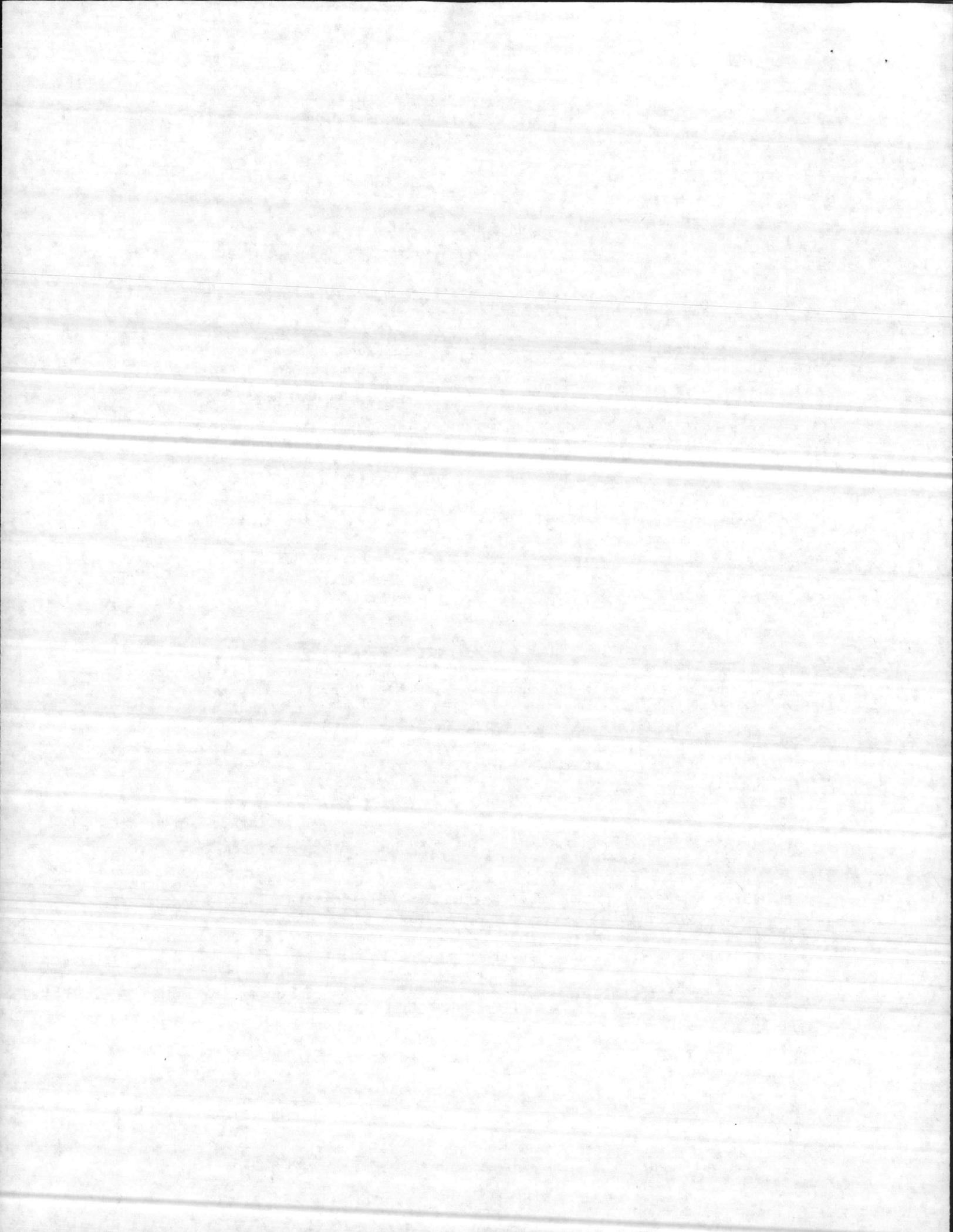


RECOMMENDATION P-1-83: Take immediate steps to restore the protective systems in Hangars 504, 515, 518, 4100, and 4108 to full operational service. Typical discrepancies are as follows:

- 1/2 up*
- a. Hangar 504: Four of six deluge systems are out of service, due to a burned-out air compressor motor for the HAD system. This condition has existed for approximately 1-year. *replaced*
- b. Hangar 515: Battery back-up power system for deluge valves out of service.
- c. Hangar 518: Lever-operated deluge system remote manual release devices have been replaced with globe valves.
- d. Hangar 4100: Foam system out of service and shut off. Lining in foam storage tanks has possibly deteriorated. Foam concentrate is contaminated, possibly with tank lining residue. Contamination of foam prevents valves (check valves, relief valves, and deluge valves) from seating properly. Piping system has leaks at nearly all threaded joints because piping is not properly made into the fittings. Oscillating nozzles will not oscillate due to corrosion in water motors.
- Deluge valves out hope for later work 10-5-83*
- e. Hangar 4108: One power supply panel, supplying back-up electrical power to six deluge systems has had all wires cut. A second power supply panel controlling the remaining two deluge systems has been removed entirely. One equipment shed dry pipe sprinkler valve is out of service due to a faulty air compressor. Dry pipe valve in other former equipment shed now permanently "wet" with alarms shut off.
- 1/2 up*

JUSTIFICATION:

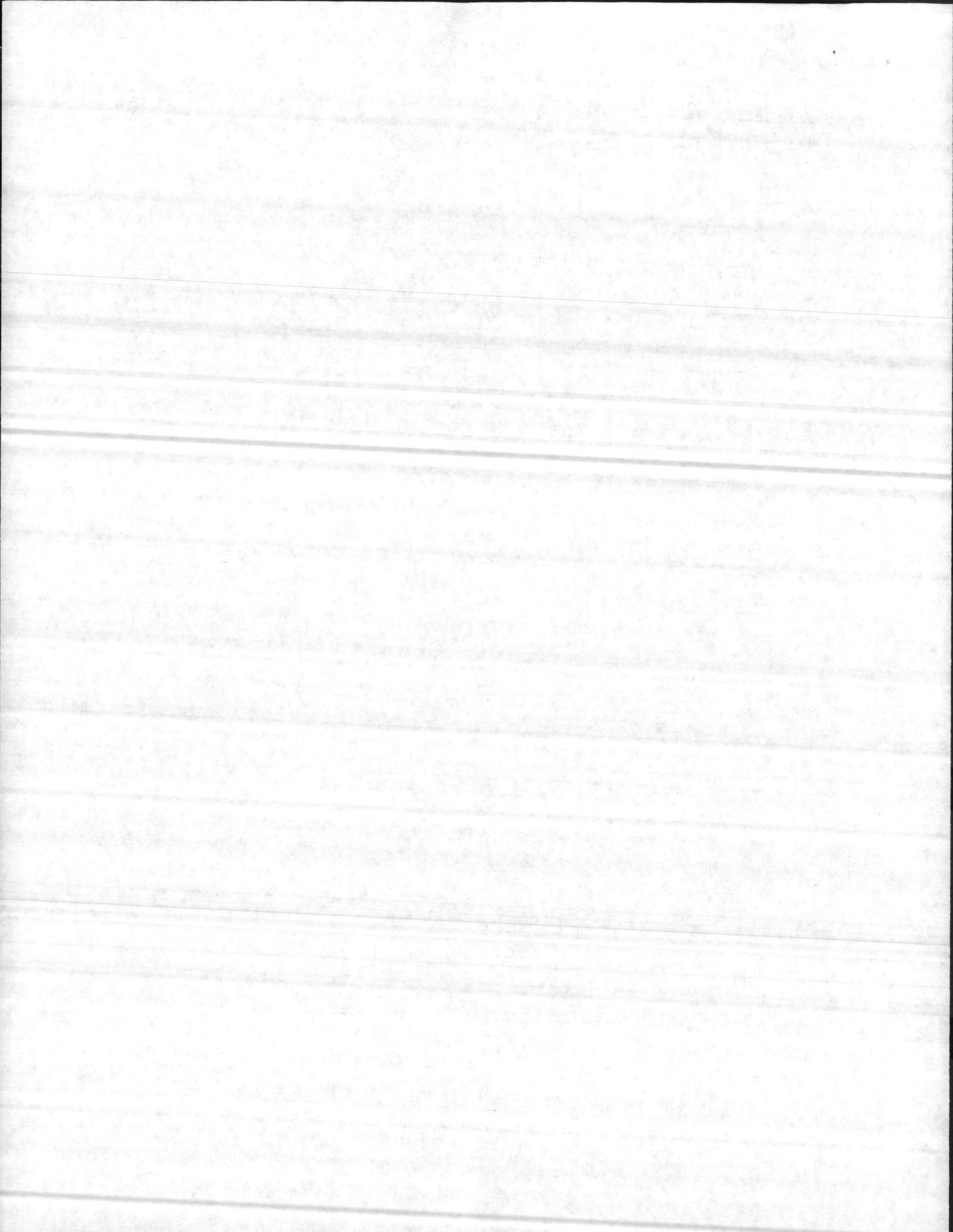
- (1) Supporting Statement: The apparent lack of qualified maintenance and repair of the sprinkler equipment in these hangars has existed over a long period. A number of items are simple to correct yet completely negate the ability of the protective systems to function. Since the effect of inadequate maintenance is cumulative, the reliability of the protective systems in all of these hangars is seriously in question.
- (2) Code/criteria reference: DOD 4270.1-M; NFPA-409, "Aircraft Hangars"; NFPA-13, "Sprinkler Systems"; and MO-117, "Maintenance of Fire Protection Systems."
- (3) Approximate current cost of accomplishing recommendation: \$30,000.
- (4) Estimated replacement value at risk: \$30 million or more may be represented in any one hangar at any given time.
- (5) Estimated probable loss without implementation of recommendation: \$30 million.
- (6) Estimated probable loss with implementation of recommendation: \$100,000.
- (7) Life Safety: Not a major factor.
- (8) Strategic Importance: The loss of aircraft in any one hangar would have a potentially severe impact upon the mission of the activity.



RECOMMENDATION P-2-83: Relocate the Child Care Center, now in Building 604, to a building providing adequate space and complying in all respects with OPNAVINST 1700.9 and NFPA-101, "Life Safety Code."

JUSTIFICATION:

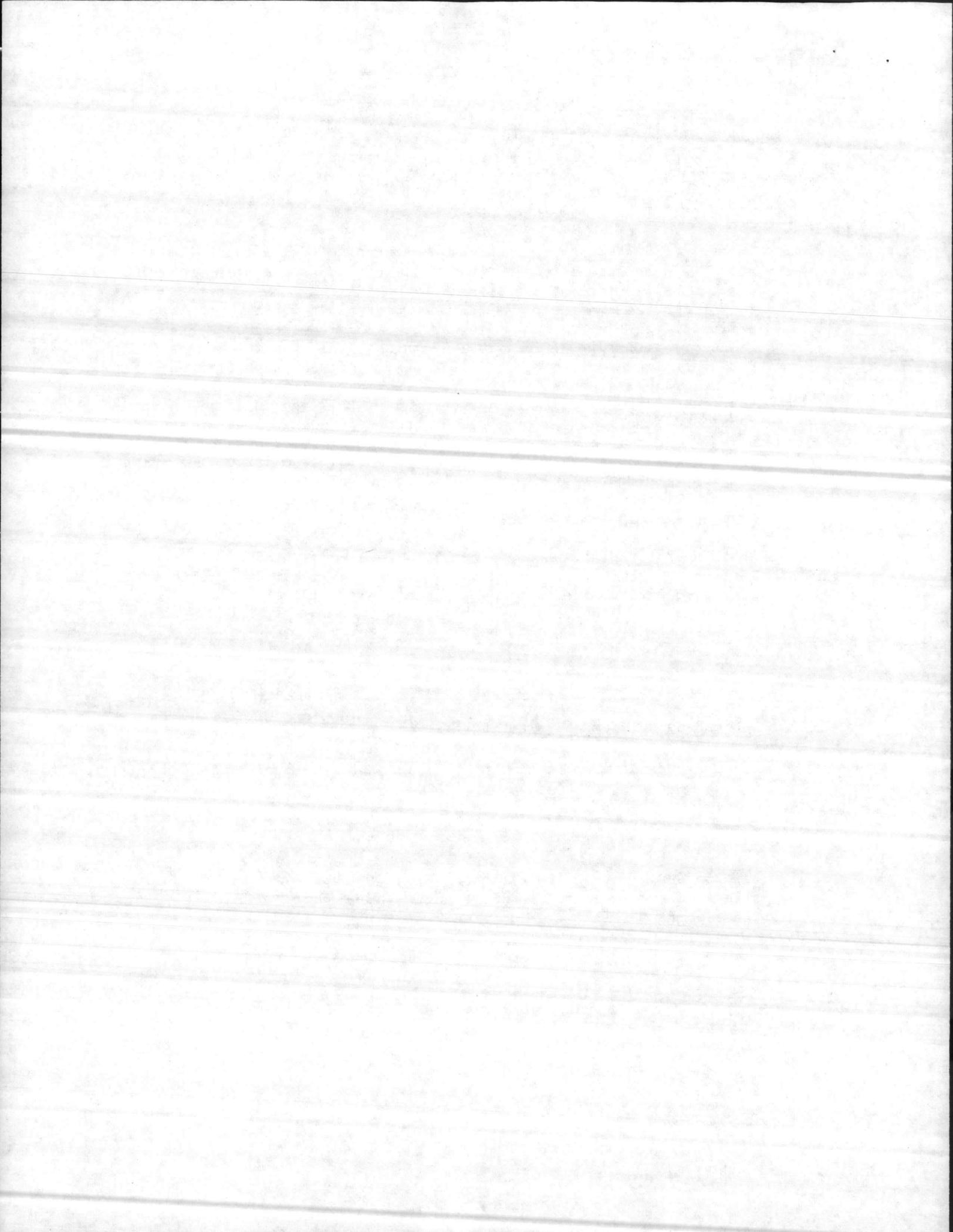
- (1) Supporting Statement: The present building is a small; overcrowded, 1-story concrete block, wood roofed, unsprinklered structure. Exit doors are in-swinging and are too narrow to permit the passage of cribs. Two battery powered residential smoke detectors are provided and the "fire alarm system" consists of a light switch controlling one 120 VAC bell. No subdivision or smoke barriers are provided and the number of attendants appears to be inadequate for the numbers and age groups of the children. Children range in age from six months to about four years. These age groups are those most susceptible to death or injury in the event of fire.
- (2) Code/criteria reference: OPNAVINST 1700.9, DOD 4270.1-M, and NFPA-101, "Life Safety Code."
- (3) Approximate current cost of accomplishing recommendation: \$100,000 assuming that an existing available building can be properly converted.
- (4) Life Safety: Potentially severe. It should be anticipated that up to 15 children might be killed or injured during a serious fire in the present building.



RECOMMENDATION P-3-83: Overhaul the fire pumps and controllers in Booster Pump House 2003 to restore these pumps to fully reliable, fully automatic condition in conformance with NFPA-20, "Centrifugal Fire Pumps." At the same time, repipe the discharge from these pumps so that they will reinforce the extremely deficient water distribution system in the vicinity of Hangar 840.

JUSTIFICATION:

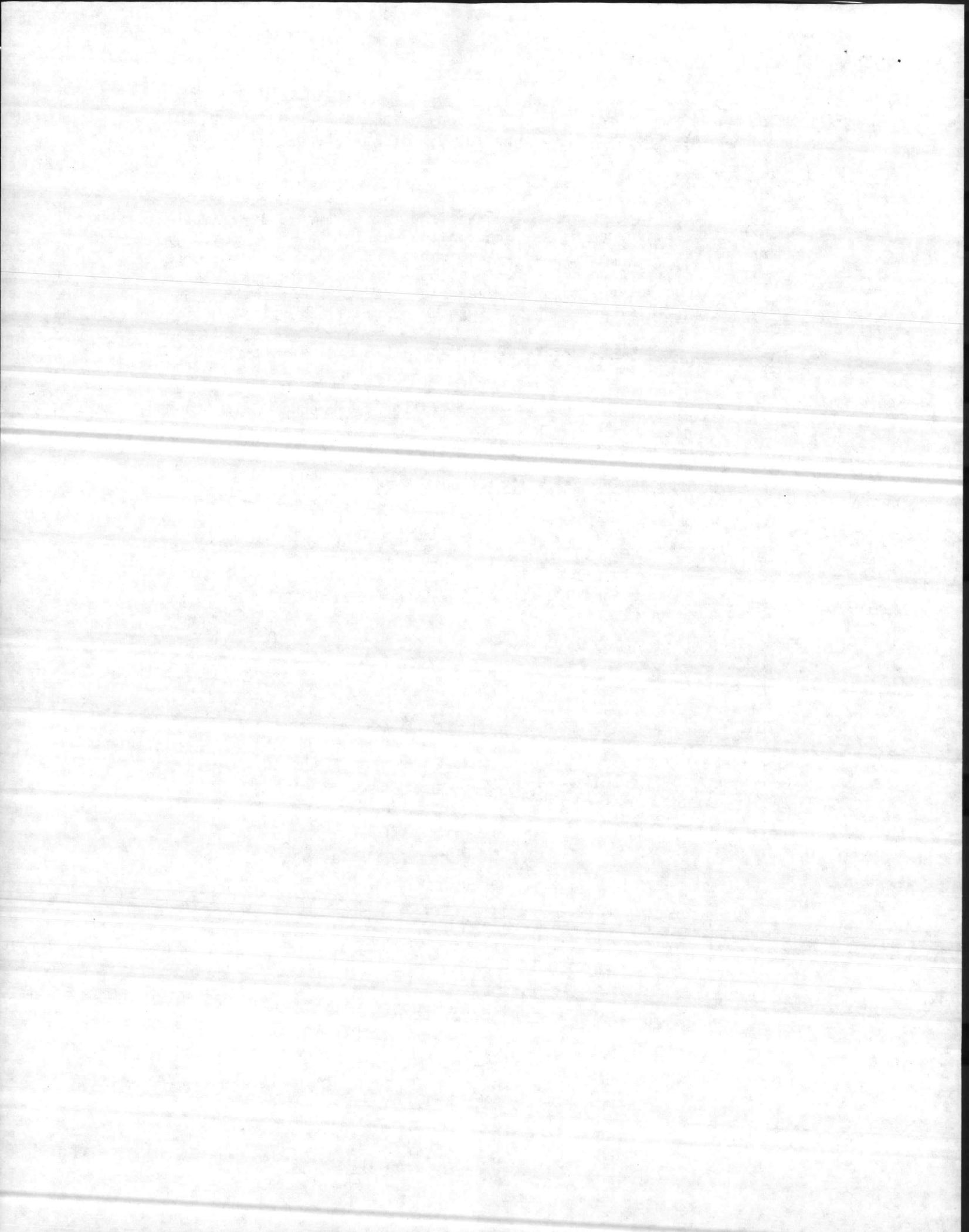
- (1) Supporting Statement: Little or no maintenance or effective repair work has been accomplished within Building 2003 since prior to 1973. The controller for the electric motor on the dual drive pump has been out of service since early 1973. The controller for the gasoline engine driver for the same pump has been completely disconnected since prior to 1977. (The gasoline engine can be started manually.) The controller for the other, electrically driven only, fire pump is set for manual start only. Due to a leaking gate valve, the pump test header froze and split during January 1977 and is still in the same condition. All pressure gages in the pump installation are damaged and completely inaccurate. Due to the remoteness of this pumphouse, considerable delay should be anticipated in getting pumps "on line" in the event of a fire in the MOQ area where hydrant tests during this survey, under "as is" conditions showed only 180 GPM available at 20 PSI. Sprinklered Warehouse 3525 is also dependent on these pumps and current tests gave only 135 GPM available at 20 PSI whereas 1800 GPM at 40 PSI is actually required. Recommendations pertaining to making these pumps available to Hangar 840 area have continued without accomplishment since 1964.
- (2) Code/criteria reference: DOD 4270.1-M; NFPA-20, "Centrifugal Fire Pumps."
- (3) Approximate current cost of accomplishing recommendation: \$50,000.
- (4) Estimated replacement value at risk: \$1 million.
- (5) Estimated probable loss without implementation of recommendation: \$500,000.
- (6) Estimated probable loss with implementation of recommendation: \$100,000.
- (7) Life Safety: Not a direct factor, although there is a moderate life safety potential since the MOQ area is almost wholly dependent upon these pumps for fire hydrant supply.



RECOMMENDATION P-4-83: Provide sprinklers under the canopy over the outside loading dock at Group Supply Warehouse 424. These sprinklers should be for Extra Hazard Occupancy and supplied via an anti-freeze loop.

JUSTIFICATION:

- (1) Supporting Statement: Large quantities of flammable and combustible material are permanently stored on the outside loading dock. This is an unsprinklered area and large windows and loading doors communicate with the loading dock. A fire in this storage could easily enter the main warehouse area and overpower the sprinklers within the main building. This condition has existed since prior to 1977.
- (2) Code/criteria reference: DOD 4270.1-M; NFPA-13, "Installation of Sprinkler Systems."
- (3) Approximate current cost of accomplishing recommendation: \$20,000.
- (4) Estimated replacement value at risk: \$5 million.
- (5) Estimated probable loss without implementation of recommendation: \$2 million.
- (6) Estimated probable loss with implementation of recommendation: \$150,000.
- (7) Strategic Importance: Unknown. The loss of stock in this building might have an adverse impact upon the mission of the activity.

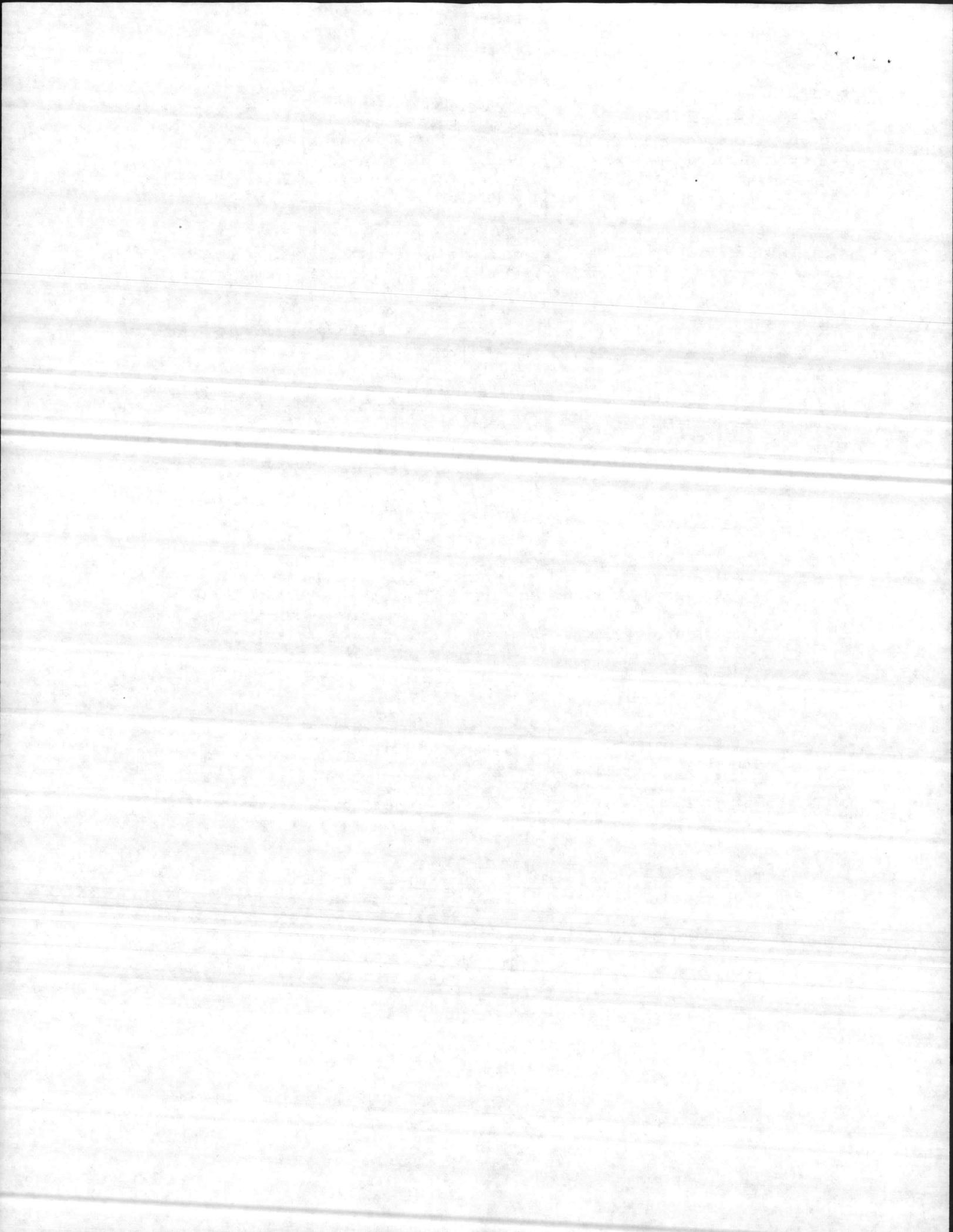


RECOMMENDATION P-5-83: Relocate the supply of flammable and combustible liquids from the loading dock of Group Supply Warehouse 424, to a small, outside storage building located at least 50 feet from the main warehouse. As an alternative to the above, a flammable liquid storage room may be constructed adjoining the main warehouse. The supply of hazardous liquids may be kept therein under the following conditions:

- a. Storage room must be of fire-resistive construction with at least 3-hour fire-rated separation from main warehouse with communicating door opening thereto provided with 4-inch high curb or ramp, and floor drains arranged to discharge to a safe outside location.
- b. Provide continuous gravity or mechanical exhaust ventilation drawing from the floor level on the exterior wall of room.
- c. Provide all electrical lighting, wiring, and equipment within room to be of type approved for Class I, Division 2; Hazardous Locations in accordance with the National Electrical Code.
- d. Provide automatic sprinkler protection in the Flammable Liquid Storage Room.

JUSTIFICATION:

- (1) Supporting Statement: Large quantities of flammable and combustible liquids in original shipping containers under open sided shipping dock adjoining a major warehouse is such that a potential for ignition exists. Should a fire occur in this location, it is likely that major damage to both the building and its contents would result.
- (2) Code/criteria reference: NFPA-30, "Flammable and Combustible Liquids Code"; DOD 4270.1-M.
- (3) Approximate current cost of accomplishing recommendation: \$50,000.
- (4) Estimated replacement value at risk: \$3 million.
- (5) Estimated probable loss without implementation of recommendation: \$2 million based on a severe flammable liquids fire damaging building and contents.
- (6) Estimated probable loss with implementation of recommendation: \$50,000 based on fire containment and prompt control.
- (7) Life safety: Moderate. The possibility of a loss of life is increased due to the lack of adequate storage facility and the probability of a flash fire and/or explosion.



b. Important:

These recommendations are for the correction of hazardous conditions considered as having significant impact potential but not of the critical nature of those in Section A.

Station-wide:

I-1-83: Rework the LP gas supplier's contract to require that all cylinder, regulator, and supply line installations comply with NFPA-54, "National Fuel Gas Code", and NFPA-58, "Liquified Petroleum Gases." The numerous unsatisfactory installations at this activity have been a matter of concern for a number of years. It is obvious that local codes, if any exist, are at considerable variance from practices required in Department of Defense establishments.

I-2-83: Provide pre-engineered dry chemical extinguishing systems, complying with NFPA-17, "Dry Chemical Extinguishing Systems", and NFPA-96, "Ventilation of Restaurant Cooking", in O-Club 710, Bowling Alley 205, and Marina Building 2800.

I-3-83: Extend existing sprinkler protection to properly protect the large spray painting booths recently installed in Hangar 4106, Hangar 518, and GSE Shop 4146. These represent severe potential fire hazards in otherwise sprinklered buildings.

9. SURVEY FINDINGS DEBRIEFED WITH

COL A. D. Hodgins, Commanding Officer  
LTCOL J. E. Van Gorder, Executive Officer  
COL M. G. Lilly, Asst. Chief of Staff for Facilities, Camp Lejeune  
Mr. E. J. Padgette, Fire Chief, Camp Lejeune

Report prepared by:

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