TEST SUMMARY

TEST TITLE: CLOSED CIRCUIT T.V. SYSTEM

TEST NUMBER: E14

OBJECTIVE:

The purpose of this test is to verify the operation of the closed-circuit television system.

ITEMS TO BE TESTED:

Camera

Remote-controlled camera appurtenances

Camera controls and monitor

SUPPORT EQUIPMENT:

Portable cosine-corrected illumination level meter, range of 0-100 foot candles.

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Diesel engine-generators

Switchgear

Unit Sub-stations

Motor Control Center

Lighting Systems

TEST DESCRIPTION:

This procedure will verify the following capabilities of the above ground surveillance T.V. camera and its enclosure; pan and tilt control picture quality, focus control, enclosure rain wiper and heater controls. It will also verify picture quality, focus control, and alignment of the portal security surveillance T.V. camera.

TEST SUMMARY

TEST TITLE: BLAST VALVES AND DAMPERS

TEST NUMBER: E15

OBJECTIVE:

The purpose of this test is to verify the capability of the blast valves and dampers to operate in the required manner within a specified time interval upon receipt of an electrical signal.

ITEMS TO BE TESTED:

Blast Valves and Blast Dampers

SUPPORT EQUIPMENT:

Stop Watch; 0.1 sec. accuracy

Limit switch, S.P.S.T. N/O

Misc. wise leads

Electronic recording timer; one millisec accuracy

Volt-ohm meter

Electrical tape

Adequate temporary lighting and 120 VAC power at blast valves and dampers must be provided

Adequate barricades and safety warning signs in blast valve

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Utility 200 psi Air System

Central Battery System

Blast Valves must be continuously open for a minimum of 72 hours prior to this test.

TEST DESCRIPTION:

Electronic timers and limit switches are placed on representative blast valves and/or blast dampers at each of the following areas:

TEST DESCRIPTION: (Continued)

1. Launcher Area No. 1 Blast Valves
2. Launcher Area No. 1 Air Intake Blast Valve
3. RPI Fuel Storage Area Vent Damper
4. Antenna Facility Blast Valve and Dampers
5. Power house Air Intake Blast Valves

Closure signals are simulated and the times recorded are taken as typical of the group. Automatic or manual opening of the valve or dampers is verified as required. Proper position indicating lamp signals are verified. This portion of the test is performed five consecutive times on each group. The capability of manual opening and/or closing of the valves at areas 1 and 2 listed above is verified by jumpering across the proper control center alarm panel switches. This portion of the test is performed only once and times are not recorded.

TEST SUMMARY

TEST TITLE: MISSILE SILO GASEOUS O_2 DETECTOR

TEST NUMBER: E16

OBJECTIVE:

The purpose of this test is to verify the operation of the Missile Silo Gaseous Oxygen Detector, its associated circuitry, and the automatic air purge of the missile silo.

ITEMS TO BE TESTED:

Missile Silo Gaseous Oxygen Detecting System

SUPPORT EQUIPMENT:

Extension Ladder; 12 ft.
Stop watch
Volt-ohmmeter; Simpson 269 or equivalent
Cylinder; 25% O_2 by volume
Polyethylene bag; approx. 2 Cu. Ft.
Marking tape
Fire extinguisher, CO_2; 5 lb.

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Missile Silo Air Handling Equipment
Batteries and Battery Charger at Equipment Terminal Level IV

TEST DESCRIPTION:

One oxygen detector probe in the missile silo is placed in a 25% oxygen atmosphere. Proper operation of warning horns and indicator lamps is verified. Activation of proper corrective action by the system Missile Silo Air Purge, is also verified.

TEST SUMMARY

TEST TITLE: PROPELLANT TERMINAL GASEOUS O_2 DETECTOR

TEST NUMBER: E17

OBJECTIVE:

The purpose of this test is to verify the proper operation of the Propellant Terminal Gaseous Oxygen Detector and associated circuitry.

ITEMS TO BE TESTED:

Propellant Terminal Gaseous O_2 Detecting System and associated circuits.

SUPPORT EQUIPMENT:

Stop watch

Volt-ohmmeter; Simpson 269 or equivalent

Cylinder; 25% O_2 by volume

Polyethylene bag; approx. 2 Cu. Ft.

Masking tape

Fire extinguisher; CO_2 5 lb.

PREREQUISITES:

The following facility system must be tested prior to the start of this test:

Batteries and Battery Charger at Equipment Terminal Level IV

TEST DESCRIPTION:

One oxygen detector probe in the propellant terminal is placed in a 25% oxygen atmosphere. Proper operation of warning horns and indicator lamps is verified.

TEST SUMMARY

TEST TITLE: FUEL STORAGE AREA FIRE SENSING AND CO_2 SYSTEM

TEST NUMBER: E18

OBJECTIVE:

The purpose of this test is to verify the proper operation of Fuel Storage Area Fire Sensors, associated circuits, and corrective action systems.

ITEMS TO BE TESTED:

Fuel Storage Area Fire Sensing System and associated circuitry. CO_2 Cylinder, air handling equipment, and associated equipment.

SUPPORT EQUIPMENT:

Extention ladder; 8 ft.
Infra-red heat lamp; 250 watts
Stop watch
Volt-ohm meter; Simpson 269 or equivalent
Thermometer; Simpson 388 or equivalent
Heat lamp kit assembly
CO_2 cylinder (replacement) 75 lb.
Masking tape

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Heating
Ventilating and air conditioning system
Central battery system

TEST DESCRIPTION:

The two Fuel Storage Area fire sensors are activated separately by the lamp as a test of the "Set-point Temperature." Proper Alarm Bell, Warning Horn and indicator lamp operation is verified. Temperature "rate of rise" tests are run on five sensors utilizing the Heat Kit lamp. In addition, the Alarm Bell warning Horn and indicator lamp operation and automatic actuation of

TEST DESCRIPTION: (Continued)

the CO_2 system is noted. The capability of the CO_2 system to discharge the proper amount of CO_2 in the required time is verified. Proper corrective action by the Fuel Storage Area air handling equipment is confirmed.

TEST SUMMARY

TEST TITLE: RADIATION SENSING SYSTEM

TEST NUMBER: E19

OBJECTIVES:

The purpose of this test is to verify the capability of the radiation sensing system to perform its design functions.

ITEMS TO BE TESTED:

Radiation sensors located in the Powerhouse and Launcher air filtration system, and in the control center air-conditioning system. Radiation detectors located on instrument cylinders and associated circuitry.

SUPPORT EQUIPMENT:

Radioactive Sample; 0.15 R/HR @ 12 in.

Radioactive Sample; 100 R/HR @ 2 in.

Twelve-inch machinists scale

Volt-ohmmeter; Simpson 269 or equivalent

PREREQUISITES:

Adequate safety precautions and personnel experienced in the handling of radioactive materials must be provided.

The following facility systems must be tested prior to the start of this test:

Diesel engine generators
Central battery system
Switchgear
Unit sub-stations
Motor control
Lighting system
Air conditioning system

TEST DESCRIPTION:

The radiation sensors located in the following areas are exposed to the proper level of radiation and correct lamp indications are verified.

Control Center (Mech. Equip. room)
Powerhouse (Air Filtration Facility)
Launcher (Air Filtration Facility)
Instrument Cylinders (Nos. 1, 2, 3, & 4)

TEST SUMMARY

TEST TITLE: MISSILE SILO LOX SPILLAGE DETECTION SYSTEM

TEST NUMBER: E20

OBJECTIVE:

The purpose of this test is to verify the operation of the Missile Silo Lox Spillage Detector and associated circuits.

ITEMS TO BE TESTED:

The Missile Silo Lox Spillage Detector and associated circuits

SUPPORT EQUIPMENT:

Volt-ohmmeter; Simpson 269 or equivalent
Stop watch
Crushed ice
Masking tape

PREREQUISITES:

The following facility system must be tested prior to the start of this test:

Central battery system

TEST DESCRIPTION:

The thermostat bulb located in the Missile Silo Sump is covered with crushed ice to lower its temperature below 35°F. The actuation of alarm horns and indicator lamps on the Missile Silo and Blast Lock Alarm Panels is noted.

TEST SUMMARY

TEST TITLE: BLAST DETECTING SYSTEMS AND BLAST VALVES

TEST NUMBER: E21

OBJECTIVES:

The purpose of this test is to verify the Missile Silo explosion detecting system, the Nuclear Blast detecting system, the operation of facility blast valves, and the ability of the powerhouse equipment to operate satisfactorily at a sustained increase in environmental temperatures.

ITEMS TO BE TESTED:

Nuclear blast detecting system

Missile silo explosion detecting system

Blast valve actuating system

Powerhouse equipment (used in temperature rise test)

SUPPORT EQUIPMENT:

Limit switch, S.P. S.T. N/O

Misc. wire leads

Electronic recording time - one millisecond accuracy

Stop watch - 0.1 second accuracy

Volt-ohmmeter; Simpson 269 or equivalent

3 point electronic strip chart temperature recorder; 0-1200°F, fully calibrated leads

Thermometer; Simpson 388 or equivalent

Infra-red heat lamp, 250 watts

Electrical tape

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Utility 200 psi air system

Central battery system

Emergency lighting system

Various items of Powerhouse equipment must be operating two hours prior to and during the "temperature rise" portion of this test. Blast Valves, all 13 stations must be open for a minimum of 72 hours prior to this test.

TEST DESCRIPTION:

The Nuclear Blast detecting System, is verified in two tests designated "Static Test A and Static Test B". A Nuclear Blast Sensor closure is simulated, proper indicator lamps are verified as energized, and reset time intervals recorded.

The Missile Silo Explosion Detecting System is tested by jumpering across the terminals of one explosion detector. The sounding of the proper alarm horn and energizing of indicator lamps is noted. The System reset capability is tested.

Blast Valve closure in the launcher area in the event of an explosion in the Missile Silo is verified by simulating an explosion sensor signal at the Missile Silo Alarm Panel. Specific indicator lamp and alarm operation is verified. The Launcher area Blast Valve closure is noted. The Powerhouse Temperature Rise Test verifies the ability of the Powerhouse Equipment to operate during a simulated nuclear attack without detrimental effect due to high temperatures. Thermocouples are placed at critical areas throughout the powerhouse and connected to a recorder. With the equipment operating, a nuclear blast signal is simulated at the alarm panel. Blast valve closure and automatic system reset is verified. The General Blast Valve Test as accomplished by simulating a nuclear blast signal and verifying closure of all complex blast valves. System reset capability is also tested.

TEST SUMMARY

TEST TITLE: ANTENNA SILO #1 AND #2 BLAST AND SILO DOOR CONTROL

TEST NUMBER: E22

OBJECTIVE:

The purpose of this test is to verify the interlocking system of the Antenna Silo Doors and the correct operation of the air conditioning damper when the doors are open.

ITEMS TO BE TESTED:

Antenna Silo No. 1 Doors Interlock
Antenna Silo No. 2 Doors Interlock
Air conditioning damper control

SUPPORT EQUIPMENT:

Volt-ohmmeter - Simpson 269 or equivalent
Masking tape

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:
Central battery system
Heating, ventilating and air conditioning
Antenna silo door hydraulic units

TEST DESCRIPTION:

Proper operation of the Interlock Over-ride Switch, Blast Door Solenoid, Blast Door Locking Pin, Air Handling Damper, and indicator lamps is verified with respect to open and closed positions of the Antenna Silo Doors.

TEST SUMMARY

TEST TITLE: PORTAL SILO AND BLAST DOOR INTERLOCK CONTROL

TEST NUMBER: E23

OBJECTIVE:

The purpose of this test is to verify the operation of interlocking system at the portal silo and blast doors.

ITEMS TO BE TESTED:

Portal silo blast door interlocking system.

SUPPORT EQUIPMENT:

Volt-ohm; Simpson 269 or equivalent

Masking tape

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Central battery system

Portal silo door hydraulic unit

Portal elevator

TEST DESCRIPTION:

With the Portal Silo doors in either the full open or full closed position, the following components of the interlock system are verified as meeting operational requirements;

Interlock override switch

Portal and blast door status indicator lamps

Blast door solenoid

Blast door locking pin

TEST SUMMARY

TEST TITLE: TUNNELS BLAST LOCKS BLAST DOOR CONTROL

TEST NUMBER: E24

OBJECTIVE:

The purpose of this test is to verify the operation of the interlocking system at the three tunnel Blast Locks.

ITEMS TO BE TESTED:

Tunnel blast lock door interlocks

SUPPORT EQUIPMENT:

Volt-ohmmeter; Simpson 269 or equivalent

Masking tape

PREREQUISITES:

The following facility system must be tested prior to the start of this test:

Central battery system

TEST DESCRIPTION:

The proper operation of the following interlock system components is verifield with the two blast door in each of three positions; both doors open, door A open and door B closed, door B open and door A closed:

Door interlock cut-out switch

Door locking pins

Door position indicator lamps

TEST SUMMARY

TEST TITLE: FUEL TRANSFER PANEL

TEST NUMBER: E25

OBJECTIVE:

The purpose of this test is to verify the operation of the Fuel Transfer Panel, its associated circuits and wiring to the RP-1 fuel valves.

ITEMS TO BE TESTED:

Fuel Transfer Panel, associated circuits and wiring.

SUPPORT EQUIPMENT:

Volt-ohmmeter; Simpson 269 or equivalent
Portable power supply; 28V DC @ 3 amp
Misc. wire leads
Masking tape
Stop watch
Test switch for use on liquid sensors

TEST DESCRIPTION:

The Fuel Storage Area and Loading Station Control Valves Test verifies proper valve position as evidenced by corresponding indicator lamp operation at the Fuel Transfer Panel. During the remaining tests listed below, facility valves are positioned as required, proper operation of indicator lamps and logic circuitry is verified, wet conditions are simulated when required, and switches are positioned to fully checkout the functional capabilities of the Fuel Transfer Panel to Control all fuel handling procedures.

Tank fill and recirculate control test
Launcher No. 1 fuel system test (Standby, load, unload and drain)
Standby control test
Load Stage I or II control test
Unload Stage I or II control test
Drain control test

TEST SUMMARY

TEST TITLE: GROUNDING SYSTEMS

TEST NUMBER: E26

OBJECTIVE:

The purpose of this test is to verify the existance of a safe, effective grounding system throughout the facility.

ITEMS TO BE TESTED:

All Facility Grounding Plates, Grounding Cables, and Grounding Mats.

SUPPORT EQUIPMENT:

Portable, ground-resistance-measuring instrument
600 ft. No. 14 copper wire
Fifteen (15) copper-clad steel rods - 3/4 in. dia. by 10 ft.
Portable AD/DC volt-ohmmeter

PREREQUISITES:

The following conditions must be verified prior to the start of this test:
Resistance of leads must be calibrated
Ground moisture content must not exceed 8% at location where ground rod is driven

TEST DESCRIPTION:

This grounding system is divided into the following seven sub-tests:

1. Preliminary procedure common to all grounding tests
2. Missile silo grounding system test
3. Equipment terminal grounding system test
4. Propellant terminal grounding system test
5. Control Center grounding system test
6. Powerhouse grounding system test
7. Antenna silo and terminal ground system test

Test No. 1 is common to each of the following tests and consists of grounding plate continuity verification, non-grounded equipment-resistance measurement, and the driving of grounding rods at specified locations around the various installations. Each of the remaining six tests consists of connecting the proper grounding plates to the grounding rods and taking the required measurements.

TEST SUMMARY

TEST TITLE: POWER STARTING AIR COMPRESSOR

TEST NUMBER: M1

OBJECTIVE:

The purpose of this test is to verify proper operation of the compressor control, indicators and diesel engine. To verify that the amount of air supplied by the diesel engine air starting system is of sufficient volume and pressure to start the diesel generators.

ITEMS TO BE TESTED:

Starting air compressor, including diesel drive unit
Air receivers and accessories
Compressor controls
Trouble contacts and annunciator light indicators

SUPPORT EQUIPMENT:

Portable A.C. voltmeter; 0-600 volts
Portable "lamp-on" ammeter; 0-10 amps

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:
Motor control centers
Control battery system

TEST DESCRIPTION:

The compressor is operated from both the electric motor and diesel engine drives.

Proper operation, automatic control and ability to pressurize receiver tanks is verified. The capability of the air starting system is demonstrated by performing eight cold starts on the generator drive diesels from one receiver tank charge. System "trouble-contacts" are closed and appropriate indication on the Annunciator Alarm Panel is verified.

TEST SUMMARY

TEST TITLE: POWERHOUSE UTILITY AIR COMPRESSOR

TEST NUMBER: M2

OBJECTIVE:

The purpose of this test is to verify the proper operation of the compressor, receiver, controls and indicator and their capability to supply compressed air of proper pressure and volume to meet system requirements.

ITEMS TO BE TESTED:

Powerhouse utility air compressor

Air receiver and accessories

Compressor controls

SUPPORT EQUIPMENT:

Stopwatch

A.C. Voltmeter, 0-600 volts

Ammeter, clamp-on type

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Diesel generators

Switchgear

Motor control centers

TEST DESCRIPTION:

Manual and automatic start up of compressor is performed. The ability of the pressure switch to start and stop compressor at proper pressures is verified. The ability of the compressor to deliver a specific volume of air in a specific unit of time is tested.

TEST SUMMARY

TEST TITLE: POWERHOUSE FUEL OIL SYSTEM

TEST NUMBER: M3

OBJECTIVE:

The purpose of this test is to verify that the fuel oil pumps, centrifugal purifier and other components combine into an integrated operating system, to supply the diesel generator, thru the day tanks the required quantity of fuel oil at the proper temperature. To verify operation of the tank level control, indicators and alarms.

ITEMS TO BE TESTED:

Fuel oil centrifuge
Fuel oil transfer pumps
Day tank and storage tank indicators, alarms and controls
Fuel oil heat exchanger

SUPPORT EQUIPMENT:

Tachometer, Strobator #631-B
Stop watch
Tank sounding tape and capacity tables

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:
Diesel generators
Hot water heating system
Compressed air systems

TEST DESCRIPTION:

Fuel valve shutoff controls are operated. Proper valve actuation and position indication lamps are verified. Fuel tank quantities are measured and compared to fuel oil guage readings. Fuel tanks are emptied and re-filled. Annunciator Alarm panel indicators and alarm horn responses for Fuel Tanks "Hi" or "Low" are verified. Oil pumps are operated from manual and automatic controls, proper pump speeds, flow rates and discharge pressures are verified. Normal centrifuge operation is confirmed and discharge flow rate, temperature and pressure is noted.

TEST SUMMARY

TEST TITLE: RAW WATER SUPPLY AND STORAGE SYSTEM

TEST NUMBER: M4

OBJECTIVE:

The purpose of this test is to verify that the deep well pumps provide raw water at the proper pressure and in the proper quantity, and to verify the proper operation of automatic pump controls and storage tank indicators, alarms and controls.

ITEMS TO BE TESTED:

Deep well pumps and controllers
Water level indicators
Water storage tanks
Tank level controllers
Tank level alarms and indicators

SUPPORT EQUIPMENT:

Level sounding tape and tank capacity chart
Stop watch
Pressure gauge; 0-25 psig

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:
Diesel generators
Switchgear
Motor control centers and control air system

TEST DESCRIPTION:

Pumps are operated manually and automatically, discharge pressures and flow rates are measured. Interlocks and automatic start-stop controls are verified. The well water level indicator reading is compared to measured level. High and low level alarm contacts are closed and appropriate alarm indication is confirmed.

TEST SUMMARY

TEST TITLE: POWERHOUSE DIESEL GENERATORS

TEST NUMBER: M5

OBJECTIVE:

The purpose of this test is to verify the functional capabilities of the diesel generators to supply power at the proper potential and rate.

ITEMS TO BE TESTED:

Diesel engine
Synchrnous generator
Exciter generator
Generator controls
Exciter controls
Engine governors
Voltage regulators
Operating and safety controls

SUPPORT EQUIPMENT:

4400-KW water reostat or resistance load bank
Thermometers, strap-on type
AC recording voltmeter
AC recording ohmmeter
AC recording wattmeter
AC recording frequency meter
Portable megohmeter; 500 volts D.C.
Portable high potential test set; 0-15,000 VDC
Portable lighting units
Electric torsiograph
Fuel oil meters; 0.5 to 6.0 gpm
Indicating and recording frequency rate of change meter
Sound level meter
Engine indicator for compression and firing pressure measurements

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Heating, ventilating and air conditioning system
Fuel oil system
Demineralized water system
Chilled water system
Compressed air system

TEST DESCRIPTION:

Verify the proper insulation resistance of generators and exciters and proper operation of the alarm system. The loading of the generators will be accomplished by a load bank with the capabilities of (changing the loads) shocking the generators from no load with incremental steps to full load or vice versa. Verify that the diesel engine generators units deliver the required electrical power as single units, and the ability of the load sharing governors to equally distribute the electrical loads to the generators when operating in parallel.

TEST SUMMARY

TEST TITLE: HOT WATER HEATING SYSTEM

TEST NUMBER: M6

OBJECTIVE:

The purpose of this test is to verify that the hot water pump, heat exchanger, controls and associated system components are functionally operable and supply the required quantity of water at the proper temperature.

ITEMS TO BE TESTED:

Circulating pumps
Heat exchanger
Pressure tank
System controls

SUPPORT EQUIPMENT:

Pressure indicator, insertion type; 0-200 psig
Thermometer, "Strap-on" type; 60° to 250°F
Stroboscopic tachometer; Strobotac Model 361-36
Flexible Rubber hose, 3 inch diameter

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Diesel generator
Switchgear
Motor control centers
Water treatment system

TEST DESCRIPTION:

The circulating pumps are operated, pump suction and discharge pressure measured and pump capacity rating verified. The system is operated under simulated level conditions. Ability of the heat exchanger and controls to maintain system temperatures is verified.

TEST DESCRIPTION:

Condensing pumps, chilled water pumps and water chillers are placed in operation. The pumps are regulated to a specified flow rate and the system is operated under load for a four hours test period. The water chiller performance is verified by noting proper inlet and outlet water temperatures of the evaporator and condenser oil pressures, power requirements, compressor speeds and by computing the total tons of refrigeration produced. Trouble contacts are jumpered and proper annunciator alarm response is verified.

TEST SUMMARY

TEST TITLE: ICE BANK

TEST NUMBER: M7

OBJECTIVE:

The purpose of this test is to verify the operation of each ice bank, the ability to produce 30,000 pounds of ice in 36 hours, and the capability to cool gpm of water from entering temperature at 55°F. to a leaving temperature of 45°F. for a period of 2 hours.

ITEMS TO BE TESTED:

Ice banks, compressor, receiver, condenser and controls
Level control
Discharge pump
Control valves

SUPPORT EQUIPMENT:

Thermometers; 0-100°F.
Pressure gauge; 0-150 psi
Portable A.C. voltmeter; 0-600 volts
Ammeter "clamp-on" type; 0-5, 0-15, 0-40, 0-100 amperes
Flowmeter, water, 4", 60-500 gpm; Neptune #441
Stop watch
Flowmeter, water 1½", 10-100 gpm; Neptune #431
Scales, 0-500 lbs.
Flexible rubber hose, 3"

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:
Control air system
Diesel engines

TEST DESCRIPTION:

The ice producing capacity of the ice bank is checked by measuring the quantity and temperature of water to the fill unit and measuring the

TEST DESCRIPTION: (Continued)

temperature and quantity of water drained from the unit after 36 hours of operation. The difference in weight is the amount of ice produced. A second test to verify the above test is also performed. Water overflow during the test is weighed. Amount of ice produced is computed from the change in density. Automatic shutoff of the ice bank compressors is verified at the specified ice thickness and the chilled water discharge pump is actuated and regulated to 100 gpm. Capability of the system to cool a specified volume of water from 55° to 45°F. during the proper time span is tested.

TEST SUMMARY

TEST TITLE: CHILLED WATER SYSTEM

TEST NUMBER: M6

OBJECTIVE:

The purpose of this test is to verify the simultaneous operation of one water chiller with three ice banks to chill 1500 GPM of water at various entering temperatures to a leaving temperature of 45°F.

ITEMS TO BE TESTED:

Water chillers and controls

Pumps

Ice banks and controls

Ice bank discharge pump

SUPPORT EQUIPMENT:

Pressure gauge: 0-150 psi

Portable A.C. voltmeter; 0-600 volts

Ammeter "clamp-on-type"; 0-5, 0-15, 0-40, 0-100 amperes

Portable A.C. voltmeter; 0-3000 volts

Ammeter "clamp-on-type"; 0-100 amperes, insulated for 3000 volts

Flexible rubber hose, 3"

Thermometer "strap-on-bulb type", 20° + 100°F

1/4" and 3" pipe plugs

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Switchgear

Motor control center

Powerhouse utility air compressor

Raw water supply and storage system

Powerhouse diesel generator

Water chiller

Water treatment system

TEST DESCRIPTION:

Maximum system loads are imposed from the A/C system and the cooling of deep well water. Ice bank units are placed in operation and ice thickness buildup on automatic control. Water chiller and system pumps are placed in operation. The chilled water is operated at full system load for 1 hour. Power requirements of system components is measured. Ability of the system to maintain design water temperature is verified.

TEST SUMMARY

TEST TITLE: WATER CHILLER

TEST NUMBER: M9

OBJECTIVE:

The purpose of this test is to verify that the water chillers, control units, and associated system components perform satisfactorily and provide the required quantity of chilled water under varing load conditions.

ITEMS TO BE TESTED:

Water chillers
Condensing water pumps
Chilled water pumps
Flash tank
Control system
Chilled water compression tank

SUPPORT CONTROL

Tachometer Strobotor, General Radio - 361-BL
Pressure indicator; 0-150 psig
Thermometers; 20° - 100°F, 100-300°F
A.C. Ammeter "clamp-on-type"; 0-100 amperes
Portable A.C. voltmeter, 0-3000 volts
Flexible rubber hose, 3"
Pipe plugs, 1/4", 3"

PREREQUISITES:

The following facility systems must be tested prior to the start of this test:

Switchgear
Motor Control Centers
Powerhouse Utility Air Compressor

Powerhouse Diesel Generator

Water Treatment System

Control Air System

Motor Protection Tests

TEST DESCRIPTION:

All system equipment is placed in operation. The discharge flow rate of each pump is measured and verified correct. Full facility loads are imposed on the chilled water system and proper operation of the temperature control system and water chiller components is checked. Motor voltage and amperage are measured during peak load. Compressor and evaporator temperatures and pressures are monitored for a specific period of time. The Tons of Refrigeration for each chiller unit is calculated. The portion of the annunciator alarm system applicable to the chilled water system is tested to verify proper alarm responses for "out of limit" conditions.

TEST SUMMARY

TEST TITLE: PLANT AND PLS INSTRUMENT AIR COMPRESSOR

TEST NUMBER: M10

OBJECTIVE:

The purpose of this test is to verify proper operation of the Plant and PLS Instrument Air System.

ITEMS TO BE TESTED:

Air Compressor
Receivers
Compressor controls
Air drier and oil vapor filter
Compressor cooling and lubrication system

SUPPORT EQUIPMENT:

Stop watch
Voltmeter, AC; 0-600 volts
Ammeter, clamp-on-type

PREREQUISITES:

The operation of the following facility systems must be demonstrated prior to the start of this test:

Switchgear
Motor Control Centers
Powerhouse Diesel Generator
Chilled Water System
Water Chiller

TEST DESCRIPTION:

The compressor is operated from manual and automatic controls. Proper compressor lubrication and operating temperature is confirmed by automatic cut-in and cut-out functions of the pressure switch to start and stop the motor at the proper pressure. Operation of the unloader valves and