

SPECIFICATIONS
FOR
GUARANTEED MAINTENANCE SERVICE, WATER TREATMENT SERVICES, CHILLER
WASTE OIL DISPOSAL AND CHILLER EDDY CURRENT TESTING OF AIR CONDITIONING
AND VENTILATION EQUIPMENT AT VARIOUS STATE BUILDING ON OAHU GROUP I,
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
CENTRAL SERVICES DIVISION
IFB NO. CSD-23-012-O

**SPECIFICATIONS FOR GUARANTEED MAINTENANCE SERVICE OF AIR CONDITIONING
AND VENTILATING EQUIPMENT AT VARIOUS STATE BUILDINGS ON OAHU
GROUP I - PART A**

I. SCOPE

The Contractor shall furnish all labor, materials, parts, tools, lubricants, refrigerants, equipment, transportation and supervision necessary for the complete inspection, maintenance and repairs to the air conditioning and ventilating equipment located at various buildings as listed herein on Attachment I, "**General Air Conditioning Equipment Report**", **pages 1 through 21**. The Contractor shall completely guarantee the satisfactory operation of all air conditioning and ventilating systems within the scope of this contract.

II. DESCRIPTION OF WORK

The Contractor shall repair or replace all worn, failed or doubtful components and parts, including tube/coil failures - regardless of cause, to ensure satisfactory operation of the air conditioning and ventilation systems. Replacement parts shall be of similar design and quality to maintain system integrity and serviceability. The Contractor is responsible for the electrical and control portions of each unit from the circuit breaker in the electric panel, including all electrical problems except electric utility power problems, which the Contractor must substantiate. All replacement control and circuit boards shall be coated with silicone.

The Contractor shall perform complete maintenance and repair/replace service, including inspections and trouble calls for all equipment. The service shall consist of thorough maintenance work in accordance with the best commercial practices governing the maintenance of air conditioning systems. Such service shall include regularly scheduled maintenance tasks and inspections for each unit listed herein. All maintenance services shall be as specified and shall be subject to inspection and approval by the Contract Administer (CA). **The guaranteed full service maintenance contract shall not relieve the Contractor from performing the specified scheduled maintenance services.**

The Contractor shall be totally responsible for all costs necessary to maintain and repair all systems (equipment, piping, ductwork, insulation, etc.) for complete and satisfactory operation. Any questions as to the satisfactory performance of maintenance service and repairs, including the satisfactory operation of all equipment and systems shall be determined by the CA.

The Contractor shall remove all trash (i.e. old filters, belts, motors, etc.), which is produced by their work required in these specifications, from the facilities' premises, and dispose of them properly.

The State, or its employees or building occupants, shall not be held responsible for incorrect or damaged deliveries made to any of the facilities even if a signature is provided. All responsibilities of receiving material and/or equipment deliveries are the responsibility of the contractor, or their subcontractor. It is recommended that a company representative be present when deliveries are made.

The Contractor shall not be responsible for repairs due to flagrant vandalism, fire, storm or related damages that can be attributed to causes beyond his control. However, the Contractor shall be responsible for such repairs if the damages are caused by the Contractor's failure to properly maintain and repair the equipment, e.g., failure to reinstall protective covers causes motor to burn during rainstorm.

The Contractor shall not be responsible for the "Automated Logic WebCTRL" Energy Monitoring and Control System (EMCS) computer portion. The Contractor is responsible for the mechanical portion of the air conditioning and ventilating systems controls. Any mechanical device, relay, etc, including wiring which is connected to the EMCS, malfunctions, must be repaired/replaced by the Contractor. However, if the mechanical device, relay, etc. is tested and found to be in proper working order, but the EMCS signal is not being sent to the mechanical device, relay, etc., the Contractor is not responsible. A proprietary (Automated Logic) sensor or device used to control the air conditioning and ventilating systems, through an EMCS controller, is not the responsibility of the Contractor. However, a generic standard sensor or device is the Contractor's responsibility. The Contractor shall respond to any trouble call to determine the cause of the problem.

Should it be determined that the problem is the EMCS, the Contractor shall contact the State, who will correct the problem; but the trouble call response will not be considered as authorized extra work or billable to the State.

Upon completion of this contract period, the next bid winning contractor shall be allowed to submit a list of discrepancy items (equipment components, that require maintenance/repair that should have been maintained/repared within this contract) within 30 days after they take responsibility of the **air conditioning systems.**

The CA, or a representative, reserves the right to determine which claims are valid and submit an official list to the contractor for corrective action. Until these discrepancies are resolved and remedied, **all services (monthly, bi-monthly, quarterly, semi-annual and annual services, trouble calls, etc.) included within this contract, shall remain in effect beyond the end of the contract period for each equipment item, and its components listed on the official discrepancy list. All corrective work and extended services shall be included within this contract and provided, at no additional cost to the State, by the contractor.**

Upon the acceptance, by the State, that all discrepancy items for an equipment item, and its components, have been properly repaired/replaced, all responsibility of that system shall cease with the contractor. **The State shall be the sole judge as to whether these discrepancies have been fully corrected.**

All services performed by the Contractor shall include applicable items listed but shall not be limited to the following maintenance tasks:

A. AIR HANDLING UNIT/FAN COIL UNIT

Bi-Monthly Service

1. Clean and clear all drip pans and flush all related condensate drain lines with nitrogen or other applicable means. (Contractor may be liable for water damage due to clogged drains). Install pan tablets to control algae.
2. Change all disposable air filters **at least once every two months or sooner if needed**; use 2" pleated, 30% efficiency type-Farr 30/30 or equal.
3. Wash permanent type filters with an approved detergent and spray coat with an approved filter treatment solution. Replace deteriorated permanent type filters which cannot be cleaned.
4. Lubricate and oil all fan and motor bearings and connections of dampers and vanes and check controls to insure proper operation.
5. Check all drives for wear; adjust belt tension. Replace belt as required.
6. Operate equipment to check for proper operation, unusual noise & vibration; adjust or repair all equipment and controls as required; clean-up all equipment.
7. Check UV light fixtures and elements (where applicable); repair/replace items as required to keep system operating properly.
8. Check time clock for proper operation and time settings.
9. Certify performance of monthly service and that all discrepancies are reported and corrected.

Quarterly Service

1. Where present, check calibration of CO₂ monitor and sensor, recalibrate as necessary.

Annual Service

1. Adjust alignment of bearings and sheaves; lubricate fan and motor bearings. Replace worn or noisy bearings or sheaves.
2. Clean cooling coils of dirt accumulation using water washer, steam or surfactant chemical coil cleaner (alkaline or acidic cleaners not allowed) as necessary.
3. Check pressure and temperature differential across cooling coils and log air and water readings. Clean strainers, check vents and drains on chilled water coils.
4. Remove and wash all supply and return air grilles, registers and diffusers and fresh air intake grilles and dampers and repair or replace deteriorated bird/insect screens.
5. Clean and adjust water control valve; clean all fan wheels and interior and exterior of equipment housings.
6. Secure all loose housing, seal leaks and touch-up paint after cleaning all rust.
7. Check and calibrate all pneumatic and/or electric temperature controls.
8. Replace any UV light elements that have not been replaced since the last annual service.
9. Check condition of insulation; repair/re-insulate **properly & immediately**,

including **any time** disturbing of insulation is require to perform work, or **upon discovery or notification**.

10. Certify performance of annual service and correct and report all discrepancies.

B. CENTRIFUGAL/SCREW CHILLER

Monthly Service

1. Check and record entering and leaving chiller water and condenser water temperatures and pressures in maintenance log.
2. Check and record head pressure, oil pressure and system pressure; check oil heater.
3. Check oil pump operation; service purge compressor and purge system. Manually rotate chillers where required.
4. Check for refrigerant and oil leakage; recharge system.
5. Adjust chilled water temperature setting for seasonal changes.
6. Check/adjust/calibrate the oxygen/refrigerant monitor and alarm system.
7. Certify monthly performance of chiller operation and maintenance service and correct and report all discrepancies.

Quarterly Service

1. Check chiller response at various load conditions for proper operation and calibration of capacity control system.
2. Check safety controls and purge controls; record settings.
3. Certify performance of quarterly service and correct and report all discrepancies.

Semi-Annual Service

1. Remove heads of condenser and internally brush tubes at the **same time** associated cooling tower is cleaned; coordinate with water treatment contractor and DAGS-Central Services Division.
2. Perform pressure tests to detect refrigerant leaks.
3. Check condition of insulation; repair/reinsulate **properly & immediately**, including **any time** disturbing of insulation is require to perform work, or **upon discovery or notification**.
4. Certify performance of semi-annual service and correct and report all discrepancies.

Annual Service

1. Have chiller and purge compressor oil **analyzed and submit written report**. (A continuous oil monitoring system may be used in lieu of testing.)
2. Replace oil cooler filter cartridge; **change oil** if recommended by analysis and per manufacturer's recommendations. Dispose of oil as specified.
3. Check refrigerant; replace filter-drier.
4. Inspect purge compressor and drum; clean and replace wearing parts
5. Electronic leak test entire system and repair leaks.
6. Megger chiller and oil pump motors and submit written report of readings; check relay contacts and electrical connections.

7. Test operate control switches; unloaders, safeties; calibrate and record settings.
8. Clean and remove all dust and foreign matter. Clean all rust spots and scratches and touch up paint with matching color, **immediately upon discovery or notification**.
9. Have the self-contained breathing apparatus equipment tested and recertified where they are provided.
10. Certify performance of annual service, report and correct all discrepancies. Submit maintenance report in writing for each unit.

C. COOLING TOWER

Monthly Service

1. Check and adjust water make-up float valve and bleed rate. Contractor will be held responsible for all cost of excessive water loss due to faulty float valves or excessive bleed rate.
2. Check general condition of tower interior and water distribution pattern.
3. Check and lubricate motor and fan bearings.
4. Check all drives for wear; adjust belt tension. Replace belts or sheaves as required.
5. Remove foreign material from inside the tower.
6. Check for leaks, patch, correct or repair **immediately upon discovery or notification**. (Contractor may be liable for roof/ flashing damage due to leaking/standing water).
7. Certify performance of monthly maintenance service and correct and report all discrepancies.

Semi-Annual Service

1. Drain, clean and flush tower; coordinate with water treatment contractor and DAGS-Central Services Division.
2. Clean condenser suction screen, drift eliminators, spray nozzles and vacuum basin residue.
3. Certify semi-annual cleaning of towers and correct and report all discrepancies.

D. VENTILATING FANS (Exhaust and Supply)

Quarterly Service

1. Check motor-controlled and back-draft dampers for proper operation; lubricate linkage for free movement.
2. Lubricate fan motors and bearings.
3. Check belt wear and tension; adjust or replace as needed.
4. Check sheaves for wear, replace as needed.
5. Check fan collar, bearings and shaft for wear, repair or replace as needed.
6. Replace air filters where installed, similar to Item A.
7. Certify performance of quarterly fan maintenance service and correct and report all discrepancies.

Annual Service

1. Check and clean fan wheels and housings of dust, dirt, and grease.
2. Remove and wash all intake, exhaust and supply: grilles, registers, louvers and dampers, and repair or replace deteriorated bird/insect screens.
3. Certify performance of annual fan maintenance service and correct and report all discrepancies.

E. PUMPS

Quarterly Service

1. Lubricate and check pump and motor bearings for abnormal temperature and unusual noise or vibration and repair/replace as needed.
2. Check packing glands and seals for excessive leakage. Adjust, tighten or replace as required.
3. Certify performance of quarterly service and correct and report all discrepancies.

Semi-Annual Service

1. Remove and clean strainer for all condenser pumps after tower cleaning.
2. Check and blow down strainer to chilled water pumps after tower cleaning. Remove and clean strainer if excessive debris is noted.
3. Check condition of insulation; repair/reinsulate **properly & immediately**, including **any time** disturbing of insulation is require to perform work, or **upon discovery or notification**.
4. Log suction and discharge pressures for all pumps.
5. Clean and remove all dust and foreign matter. Clean all rust spots and scratches and touch up paint with matching color, **immediately upon discovery or notification**.
6. Check motor coupling for alignment; mounting bolts are secure.
7. Certify performance of semi-annual service and correct and report all discrepancies.

F. TEMPERATURE AND PNEUMATIC CONTROLS

Quarterly Service

1. Check air compressor and belt drive for unusual noise and excessive wear; adjust belt tension, replace belt or sheaves as required. Check oil and add as required.
2. Check air system for leaks and repair. Check and clean traps; replace air filter, and drain condensate and tank (pneumatic). (Contractor may be liable for damages due to leaking condensate water from within the pneumatic system).
3. Check control devices for proper operation and for leaks, sticking stems, and air tightness; repair/replace weak or broken springs and ruptured diaphragms.
4. Check automatic dampers for tightness in closing, bent blades and

defective linkage; lubricate connections for free movement and repair/replace as required.

5. Adjust thermostat to maintain 75°F room temperature.
6. Certify performance of quarterly maintenance service and that all discrepancies are reported and corrected.

Annual Service

1. Check air compressor for proper pressure settings; operating time, belt tension and wear, presence of moisture, safety relief operation and oil level (pneumatic). Record compressor run time and cut-in/cut-out pressures.
2. Change compressor oil; inspect valve assemblies; check and adjust.
3. Calibrate pneumatic and/or electric temperature controls.
4. Certify performance of annual maintenance service and correct and report all discrepancies.

G. PACKAGED WATER CHILLER, RECIPROCATING COMPRESSOR, AIR-COOLED CONDENSER

Monthly Service

1. Check and record entering and leaving water temperatures and pressures of chilled water and water-cooled condenser in maintenance book.
2. Check and record refrigerant compressor suction and discharge and oil pressures.
3. Visual check for water, refrigerant and oil leakage; correct or repair as required. Check vibration isolator mounts.
4. Check compressor, fan, and motor bearings for abnormal temperature and unusual noise; lubricate and/or replace as required.
5. Adjust chilled water temperature setting for seasonal change.
6. Check refrigerant sight glass; change filter/drier if moisture indicated (DX system). Check compressor oil level and add oil as required.
7. Check air-cooled condenser fans, sheaves, belts; tension, adjust, or replace as required.
8. Adjust alignment of bearings and sheaves for fans, motors, and compressors, and replace worn or noisy bearings or sheaves.
9. Note and run system operation through complete operating cycle and adjust for proper operation.
11. Certify performance of monthly maintenance service and correct and report all discrepancies.

Quarterly Service

1. Check chiller response at various cooling load conditions for proper operation and calibration of capacity control system and record settings.
2. Check operation of freezestat and oil failure switch; record settings.
3. Test and adjust "make-up" water and expansion tank.
4. Clean condenser coils with water washer, steam or surfactant chemical coil cleaner (alkaline or acidic cleaners not allowed) (air-cooled).
5. Certify performance of quarterly maintenance service and correct and

report all discrepancies.

Semi-Annual Service

1. Remove heads of condenser and internally brush tubes at the same time cooling tower is cleaned (water-cooled).
2. Certify performance of semi-annual maintenance service and correct and report all discrepancies.

Annual Service

1. Have compressor crankcase oil **analyzed and submit written report**. Replace strainer and oil filter; **change oil** if recommended by analysis and per manufacturer's recommendations.
2. Check refrigerant; replace filter-drier.
3. Megger chiller motor and submit written report of readings; check starter relay and control contacts and electrical connections for tightness and clean as required.
4. Test operate control switches, compressor unloading and safeties; calibrate and record settings. Adjust as required.
5. Check and clean all unit housings (inside and outside and components), seal leaks and remove rust from exterior components and touch-up paint with match color, **immediately upon discovery or notification**.
6. Check condition of insulation; repair/re-insulate **properly & immediately**, including **any time** disturbing of insulation is require to perform work, or **upon discovery or notification**.
7. Certify performance of annual maintenance service and correct and report all discrepancies.

H. PACKAGE OR SPLIT DX AIR-COOLED AIR CONDITIONER

Monthly Service

Perform the tasks of Item A - Air Handling Unit/Fan Coil Unit and Item G - PACKAGED WATER CHILLER, RECIPROCATING COMPRESSOR, AIR-COOLED CONDENSER.

Quarterly Service

Perform the tasks of Item G - PACKAGED WATER CHILLER, RECIPROCATING COMPRESSOR, AIR-COOLED CONDENSER.

Semi-Annual Service

Perform the tasks of Item G - PACKAGED WATER CHILLER, RECIPROCATING COMPRESSOR, AIR-COOLED CONDENSER.

Annual Service

Perform the tasks of Item A - Air Handling Unit/Fan Coil Unit and Item G - PACKAGED WATER CHILLER, RECIPROCATING COMPRESSOR, AIR-

COOLED CONDENSER.

I. WINDOW AND DUCT-LESS SPLIT DX AIR CONDITIONERS (3-1/2 Tons or Less)

Quarterly Service

1. Clean evaporator and condenser coils with water washer, steam or surfactant chemical coil cleaner (alkaline or acidic cleaners not allowed); wash unit to remove dirt, oil and debris from fan assembly and chassis.
2. Clean condensate pan and flush drain line.
3. Lubricate compressor and fan motor bearings.
4. Check system refrigerant charge.
5. Clean, wash or furnish and install new filter as required.
6. Run and check units operation and controls through complete cycle; record temperature and setting when compressor cuts in.
7. Certify performance of quarterly maintenance service and correct and report all discrepancies.

J. STANDBY AND LEAD-LAG EQUIPMENT (Pumps, Chillers, Cooling Towers, etc.) CONTROL SWITCHES AND TIME CLOCKS

Monthly

1. The Contractor shall be responsible for the manual operational change-over/rotation of all standby and lead-lag equipment not operated by computer (monthly, unless noted otherwise).
2. Clean contacts, replace if necessary; check and adjust time settings as directed or required. Change battery for back-up if appropriate or necessary.
3. Should time clock fail - replace with electronic type with capacitance back-up (Batteries NOT ALLOWED).
4. Should bypass timer switch fail - replace with adjustable 4-hour programmable electronic selector switch or push button.

K. VALVES AND CONDENSER WATER LINES, EQUIPMENT AND SUPPORTS

1. The Contractor shall exercise all equipment shut-off valves quarterly for proper operation and tightness.
2. Wirebrush and remove rust from pipe, equipment and support surfaces than prime and paint with corrosion protection coating (color to match existing) to prevent further rusting. Perform work **immediately upon discovery or notification.**

L. WATER TREATMENT SERVICE

1. Bidder may subcontract for the chemicals and water treatment service

which shall be provided under this contract by a qualified water treatment company experienced in the business of servicing air conditioning water systems. (See attached "Specifications for Water Treatment of Air Conditioning Systems" and refer to the portion of the SPECIAL PROVISIONS regarding SUBCONTRACTING.)

2. Log and date maintenance service actions in a "Chemical Treatment Log Book" (e.g. monthly water analysis, equipment maintenance and repair, chemical feed set points and adjustments made, annotate amount of each chemical used and on-hand).
3. The Contractor shall submit an annual updated inventory of Water Treatment Equipment, by building floor and location during the contract period.

M. CHILLER EDDY CURRENT TESTING

1. Bidder may subcontract for the eddy current testing of the listed chiller units which shall be provided under this contract by a qualified eddy current testing company experienced in the business of nondestructive testing of installed heat exchanger tubing. (See attached "Specifications for Chiller Eddy Current Testing" and refer to the portion of the SPECIAL PROVISIONS regarding SUBCONTRACTING.)
2. Submit eddy current test report booklet for each chiller tested with appropriate information included and as specified.

N. CHILLER WASTE OIL DISPOSAL

1. Bidder may subcontract for the disposal of hazardous chiller waste oil generated during the execution of their work and which shall be provided under this contract by a qualified hazardous waste disposal company experienced in the business of legally disposing of hazardous waste material in accordance with all Federal, State and Local Regulations. (See attached "Specifications for Chiller Waste Oil Disposal" and refer to the portion of the SPECIAL PROVISIONS regarding SUBCONTRACTING.)
2. Submit copies of all EPA required paperwork to the State upon completion of disposal and as specified.

O. CLEANING OF MECHANICAL EQUIPMENT ROOMS OR ENCLOSURES
Monthly

1. Vacuum or wipe clean all equipment surfaces and all related appurtenance.
2. Vacuum clean or sweep complete floor and platform areas. **DO NOT wet floor and platform area where there is no waterproofing.**
3. Wet wash (hose or wet mop) complete floor area with tap water where allowed. **CAUTION: DO NOT splash water onto the electrical and mechanical equipment.**
4. **Remove all** used, deteriorated, replaced, discarded parts, oil and other liquids not being used, and related debris.

5. Notify Contract Administrator of any dangerous conditions, improper storage of furniture, materials and supplies which impacts your work within rooms and enclosures, including vandalism.

III. SPECIAL REPORTS

Prior to commencement with the work on the contract, the Contractor shall submit to the Contract Administrator his monthly inspection schedule for the period of the contract.

The Contractor shall also maintain a separate book, record, documents and other evidence pertaining to the maintenance, repair and costs of each air conditioning system at the various buildings to the extent and in such detail as will properly and adequately reflect the past maintenance history and cost (labor, materials, parts and equipment). The Contractor shall also submit an annual updated inventory of equipment, by building floor and location during the contract period.

The Contractor shall submit an annual updated inventory of air filters and belts, by building floor and location during the contract period.

IV. WORK SCHEDULE

The contractor shall perform total coverage maintenance and repair services to air conditioning and ventilating systems in the various buildings as listed herein, including any other equipment not listed but which are permanently part of the existing systems and not newly installed, all in accordance with the best commercial practices and as required to provide assurance of safety and operational reliability.

Within seven (7) days after the award of this contract, the Contractor shall submit to the Contract Administrator, in writing a proposed schedule on Inspection, Preventive Maintenance, Maintenance Checklist and Maintenance Record System, all in sufficient detail to show its adequacy in carrying out the terms of this contract.

Contractor shall include forms and checklists to be used by his maintenance personnel in the performance of the contract requirements for approval by the State. The State reserves the right to provide the Contractor with preprinted maintenance worksheets to be completed by the Contractor.

All maintenance tasks described herein shall be performed between the hours of 7:30 A.M. to 4:00 P.M. on normal working days. Normal working days shall be defined as **Mondays through Fridays**, excluding State holidays.

- A. Monthly/Bi-monthly maintenance tasks shall be performed in the last week of the month, normal working days; bi-monthly tasks shall be performed in August, October, December, February, April and June or as coordinated by the Contract Administrator. Monthly/Bi-monthly service reports shall be certified by a representative of the building. Monthly/Bi-monthly service shall be performed not less than three (3) weeks for the monthly and seven (7) weeks for the Bi-monthly maintenance tasks but no more than five (5) weeks for monthly and nine (9) weeks for the Bi-Monthly from the last service period.

- B. Quarterly maintenance tasks shall be performed in July, October, January and

April on normal working days or as coordinated by the Contract Administrator. Quarterly service reports shall be certified by a representative of the building.

- C. Semi-Annual maintenance tasks shall be performed in September and March on normal working days or as coordinated by the Contract Administrator. Semi-annual service reports shall be certified by a representative of the building.
- D. Annual maintenance tasks shall be performed in December on normal working days or as coordinated by the Contract Administrator. Annual service reports shall be certified by a representative of the building.

The Contractor is required to schedule his work to accommodate and prevent disruption of building operations as much as possible and/or may be required to return at a more appropriate time all at no additional cost to the State, but work must be performed and not missed.

All work performed by the Contractor shall be subject to random periodic inspection and testing by the Contract Administrator or a representative of the Central Services Division, DAGS, State of Hawaii. The State reserves the right to have the Contractor present at such inspections to be scheduled by the State periodically.

All Contractor service reports, whether regular maintenance, trouble call, emergency or authorized extra work, shall be filled out properly and completely at the time of service and shall include: day & date, time start, time complete, service performed, materials used and costs, control number, service person, and shall be certified (signed) by a representative of the building (one (1) service report shall be filled out for each day one or more service technicians report to a facility).

V. **MAINTENANCE CHECKLIST**

The Contractor shall prepare and maintain a maintenance checklist/log book and post a checklist/log book on each unit as described herein. The checklist /log book will include the date maintenance was performed, the name of mechanic who performed said maintenance and the type of work performed on the unit, if any. It will be the Contractor's responsibility to maintain the checklist/log book by recording the above data after each scheduled maintenance, emergency repairs, etc. and have the checklist/log book available for inspection at the building sites (all checklists/log books shall be the property of the State).

At the end of each contract period the Contractor shall submit with their final invoice, completed checklists/log books of all air conditioning and ventilating equipment at each building location. **No payment will be made until all completed checklists/log books are received.**

VI. **EMERGENCY SERVICE AND REPAIR**

Emergency service required between regular maintenance calls shall be rendered **within two (2) hours after the Contractor is notified**, non-work days excluded. **All repair shall be provided at no additional charge to the State.** The Contractor shall provide copies of the past maintenance history and cost upon request by the Contract Administrator.

As emergency/repair jobs are completed, the Contractor **must notify** the Contract Administrator **daily** by E-mail of the status of repairs and estimated completion times.

The State reserves the right to have maintenance or repair tasks performed on the weekends or after normal operating hours. Whenever the State exercises this right, the State will compensate the Contractor only for one half (1/2) the hourly rate provided by bidder on the applicable Offer Form page for its employees which **includes applicable fringe benefit, mileage, travel, and tax costs.**

The Contractor shall be responsible for all other costs as if the work was performed during normal working hours.

The Contractor shall notify the State when parts are not readily available to accomplish the repairs. The State reserves the right to have the parts sent by air freight at the expense of the State.

When "chargeable" emergency services or authorized extra work are necessary, the Contractor shall promptly provide the Contract Administrator within 24 hours of the notification of the emergency repair trouble call, with an estimated cost and shall receive advance approval from him prior to performing any such work over three (3) hours labor or \$300.00 total cost.

A written quotation shall follow within 48 hours of any "chargeable" emergency services performed, containing the following minimum information:

- a. Description and breakdown of material, parts and labor costs.
- b. Extra costs such as air freight.
- c. Completion date.

Contractor shall bill such "chargeable" emergency services or authorized extra work separately from the contract price. Unless the Contractor is given a separate purchase order authorizing him to make such repairs, the State shall not be held responsible for payment of any such work performed by the Contractor.

VII. TROUBLE CALL PROCEDURES FOR AIR CONDITIONING SERVICE CONTRACTS:

1. State Agency calls Central Services Division (CSD) to report air conditioner problems.
2. Contractor **shall NOT respond** to calls from State Agencies, **without** Central Services Division prior approval, but shall **instruct** the State Agency to call CSD.
3. CSD notifies Contractor of problem and assigns a control number.
4. The Contractor shall E-mail CSD by 4:30PM, on the last working day of each week, the status of all outstanding trouble calls. The E-mail shall provide information on the problem found, what actions the contractor is intending to take and an estimated completion date.
5. CSD will inform State Agencies of status or pending actions.

6. Unauthorized extra work performed on a trouble call may not be compensated as determined by the Contract Administrator.

VIII. PARTS AND MATERIAL

The Contractor shall restore to serviceability all parts that are found to cost less to restore than to replace with a new part. Where parts are worn out and cannot be restored, the Contractor shall replace these parts with new parts. Only new, standard parts manufactured by the maker of each unit or parts of equal quality shall be used. **All parts and materials shall be provided at no additional cost to the State.**

If a replacement part is found not to be available due to the age of the equipment, the Contractor shall notify the State and provide the equipment make and model number and a description of the part and the part number. The State shall not be responsible for replacement cost of parts and equipment solely due to lack of availability of replacement parts.

The Contractor shall maintain a supply of parts and material that is required for normal repairs of the air conditioning units. The Contractor shall notify the State whenever parts are not locally available to accomplish the repairs. **The State reserves the right to request the parts be shipped by air freight at the expense of the State and cost shall not include Contractor mark-up. Should the contractor elect to purchase parts from the mainland at reduced prices, even though the part is available locally, the State reserves the right to require the Contractor to air express (next day delivery) the parts at the Contractor's expense.**

The Contractor shall include all costs necessary to provide and maintain a supply of refrigerant (virgin or equal quality) for the life of the contract and shall maintain a record of refrigerant usage for each location and comply with all government regulations and shall support and protect the State legally and financially with regard to these regulations. Recovery or storage of refrigerant shall be included at no additional cost to the State.

IX. ALLOWABLE COSTS FOR PARTS

If replacement parts or materials are required for "chargeable" emergency services or authorized extra work, the State shall compensate the Contractor for the part(s) at the Contractor's cost, plus labor. The Contractor's material cost mark-up shall not exceed 20%, which shall **include shipping, overhead, profit, taxes, and any other incidental expenses**. If a subcontractor service is required, the Contractor's mark-up shall be limited to 10%, which shall **include all the above mentioned expenses**. The Contractor shall substantiate all costs by submitting copy of part or material invoices with their invoice to the State. Use only new, standard parts or material as manufactured by the maker of each unit or part of equal quality.

X. CLEANUP AND WORK PRACTICES

The Contractor shall keep the job site free of debris, litter, refuse, etc. and shall clean all fluids, oil, grease drippings or spills during the daily progress of work. The Contractor shall

remove all tools, **used or waste oils and fluids**, parts, and equipment from the service area upon completion of the work and legally dispose of, whether hazardous or not, in accordance with EPA and/or other government regulations including providing written records. The Contractor shall support and protect the State legally and financially with regard to these regulations.

Contractor shall exercise caution during the progress of his maintenance and repair work to prevent damage to any of the building structure. Contractor shall restore all damages, caused by the Contractor's negligence, at the Contractor's own expense, when requested by the State.

XI. SAFETY PRECAUTIONS

The Contractor is not to perform maintenance and repair work until all switches are de-energized, locked, and tagged. The Contractor shall comply with all applicable safety regulations promulgated by OSHA, EPA and other governmental agencies.

XII. EQUIPMENT REQUIRING REPLACEMENT

Within one (1) year of the Contract Notice-To-Proceed (NTP) date, the Contractor shall inform the Contract Administrator (CA) on March 1st each year, in writing, of equipment requiring replacement or upgrade, and shall include their justification for replacement or upgrade, and an approximation of the equipment's remaining life expectancy. Replacement is a 1 for 1 replacement of existing equipment, an upgrade will include redesign due to load increase or a drastic change of the existing equipment. A two (2) year requirement is necessary for funding, design and construction purposes. (The CA has the right to accept or reject the Contractor's request. Prior requests, submitted within previous contracts, and accepted by the CA, do not apply.)

The Contractor shall remain responsible for the fully guaranteed maintenance of the equipment for the equipment's remaining life expectancy from the date of the request, if accepted by the CA.

For example: Equipment A's request for replacement is Jan. 1, 2007 with a remaining life expectancy of four (4) years. Here the Contractor would be responsible to fully guarantee maintenance of the equipment until Dec. 31, 2010. Any repair or replacement parts required during the above period would be the responsibility of the Contractor. If the State has not replaced the equipment by Dec. 31, 2010, the State shall be responsible to pay for the equipment's emergency replacement or repair parts upon the equipment's failure and in accordance with contract terms.

Equipment can be replaced under this maintenance contract using the same terms as Section IX – Allowable Cost for Parts if it is cheaper than bidding out, as determined by the Contract Administrator.

XIII. SECURITY REQUIREMENTS

The Contractor must be aware of the heightened security conditions at all the State facilities covered by this contract. The Contractor is requested to be aware and to report any suspicious activity or obvious breach of security in relation to, or in the course of their work at any of the State facilities to the CA with as much detailed information as possible. The Contractor must keep their work areas closed and secure; before, during and after performing work. Any doors left open and unsecured may be liable for security breaches and be charged at \$100.00 per incident per day per location. The State reserves the right to request that background security checks be provided when requested for each personnel assigned to this contract.

**SPECIFICATIONS FOR WATER TREATMENT SERVICE OF AIR CONDITIONING SYSTEMS
AT VARIOUS STATE BUILDINGS ON OAHU
GROUP I - PART B**

I. GENERAL

1. Bidder may subcontract for the services of a Water Treatment Contractor (WTC), who shall have a minimum of five (5) years water treatment service experience in Hawaii and who shall provide all necessary equipment, chemicals and services required to control corrosion, scale, and biological growth in the following systems:
 - a. cooling tower
 - b. condenser water
 - c. chill water

located at various buildings as listed on **Offer Form “Part B – Water Treatment Service” pages OF-8 Through Of-12.**

Attachment II, “Schedule of Chemical Equipment”, pages SWT-1 is provided for information only and may not include all chemical treatment equipment on-site.

All WTC shall be in accordance with the specifications, special provisions, and terms and conditions herein; using qualified personnel with a minimum of five (5) years of field experience or engineering degree in maintaining a water treatment program and be based on Oahu.

2. **A minimum of 10% of the estimated annual usage of chemicals specified herein must be delivered to the service sites prior to the start date of this contract.** Each package of chemicals delivered shall be labeled with directions for usage per the approved dosage for each chemical. Include the appropriate **MSDS sheets** for all chemicals with the initial delivery.
3. The treatment supplied by the WTC shall be one that has been especially designed and tailor-made for the water being used in each system.
4. The WTC shall warrant that the chemicals used in the water treatment program and offered herein will not: endanger the health or safety of persons coming into contact with the materials, damage personal or real property, have a detrimental effect on the metallic or non-metallic materials in the equipment being treated; as long as the WTC instructions are followed.
5. The chemical containers and equipment shall be located within a leak containment system. **The WTC shall have an absorbent and/or clean-up system/program which must be available at each site and be submitted and approved by the State prior to start date of this contract.**
6. All material and equipment provided by the WTC at each site for the execution of this work **becomes the property of the State** at the termination of the contract. Therefor any costs for the materials and equipment used must be included in the offer price as submitted. The WTC shall submit an updated list of all equipment

and parts included in the WT system to the State annually at the end of the contract period, including name, model no., serial no., etc.

7. The WTC shall provide any and all testing (e.g.- Legionella, etc.) as may be required to safeguard and protect the State should suspect conditions, allegations or complaints be experienced or as requested at no additional cost to the State.

II. MINIMUM REQUIREMENTS OF THE TREATMENT PROGRAM

1. Scale and Corrosion Control

- a. Scale and corrosion shall be inhibited by the controlled use of scale and corrosion prevention materials as herein noted.
 - 1) The use of essentially toxic and staining corrosion inhibitors such as chromate will not be permitted. The chilled water system is closed systems and can use nitrite solutions.
 - 2) Inhibitors such as organic phosphorous type shall be used for steel.
 - 3) Inhibitors such as azole type shall be used for copper.
 - 4) The WTC selected corrosion inhibitors selected shall have been proven effective by at least two years' usage in the State of Hawaii.
 - 5) The WTC selected scale inhibitors selected shall have been proven effective by at least two years' usage in the State of Hawaii.
 - 6) Poly-phosphates are not considered effective corrosion inhibitors and shall not be permitted.
- b. An automatic feed system is generally installed at the service sites for the WTC use; however, the WTC must verify this information and shall furnish and install in whole or part that which is missing from the system as currently installed at the site (also, see III Service Requirements, paragraph 8, page S-22 hereinafter).
 - 1) The system shall be a completely automatic proportional pump feed and the bleed-off shall be in direct proportion to equipment load indicated by the makeup water.(condenser water)
 - 2) Control shall be by means of a solid state conductivity meter and a flow through probe sensor.(condenser water)
 - 3) The controller is to be programmed to bleed-off the system and to regulate a preset (adjustable) solution feed pump.(condenser water)
 - 4) A biocide timer to regulate a preset (adjustable) solution feed pump.(condenser water)
 - 5) Closed system valved bypass Pot feeder.(chilled water) **Note:** Not all sites have Pot feeder, nor is Contractor required to supply it for the contract. WTC shall use their own injection pump to install chemicals when required/requested to maintain residual.
- c. The water treatment must constantly prevent the build-up of adherent mineral deposits on the heat transfer surfaces of the equipment being treated. Periodic circulation of inhibited descaling acids will not be considered as meeting these specifications.

- d. Certified corrosion test coupon rack kit with test coupons to establish corrosion rates in the condenser water system are installed at each service site for the WTC use. WTC shall perform an **ISO 9000** corrosion analysis and test coupon replacement **semi-annually** at the end of June and December. Make adjustments to the water treatment program as required by findings and submit reports to the State for each site within one (1) month of coupon replacements. Corrosion rates shall be less than 2 mils per year for copper and 4 mils per year for steel - both with **no pitting**. Report shall **qualify** the type of corrosion occurring -general, localized, or pitting; and **MUST quantify** (in mils) the maximum localized or pit depth and general corrosion loss rate.

2. Biological Growth Control

- a. Bacteria, algae and slime growths shall be prevented in all water circuits by using suitable biocides. Total colonies shall not exceed 10,000.
- b. Chemicals may be fed into water circuits requiring continuous make-up by automatic proportional feeding devices or by adding directly to the tower sump as required. Chemicals shall be slug fed into the system on a regular basis and not added continuously.
- c. Stabilized bromine oxidizing biocides shall be used, but shall not include metallic salts, such as tin. A sufficient halogen residual shall be maintained to prevent Legionella. Quaternaries may be used, but only with bromine oxidizing biocides.

3. Chemicals

- a. All chemicals shall be supplied in their original factory containers and no dilution of chemicals is allowed. Handling of chemicals shall be by the WTC and shall include specific application information, safety, and quality control information, including **MSDS** sheets.
- b. The chemicals provided must meet OSHA, Environmental Protection Agency, and ISO-9000 requirements for safety to personnel and the environment, and must be approved by the State.
- c. All chemicals supplied shall have been registered and in satisfactory use in Hawaii for at least two years. Bidder may be required to provide evidence of satisfactory performance of the chemicals offered. The State shall be the sole judge of such satisfaction and the State's decision shall be final.
- d. Chemicals, other than those presently being used in the water treatment program, hereinafter referred as "new chemicals", shall be compatible with the existing chemicals, scale and corrosion inhibitor and broad spectrum bacteriostat.
 - 1) Verification by an independent testing laboratory for the compatibility of the new chemicals shall be submitted upon award and **prior to commencement of work**.

- 2) This verification is required for all chemicals not presently being used in the treatment program.
 - 3) Should the new chemicals be determined to be incompatible with the chemicals presently in use, the WTC shall be responsible for flushing the system to remove all chemicals before the new chemicals are introduced into the system. Any damages to the system resulting from the failure of the WTC to satisfactorily flush the system shall be repaired by the WTC at his expense and at no cost to the State.
- e. The State will require the WTC to use the State's existing on-site stock of chemicals before purchasing additional chemicals. **If the existing chemicals are not compatible with the new chemicals, they shall be legally disposed of by the WTC within the first two months of the contract and at no cost to the State. All other on-site aged, unused or stored chemicals must also be legally disposed of by the WTC within the first two months of the contract and at no cost to the State.**

III. **SERVICE REQUIREMENTS**

1. **Upon award of the contract** the representative designated in the bid by the WTC shall **visit the service sites to make an initial detailed chilled, condenser and raw water analysis** to establish the prescribed treatment program.
 - a. The initial service calls shall include establishment of treatment dosages, bleed schedules, and interval to replenish chemicals for automatic feed system.
 - b. The WTC shall submit report on the results of the initial water analysis and the prescribed water treatment program for each site including findings and recommendations. These reports shall be submitted to the State within **three (3) calendar days** following the service call to each site.
 - c. The WTC shall also submit supplemental, monthly, quarterly, annually and semi-annually reports for each site and shall initiate and document any changes required from the initial prescribed water treatment program.
2. The designated representative of the WTC shall make service calls and water analysis at intervals of a maximum of thirty (30) calendar days for condenser water and one hundred eighty (180) calendar days for chilled water, or sooner if required or notified of concern. WTC shall notify the Contract Administrator **prior** to conducting the tests and **upon completion** of the service/testing.
 - a. The representative shall make initial application of each material and shall continuously furnish specific treatment of the water as required.
 - b. He shall also investigate any unusual conditions pertaining to scale deposition as indicated by condenser operating data, corrosion, and algae growths, and implement corrective action, as required.
 - c. The WTC shall submit the results of the water analysis and the prescribed

water treatment including findings and recommendations and service requirements performed in a report. This report shall be submitted to the State within **three (3) calendar days** following the service call to each site.

3. The WTC shall be totally responsible for a continuous water treatment program.
 - a. WTC shall be available on-site during the performance of the cooling tower and condenser tube cleaning services and coordinate the inspection with the Contractor and the State. Only one (1) chiller per site can be down at any time.
 - b. The WTC shall be totally responsible for the WT equipment and shall keep it functioning at its optimum through proper maintenance, repair, or replacement as required including piping and electrical.
4. Condenser Water Systems shall be serviced **monthly** as follows:
 - a. Check chemical pumps for proper operation and/or adjust if needed.
 - b. Check condition of chemical drums and containment system for leaks and repair/replace and refill as required.
 - c. Check operations of automatic chemical controller system, sensor and piping for proper operation. Check for leaks and repair.
 - d. Calibrate chemical feed as required by water analysis from test results. Indicate amount of each chemical used at each site.
 - e. Log water meter readings for makeup and bleed at sites where available. **Remove empty chemical containers and clean area.**
 - f. Certify that system has received monthly service and report all discrepancies, adjustments, repairs or corrections performed.
5. Chilled Water Systems shall be serviced **semi-annually** in March and September as follows:
 - a. Check chemical concentration and add chemicals if needed to keep the residual concentration in 800 to 1000 PPM range. Should recharging be required, it shall be performed **within one week** from discovery or notification along with a **new report to be submitted immediately.**
 - b. Certify that system has received semiannual service and report residual concentration **and the amount of chemical used** at each site.
6. The WTC shall maintain a "service log" at each chiller room for recording the following information for each visit, also include in submitted regular service reports and recheck service reports:
 - a. Name of service representative and date of service.

- b. Items serviced, adjusted, repaired, etc.
 - c. Record set points and recommended ranges including (make-up and bleed water meter readings at locations where available) and quantities of each chemical used and remaining.
 - d. Record and analyze readings of raw and systems water samples to include but not be limited to: **pH, conductivity (micro-mho), silica, alkalinity, calcium hardness, magnesium, chlorides, bio-organism counts, halogen levels (if applicable) and nitrite** residuals.
7. All work done and all material furnished shall be subject to inspection and approval of the Contract Administrator so as to ascertain that the services rendered are in accordance with the requirements and intentions of the specifications, special provisions, and the general conditions.

IV. **PENALTIES**

The Contractor shall not be responsible for repairs/penalties due to flagrant vandalism, fire, storm or related damages that can be attributed to causes beyond his control. However, the Contractor shall be responsible for such repairs/penalties if the damages are caused by the Contractor's negligence or failure to properly maintain and repair the equipment/system as deemed by the State.

1. The WTC shall clean the entire system at no cost to the State within thirty (30) days of discovery of the Contractor's failure to meet minimum and service requirements as deemed by the State.
2. If the corrosion rate exceeds 2 mils per year for copper and/or 4 mils per year for steel, and/or there is pitting, the WTC shall be assessed **damages of \$3,000.00 per chiller in the system**.
3. If the bacterial population in the condenser water exceeds 10,000 colonies or is judged to be out of control by the State, the WTC shall take immediate corrective action to reduce the population below 10,000 colonies or be assessed \$50.00 per incident per site per calendar day.
4. The WTC may be assessed \$50.00 per incident per site for each and every calendar day from the date of non-compliance. If the WTC fails to correct any condition deemed by the State to not meet the minimum and service requirements indicated above, the State reserves the right to require the Contractor to replace the WTC and to not allow the WTC to bid or participate in any future State work.
5. If water meter readings indicate excessive water usage by the condenser water system in the absence of mechanical problems in the system, the cost of the excess water used as calculated by the State will be deducted from the WTC billing to the State.
6. Should a chemical cleaning of the chiller tubes become necessary, the WTC shall

perform same including the re-brushing of the chiller tubes all at no additional cost to the State, and in addition be assessed **\$500.00 per chiller per occurrence**.

7. Should corrosion damage to any part of the system occur due to the use of oxidizing biocides, halogen levels exceeding 0.5ppm, the WTC shall be required to repair or correct the damages, and in addition be assessed **\$500.00 per chiller per occurrence**, or **number 2** above at the States discretion.
8. Should an unsatisfactory condition be discovered or upon notification, the WTC shall correct it immediately and re-check the system within one week and submit a new report. Failure to re-check and submit new report shall cause the WTC to be assessed **\$25.00 per incident** for each and every calendar day from the date of non-compliance until the re-check and report is submitted.

SITES AND SYSTEMS

The sites and systems covered under these specifications are as follows:

<u>Location</u>	<u>Tag</u>	<u>Make/Model</u>	<u>Capacity</u>	<u>Operations</u>
1. Diamond Head Health Center 3627 Kilauea Avenue Honolulu, HI 96816	CH-1	York OT-B1-B1-OF	140 tons	12 Hr. M-F
	CH-2	York OT-B1-B1-OF	140 tons	12 Hr. M-F (1 chiller only during winter)
2. Hale Auhau 425 Queen Street Honolulu, HI 96813	Chillers at Keelikolani			
3. Hawaii State Library 478 S. King Street Honolulu, HI 96813	CH-1	McQuay PEH-046	130 tons	12 Hr. M-F
	CH-2	McQuay PEH-046	130 tons	12 Hr. M-F
4. Kakuihewa (Kapolei SOB) 601 Kamokila Blvd. Kapolei, HI 96707	CH-1	Trane RTHB215FLF	200 tons	12 Hr. M-F
	CH-2	Trane RTHB215FLF	200 tons	12 Hr. M-F
	CH-3	Trane CGAEC504AE	48 tons	Standby(W)
5. Kalanimoku 1151 Punchbowl Street Honolulu, HI 96813	CH-1	Trane CVHE320	225 tons	12 Hr. M-F
	CH-2	Trane CVHE320	225 tons	12 Hr. M-F
	CH-3	Carrier 19XRV	350 tons	12 Hr. M-F One chiller runs off hours to provide cooling 24/7
6. Kamamalu 250 South King Street Honolulu, HI 9813	CH-1	MultiStack MS5082fc	75 tons	12 Hr. M-F
	CH-1	MultiStack MS5082fc	75 tons	12 Hr. M-F
7. Keelikolani 830 Punchbowl Street Honolulu, HI 96813	* CH-1	Trane CVHE032F	250 tons	NIC.
	CH-2	Trane CVHE032F	250 tons	12 Hr. M-F
	CH-3	York YMC2	225 tons	12 Hr. M-F
8. Kekuanaoa 465 South King Street Honolulu, HI 96813	CH-1	Carrier 30HXC096RY	93 tons	12 Hr. M-F
	CH-2	Carrier 30HXC096RY	93 tons	12 Hr. M-F
9. King Kalakaua 335 Merchant Street Honolulu, HI 96813	CH-1	Trane RTHB150	160 tons	12 Hr. M-F
	CH-2	Trane RTHB-150	160 tons	12 Hr. M-F
10. Leiopapa A Kamehameha (SOT) 235 South Beretania Street Honolulu, HI 96813	CH-1	Carrier 30XWB17560	170 tons	12 Hr. M-F
	CH-2	Carrier 30XWB17560	170 tons	12 Hr. M-F
	CH-3	Carrier 30XWB17560	170 tons	12 Hr. M-F
11. Liliuokalani 1390 Miller Street Honolulu, HI 96813	CH-1	Trane RTWA125L	125 tons	12 Hr. M-F
	CH-2	Trane RTWA125L	125 tons	12 Hr. M-F

12. No 1 Capitol District 250 South Hotel Street Honolulu, HI 96813	CH-1	Trane CVHE-32G	260 tons	12 Hr. M-F
	CH-2	Trane CRHR500C-4HAT	95 tons	12 Hr. M-F
	CH-3	Trane CGWQO52FAO	54 tons	Off Hours
13. State Capitol 415 South Beretania Street Honolulu, HI 96813	CH-1	Carrier 19XL5353	380 tons	12 Hr. M-F
	CH-2	Carrier 19XL5353	380 tons	12 Hr. M-F
	* CH-3	Carrier 22XL2121EC60	250 tons	NIC

Note: standby chillers are alternated: Monthly-manually or Weekly by computer.
King Kalakaua building has condenser water that is operated and maintained by the building owner association, including cooling towers and water treatment.

Note: * Not In Contract. One chiller at Keelikolani and at State Capitol are Not In Contract (NIC).

**SPECIFICATIONS FOR CHILLER WASTE OIL DISPOSAL AT VARIOUS STATE BUILDINGS
ON OAHU
GROUP I - PART C**

I. SCOPE

The Contractor may subcontract for the services of an independent agency that specializes in disposing of chiller waste oil. The Waste Oil Contractor (WOC) shall dispose of the waste oil yearly, at the same time (within one week), after all the annual services have been performed by the Contractor on the single or multiple centrifugal/screw chillers located at various State buildings as scheduled in the IFB, shown on SPECIFICATIONS Page S-23, "Sites and Systems" and as indicated herein. The chiller waste oil shall be considered as **hazardous waste** and be properly disposed of accordingly. A manifest report shall be provided for each building site.

II. GENERAL REQUIREMENTS AND QUALIFICATIONS

The WOC shall be registered with and have a United States of America, Environmental Protection Agency (US-EPA) Identification Number, and be licensed in the State of Hawaii. The WOC, and any other entities they involve, shall be familiar with and follow the requirements of US-EPA, US-DOT, State of Hawaii and Local Authorities, as appropriate, regarding the performance of the specified work. In addition to the WOC, all entities involved in the performance of this work shall also be registered with and have a US-EPA Identification Number, and be licensed in the State of Hawaii, if required.

III. RESPONSIBILITIES

1. The State of Hawaii, Department of Accounting and General Services, Central Services Division will supply the Generator's US-EPA ID NO. for each building location to the WOC for their use in preparing the appropriate paperwork, manifests, etc.
2. The Contractor, after having performed the annual services to the chillers including oil change, shall store the used (waste) oil in suitable (no leak), tagged and identified containers within each building chiller room. Identification shall include type of waste and approximate amount to the nearest gallon.
3. The WOC shall visit each building site chiller room to collect all containers identified as chiller waste oil and transport them to a central location for consolidation into US-DOT approved shipping/transportation containers. The WOC shall make all required shipping/transportation arrangements with appropriate paperwork and safely ship/transport the containers to a US-EPA approved hazardous waste disposal site. Also, the WOC shall legally dispose of the existing storage containers taken from each building sites. After the disposal of the waste oil, the WOC shall provide official copies of the US-EPA Uniform Hazardous Waste Manifest to the State.

4. The WOC, and any other involved entities, shall be responsible for appropriately cleaning up any spills which may occur during the entire performance of the disposal work, including shipping/transporting and shall support, protect and save harmless the State in regard to this work.

No payment will be made by the State **without** the required paperwork at the completion of the Disposal work.

**SPECIFICATIONS FOR CHILLER EDDY CURRENT TESTING AT VARIOUS STATE BUILDINGS ON OAHU
GROUP I - PART D**

I. SCOPE

The Contractor may subcontract for the services of an independent agency that specializes in performing eddy current inspection testing of installed heat exchanger tubing. The eddy current testing contractor (ECTC) shall performing eddy current inspection testing (ECT) on single or multiple centrifugal/screw chillers located at various State buildings as scheduled in the IFB, shown on SPECIFICATIONS Page S-23, "Sites and Systems" and as indicated herein. A test report shall be provided for each chiller/site tested.

II. GENERAL REQUIREMENTS AND QUALIFICATIONS

The Contractor shall prepare the chiller machine(s) tubing for ECT by removing insulation and one shell head of each evaporator and condenser section and brushing tubes if necessary. Upon testing completion, the Contractor shall properly and completely re-insulate the removed section of chiller insulation. Provide adequate scaffolding and access for the ECTC.

The ECTC personnel conducting the testing shall be an individual currently certified within the last five years as a Level II or III examiner in ECT by a current National ASNT Certified Level III Examiner and in accordance with the American Society for Non-destructive Testing (ASNT) Recommended Practices SNT-TC-1A, latest edition. The examiner shall be currently full-time employed in the performance of ECT with a minimum of ten years ECT experience at the time of bid. **The ECTC personnel shall have a minimum of 1500 hours documented experience in conducting eddy current examinations of installed chiller tubing including finned, skipfin and prime surface tubing of various alloys such as Cu, CuNi and Admiralty Brass. The required 1500 hours testing shall have been obtained under the direct supervision of an ASNT Certified Level III Examiner, who has over 3000 hours of testing experience. The Examiner's National Examination Level II or III ASNT certificate number(s) shall be submitted with the bid along with the ECTC company's Level III certification and "Written Practice" which specifies the company's requirements as outlined in the aforementioned SNT-TC-1A.** Documented proof of all the above shall be provided if requested.

III. TESTING REQUIREMENTS

A. Skip Fin Tubing Requirements: A multi-frequency technique utilizing (as a minimum) two separate but simultaneous inspection channels shall be used to test the entire length of each tube in the following manner:

1. The specified ASME calibration standard shall also contain a non-finned "land area" section with a support wear defect of from 0.005" to 0.010" depth. A simulated support plate of similar material and thickness of the support plate in the refrigeration machine shall be placed over the wear

area during calibration.

2. Channel 1 - Differential mode in accordance with section V, Article 8, Appendix 1 of the ASME Boiler and Pressure Vessel Code, latest Edition.

3. Channel 2 - Absolute mode capable of:

Detecting tube wear under the support in excess of 10% of land area tube wall thickness with an accuracy of +/- 25% when wear is 20% or greater of land area tube wall thickness.

Detecting bulges or diametrical changes greater than one percent of tube ID with an accuracy of +/- 25% of indication.

Detecting variation in tube thickness greater than 0.002"

- B. Prime Surface Requirements: A multi-frequency technique shall be used to test the entire length of each tube in the following manner:

1. Channel 1 - Differential mode in accordance with section V, Article 8, Appendix 1 of the ASME Boiler and Pressure Vessel Code, latest Edition.
2. Channel 2 - Absolute mode in accordance with section V, Article 8, Appendix 1 of the ASME Boiler and Pressure Vessel Code, latest Edition.
3. Channel 3 - A "mixed" differential mode adjusted to effectively reduce the effect of support plate signals thereby providing the capability to detect and measure defects occurring under or adjacent to the support plates with the accuracy's specified in paragraph 3 above.

IV. REPORTING REQUIREMENTS

- A. Except for bulges, shallow defect indications less than 20% in depth of the tube wall thickness are not required to be specifically reported. However, if numerous shallow defect signals are detected, their presence should be reported as a general comment. During the examination, the State and Contractor shall be notified of any tubes with restrictions which prevent eddy current testing in order for the tube to be cleared for testing. The ECTC shall analyze test data for defects while performing the inspection and before leaving the jobsite shall furnish the State with quantitative summary of the test findings such as number of tubes with minor defects, severe defects, etc. as shown in the following examples:

EXAMPLE

- | | |
|----|--|
| 16 | tubes with ID defects from 20% to 40% in depth of tube wall thickness. |
| 2 | tubes with ID defects 40% or greater in depth of tube wall thickness. |
| 4 | tubes with support wear less than 10% in depth of tube wall thickness. |
| 2 | tubes with bulge greater than 5% of nominal tube ID. |

One end of each tube containing defects which are 40% or more of tube wall thickness in depth shall be marked (painted) to insure positive identification.

Additionally, tubes with bulges in excess of 10% of tube ID or support wear in excess of 20% of tube wall thickness as well as other tubes suspected of possibly failing in service shall be similarly marked.

- B. Test reports shall be provided within two weeks of completion of testing and shall include as a minimum:
1. Diameter and type of inspection probes.
 2. Test equipment used.
 3. Standard(s) design and calibration.
 4. Test data summary (voltage and phase angle readings) of tubes with significant defect indications.
 5. Statistical summary of defect indications (percentage of tubes with support wear, percentage of tubes with ID defects, etc.)
 6. Readily readable photographs or drawings of tubesheets (scaled for not less than 15 tubes per linear inch) showing tube identification system, location of defects and type of defects.
 7. Recommendations and/or comments concerning tubing condition, tube replacement, tube removal for metallurgical evaluation and future frequency of testing.
 8. Quality color borescopic photographs, made perpendicular to the tube wall, of typical or pertinent ID defects or the use of a remote video borescope coupled to a TV monitor that is capable of examining the entire length of each tube in question and record on a color video cassette. These will provide permanent recording of the ID tube defects and will become the property of the State upon completion.
 9. Be reviewed and approved by the ASNT certified Level III individual whose certification number shall be included.