



DEPARTMENT OF THE NAVY  
COMMANDER NAVY REGION SOUTHWEST  
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SAN DIEGO, CA 92132-0058

IN REPLY REFER TO:

COMNAVREGSWINST 4101.1  
N44

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COMNAVREGSW INSTRUCTION 4101.1

Subj: REGIONAL ENERGY MANAGEMENT PROGRAM

- Ref:
- (a) Executive Order 13123, Greening the Government through Efficient Energy Management
  - (b) OPNAVINST 4100.5D, Energy Management
  - (c) <http://www.energy.ca.gov/title24/index.html>, Title 24, Part 6, California Code of Regulations, California's Energy Efficiency Standards
  - (d) <http://www.eren.doe.gov/femp/procurement>, Federal Energy Management Program (FEMP), Product Energy Efficiency Recommendations
  - (e) <http://www.epa.gov/appdstar/estar/products.html>, DOE/EPA Energy Star® Products
  - (f) COMNAVREGSWNOTE 11300.1 of 2 Nov 1999, Energy Management System/Direct Digital Controls (EMS/DDC) Design and Procurement Standardization Policy
  - (g) COMNAVREGSWNOTE 4101 of 26 Sep 2000, Utility Demand Reduction Program for Navy Region Southwest Metro Area
  - (h) COMNAVREGSWINST 4101.3, Energy Efficient Procurement Policy
  - (i) COMNAVREGSWINST 11000.2, Building Monitors
  - (j) Executive Order 13148, Greening the Government through Leadership in Environmental Management
  - (k) [Naval Base Ventura County Energy Showcase web site](#)
  - (l) Executive Order 13149, Greening the Government through Federal Fleet and Transportation Efficiency

- Encl:
- (1) Energy Management Program Responsibilities
  - (2) Energy Management Requirements and Guidelines
  - (3) Energy Design Criteria

1. Purpose. To set energy management policy; provide goals, guidelines, and procedures; establish energy design criteria for Commander, Navy Region Southwest (CNRSW) facilities; and assign action responsibilities per references (a) through (l) in order to establish and maintain a world class regional energy management program for CNRSW.

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2. Cancellation. Existing energy management instructions for CNRSW complexes, in their entirety.

3. Scope. Applies to all CNRSW complexes.

4. Background. Reference (a) sets the following energy and emissions goals for Federal agencies:

a. To reduce greenhouse gas emissions by 30 percent by 2010, relative to 1990 levels.

b. Reduce energy consumption per square foot by 30 percent by 2005 and 35 percent by 2010, relative to 1985.

c. Reduce industrial and laboratory energy use per square foot or other approved unit by 20 percent by 2005 and 25 percent by 2010, relative to 1990.

d. Strive to expand the use of renewable energy.

e. Strive to reduce the use of petroleum.

f. Strive to reduce source uses of energy and;

g. Reduce water consumption.

Reference (b) sets Navy energy policy. Reference (c) provides energy efficiency standards for residential and non-residential buildings in California. Although Federal facilities are exempt, California's Title 24 energy standards are considered appropriate for CNRSW facilities in California and Nevada. Reference (d) provides Federal Energy Management Program (FEMP) product energy efficiency recommendations. Reference (e) provides guidance and tools for purchasing Energy Star® products. Reference (f) sets policy for the design and procurement of energy management systems (EMS) and direct digital controls (DDC) and associated equipment in the San Diego area. Reference (g) is the Utility Demand Reduction Program Plan, applicable to the San Diego area. Reference (h) sets CNRSW policy for the procurement of energy-efficient equipment, environmentally preferable purchasing and sustainable design. Reference (i) establishes requirements for building monitors for CNRSW complexes. Part 6 of reference (j) identifies guidance to promote "sustainable landscape design and management." Reference (k) is the web site for the Navy energy showcase site at Naval Base Ventura County. Reference (l) establishes new goals for Federal fleet and transportation efficiency.

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5. Discussion. Significant cost avoidance and reduction can be achieved through an effective energy management program. In addition, significant environmental benefits such as a reduction of greenhouse gas emissions and other pollutants associated with the production of electricity or the burning of fuels are attainable via such a program. An effective energy management program requires an all-hands effort and an on-going commitment to sound energy management practices, life-cycle cost-effective projects, and efficiency in day-to-day operations. It does not sacrifice quality of life or productivity for artificial gains in energy efficiency. An effective energy management program can actually improve quality of life and productivity by tailoring energy use to actual needs and by freeing up energy dollars for more urgent mission and personnel support requirements.

6. Policy. CNRSW is committed to achieve the energy and emissions reduction goals of reference (a). Specific energy management program requirements and organizational responsibilities are provided by enclosures (1) and (2). Enclosure (3) sets energy design criteria for CNRSW facilities. These requirements are applicable to all CNRSW complexes.

7. Action. All CNRSW complexes, and tenant commands, activities, departments, and other organizations located on board CNRSW bases, shall carry out the energy management policies and practices prescribed by enclosures (1) through (3). They shall use all management, technical, and contractual resources available to achieve the goals set by reference (a). Complexes may exceed the requirements of this instruction as considered necessary and consistent with mission requirements and health, safety and morale concerns. CNRSW Assistant Chief of Staff (ACOS) for Facilities is responsible for the strategic direction of this program and is directed to monitor energy use in CNRSW and report progress towards meeting energy goals.



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ENERGY MANAGEMENT PROGRAM RESPONSIBILITIES

1. General. An effective energy management program must have command support, must be implemented base-wide through the chain of command, and must enlist the support of all base personnel. Energy managers must have authority commensurate with their responsibility and should have the ability to commit the necessary technical, management and financial resources to maximize cost and energy savings. The program should integrate the knowledge, skills and ideas of energy managers, utilities' operators, facilities' technicians, shop mechanics, building operators, and others to achieve the greatest results. The CNRSW energy management program is designed accordingly.

2. Organization and Responsibilities. The regional energy management program is comprised of the following elements:

a. Regional Energy Management Board. This is a strategic-level board, which provides policy direction to the regional energy management program. It shall meet at least annually to review the progress of all complexes toward Navy energy goals, consider changes to energy policies, and provide program direction. The board is comprised of the following members:

- ACOS for Facilities (Chair)
- ACOS for Logistics
- ACOS for Infrastructure Planning
- ACOS for Support Services
- ACOS for Environment & Safety
- Program Manager (PM) for Utilities

b. PM for Utilities. The PM for Utilities (Code N44RU) is responsible for implementing the CNRSW energy management program.

c. Regional Energy Steering Committee (RESC). This group provides oversight and coordination of energy and utilities studies, audits, and projects within the region. The group shall have the following membership:

- PM for Utilities (Chair)
- Director, PWC Utilities Business Support Division
- SOUTHWESTNAVFACENGCOM Energy Business Line Team Leader
- SOUTHWESTNAVFACENGCOM Energy Business Line Project Managers, as assigned
- SOUTHWESTNAVFACENGCOM Energy Business Line Contracting Officer

The RESC is responsible for the following:

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(1) Provide technical support to the regional energy management program.

(2) Plan energy audits, engineering studies, utility system assessments, and other technical studies.

(3) Initiate competitive utility procurements, third party utility projects, energy savings performance contracts (ESPC), and similar initiatives to reduce the Region's energy costs.

(4) Initiate and coordinate demand-side management (DSM) programs, including energy audits, engineering studies, rate analyses, and other initiatives.

(5) Develop and manage Energy Conservation Investment Program (ECIP).

d. Regional Energy Program Office (REPO). The REPO provides energy management and technical support to the regional energy management program. The REPO is comprised of experienced Navy energy managers and support personnel; staffing varies with requirements. The REPO reports to the PM for Utilities. REPO responsibilities include the following:

(1) Serve as the primary point of contact for energy management matters on a daily basis.

(2) Assist San Diego area PWO's in conducting Energy Management Team meetings and training workshops. Maintain current team rosters, make logistic arrangements for meetings, prepare training materials, develop agendas, arrange for speakers, and otherwise help conduct professional, value-added meetings.

(3) Review ECIP, DSM, ESPC, and other energy-related facilities projects and provide applicable engineering review comments in the furtherance of energy efficiency.

(4) Organize and coordinate Energy Awareness Week committees in the San Diego area and support Region complexes in implementing their programs. Help plan educational events, recognition ceremonies, publicity, and other events to promote awareness.

(5) Help execute utility demand reduction (UDR) alerts in the San Diego area per reference (g). Make UDR notifications, shed Regional loads controlled by EMS/DDC, monitor effectiveness of demand reduction efforts and make follow-up notifications as

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necessary. Evaluate the effectiveness of UDR alerts and implement measures to improve the effectiveness of future alerts.

(6) Support the Regional Energy Steering Group. Participate in meetings, report on Region programs and projects, work to plan upcoming projects and studies, identify emerging program needs, and help coordinate program activities with key support agencies.

(7) Host an annual regional energy management conference; support the meetings of the Regional Energy Management Board; and coordinate energy workshops as needed.

(8) Initiate renewable energy, alternate fuel vehicle, and other emerging technology demonstration projects, frequently partnering and coordinating with the Navy Environmental Leadership Program (NELP).

(9) Support the complexes' efforts, such as energy audits, surveys and studies, metering programs, lighting optimization programs, and other actions.

(10) Review energy reports for all complexes, including the quarterly Energy Audit Report. Disseminate pertinent information throughout the Region.

(11) Provide nomination criteria and requirements to all complexes for Federal Energy Management Program (FEMP), SECNAV and other energy awards. Prepare and submit award nominations to Code N44R.

(12) Develop and maintain an effective regional energy awards program to recognize commands or individuals who excel in conservation efforts.

(13) Represent Navy Region Southwest at workshops, seminars, and meetings on energy and utilities management.

(14) Recommend changes to energy and utilities management instructions as necessary.

e. Public Works Officers (PWO's). The PWO's direct the energy management programs at each complex within the region. PWO's manage their complexes' utility budgets, and have the authority and resources necessary to carry out an effective energy management program. Their responsibilities include the following:

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(1) Establish and maintain an effective Energy Management Team to implement regional energy policies.

(2) Ensure team members are aware of the Region's energy goals, the specific energy issues facing their complexes and their energy management responsibilities. Encourage team members to use their knowledge of building operations and mission requirements to suggest ways to reduce energy costs.

(3) Provide executive briefings to the Commanding Officer, department heads, and to tenant activities. Keep the command apprised of energy issues and progress toward energy and cost reduction goals. Make energy management an integral part of daily operations.

(4) Carry out walk-through's of key facilities to ensure that good energy management procedures are in place, building systems and controls are working properly and facility personnel understand what measures they are to take in case of UDR alerts. Also, identify any fast-payback energy projects that might be implemented at each facility.

(5) Ensure maintenance personnel have the resources to properly maintain, repair, and monitor building systems. Set up a system for energy-related problems to be promptly reported and resolved. Encourage maintenance personnel to use their expert knowledge of building systems to submit suggestions to reduce energy costs.

(6) Review energy deficiency reports. Ensure fast-payback opportunities are implemented immediately. Submit energy opportunities beyond local funding limitations to higher authority for implementation.

(7) Establish and maintain an active energy suggestion program. Refer adopted suggestions to REPO for wider implementation.

(8) Ensure designs for facilities projects are reviewed by the PWO and energy manager for energy efficiency. Ensure that equipment purchases comply with this Instruction and reference (h).

(9) Establish and maintain an energy awards program for the complex.

(10) Ensure that utility operations, building operations and maintenance programs are integrated to achieve the most life-cycle cost-effective operation.

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f. Complex Energy Managers. Each complex shall have an energy manager, whether as a primary or collateral duty. The energy manager may be a military or civilian position, but in the interest of program continuity a civilian position is preferable. The energy manager reports to the PWO. Energy managers shall:

(1) Serve as the PWO's program manager for energy management. Provide the technical and staff support needed for the PWO to carry out the above energy management responsibilities.

(2) Assist the PWO in conducting Energy Management Team meetings and training workshops.

(3) Identify the complex's key facilities in terms of energy use and conduct energy walk-through's as described above.

(4) Review utilities production reports and billings, identify apparent anomalies, and take appropriate measures to correct anomalies and reduce energy costs.

(5) Review energy-related facilities projects and provide energy review comments.

(6) Organize and coordinate Energy Awareness Week committees. Help plan educational events, recognition ceremonies, publicity and other events to promote awareness.

(7) As applicable, execute UDR alerts for the complex.

(8) Initiate renewable energy, alternate fuel vehicle, fuel cell, and other emerging technology demonstration projects, as feasible and cost-effective.

(9) Review ECIP, DSM, and ESPC projects for the complex.

(10) Coordinate energy audits, surveys and studies, and other energy management actions.

(11) Review the quarterly Energy Audit Report and other energy reports provided by others. Disseminate pertinent information.

(12) Prepare FEMP, SECNAV, and other energy award nominations for submittal.

(13) Represent the complex at workshops, seminars, and meetings on energy and utilities management.

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(14) Recommend changes to complex energy and utilities management instructions, as necessary, for PWO and command approval.

g. Energy Management Teams. Each complex shall have an Energy Management Team (EMT), headed by the PWO and supported by the energy manager. The team shall implement regional energy policies throughout the complex. The EMT shall be comprised of the energy manager, monitors, facility managers, department representatives, Maintenance shops representatives, and Utilities personnel, as appropriate. EMT members shall:

- (1) Become familiar with applicable energy directives.
- (2) Attend all EMT meetings and workshops, as required.
- (3) As tasked by the PWO, walk through their facilities with the energy manager and shops personnel to ensure building systems are working properly and that building operations are energy efficient.
- (4) For members not tasked to do a walk-through, audit facilities independently for the same items as above. Request assistance as required. Report any apparent building deficiencies to the energy manager.
- (5) Provide energy conservation briefings to personnel in their organization or building.
- (6) Report water, steam, natural gas, and compressed air leaks to the Complex's Work Reception Desk.
- (7) Inform Building Monitors and other key personnel of the provisions of the Utility Demand Reduction (UDR) Program. Carry out demand reduction measures in assigned spaces when UDR alerts are called.
- (8) Schedule and submit to the PWO a listing of events planned for Energy Awareness Week in order to coordinate them with other events. Submit listing no later than three weeks prior to start of Energy Awareness Week.
- (9) Assist PWO with Regional Energy Awareness Week activities.
- (10) Report to the Energy Management Team any energy discrepancies and violations noted, even though outside own area of responsibility.

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(11) Initiate corrective action of energy discrepancies in area of responsibility.

h. Building Monitors. Each Region building is assigned a collateral duty building monitor per reference (i). The monitor's duties include energy management. Monitors are members of the Energy Management Team.



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ENERGY MANAGEMENT REQUIREMENTS AND GUIDELINES

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1. General Energy Management Requirements. The following general requirements and guidelines will be uniformly implemented and enforced:

a. The energy-efficient operation of buildings, which costs little, can save as much energy as expensive energy projects. Accordingly, CNRSW personnel shall carry out the following basic energy management measures to minimize energy and water costs:

(1) San Diego complexes shall participate in the Utility Demand Reduction (UDR) Program when electrical demand reduction or gas curtailment events are called; reference (g) refers.

(2) Secure lighting, air conditioning, office equipment and other equipment to the greatest degree practical after working hours, on holidays, and on weekends. Do not operate central air conditioning systems and large blocks of lights for the sake of the watch section or personnel working after hours. If the complex implements shortened work weeks, ensure buildings are secured as fully as possible at the end of the last workday, to maximize energy cost savings.

(3) Turn off all lights in individual offices and spaces whenever the occupant leaves the area for any period longer than two minutes. Turn off exhaust fans and lights in unoccupied restrooms. Secure machinery and equipment when not in use.

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(4) Turn off lights in classrooms, conference rooms and other common use areas whenever unoccupied.

(5) Encourage others to take the initiative to turn off lights and equipment when not needed.

(6) Ensure outside lights are never on during the day. Report problems to the Complex's Work Reception Desk.

(7) Report broken or inaccurate lighting, heating and air conditioning controls to the Work Reception Desk as potential energy problems. Do not act indifferently towards malfunctioning heating, air conditioning and lighting controls.

(8) Secure interior lights whenever natural lighting provides adequate illumination.

(9) Turn off all or part of the overhead industrial lighting in hangars, warehouses, shops, etc., as operations and lighting conditions permit. These lights are rarely all required during the day. Use task lighting for specific lighting requirements on the work floor.

(10) Secure exterior doors and windows when heating or cooling systems are in operation.

(11) Report all leaks, including steam, natural gas, water, and compressed air to the Complex's Work Reception desk. Running toilets, broken faucets and similar minor problems cost hundreds of dollars a month and often these problems go unreported.

(12) Turn off the engine in government vehicles while waiting for personnel or material to be loaded or unloaded.

(13) Become familiar with and practice driving habits designed to conserve fuel and reduce maintenance costs.

(14) Consolidate trips involving government vehicles. Rearrange schedules to reduce trips.

b. Activities shall provide training to their military and civilian personnel on the above general requirements and shall ensure compliance within their assigned spaces.

c. Activities shall further comply with the specific energy management requirements on the following pages.

## 2. Energy Awareness

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a. Activities shall establish and sustain an active energy awareness program. This program shall include, at a minimum, the following elements:

(1) Command Involvement. Complex Commanding Officers must be aware of and be personally involved in the energy management program. They shall take a leadership role in the program and shall integrate energy efficiency into all aspects of base operations. The Energy Management Team shall provide energy briefings and program information to the Commanding Officer, department heads and other key personnel on a frequent basis.

(2) Training. Complexes shall maintain an active Energy Management Team, including an effective network of building monitors. The team shall meet at least quarterly for training, sharing ideas, and receiving feedback on progress toward meeting its energy goals. Monitors and other key members of the team shall be trained in the most effective ways to manage energy in their facilities, key things to check in building systems and new programs and ideas.

(3) Awareness Activities. Complexes shall conduct energy awareness activities during the annual Energy Awareness Week and throughout the year. Such activities shall include an active energy suggestion and awards program, articles in base publications, announcements on closed circuit TV systems, periodic e-mails and notices on subjects of concern, feedback to the command on energy goals and progress, and similar activities.

(4) Awards. Complexes will participate in the CNRSW Energy Leadership Award program to recognize commands, groups and individuals for outstanding achievements in energy and water conservation. Complexes shall conduct such other recognition programs as may be appropriate. Energy Leadership Awards shall be made at the complex and Region levels, with complex awardees competing for the Region awards. The CNRSW Utilities Program Manager will notify complexes of award submittal requirements and procedures 90 days before submittals are due.

### 3. Lighting

a. CNRSW facilities shall be equipped with the most efficient lighting systems practical, and shall have the proper controls to enable building occupants to operate buildings as efficiently as possible. Accordingly, the following operation and maintenance (O&M) requirements are set:

(1) Incandescent light bulbs are prohibited in CNRSW facilities except where there is no alternative product available. Incandescent light bulbs shall be replaced by compact

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fluorescent lamps in all lighting fixtures, table and floor lamps, floodlights, fire alarm boxes, and other fixtures.

(2) Decorative lighting is prohibited in CNRSW facilities except as specifically authorized by the PWO. Decorative lighting includes exterior floodlights, down lights, up lights, and other architectural lighting. Authorized decorative lighting shall be turned off at the seven (7) CNRSW bases located in California during California Stage 2 and Stage 3 emergencies.

(3) Supplementary task lighting shall be used to provide more light where it is needed, rather than adding more general lighting. Task lighting shall be compact fluorescent type or of equal efficiency.

(4) Natural light shall be used whenever possible, such as by opening hangar doors, blinds, and drapes, and removing paint from windows and skylights.

(5) When painting office areas, non-glossy, light, reflective colors should be used to improve illumination of area. (Glossy paint can cause glare.)

(6) Hangar bay decks should be painted white to provide reflected light under and around aircraft. Specialized glossy paint is available for this application.

(7) Wherever practicable, partitions should be removed to create open spaces, which will permit freer movement of air and reduction in lighting requirements.

(8) Lamps and light fixtures should be cleaned annually.

(9) T12 type fluorescent light fixtures in CNRSW facilities shall be upgraded to T8 or T5 type, with electronic ballasts, as soon as possible. Lamp replacements for T8 systems shall only be T8 products, as re-installing T12 tubes in the upgraded systems will shorten the life of ballasts and lamps.

(10) Lamps should be relamped in groups (by room, area or building) and records should be kept of what was relamped and when.

(11) Four lamp fluorescent fixtures shall be delamped to two tubes and one ballast disconnected or removed. When unique situations require greater light intensity, such as 3 or 4 lamp fixtures, separate switching shall control the inner and outer lamps.

(12) Janitorial work shall be done during regular working hours, to eliminate excessive lighting of facilities at night. Where cleaning crews must work at night, they shall be instructed to light only the immediate area in which they are working, turning lights off as they leave.

(13) Soda and juice vending machines shall be delamped except where light is provided by light-emitting diode (L.E.D.) lamps. Soda and juice vending machines with lighting and compressor cycling controls may be lighted.

#### 4. Office Equipment

a. All new and replacement office equipment, whether owned or leased, shall comply with EPA's Energy Star® requirements. Reference (e) is a good source of Energy Star® information. New leased and purchased office equipment shall have power saving features and those features shall be specified to be enabled at delivery.

b. The following specific energy management requirements are set for CNRSW computers:

(1) The "sleep mode" shifts office equipment into a low-energy mode when not in use for a period of time, reducing energy use by up to 90 percent. Printers, copiers and other equipment should have sleep mode capability, but it is sometimes not enabled. Accordingly, check the manuals on your office equipment and if available, ensure the sleep mode is enabled and is set to activate after ten minutes of inactivity. The Dell computers in common use in the region are set by default to put the monitor in suspend mode after 20 minutes and off after 60 minutes. If this does not occur on your computer, call your help desk for assistance. If you have stand alone computers using the Windows 98 operating system, go to control panel and look for the power management icon and enable the sleep mode.

(2) Your personal work station may represent 400 to 600 watts of power and is a significant load. Shut down your PC, monitor, dedicated printer, and ancillary equipment at the end of the workday by selecting start, shut down, and shut down your computer.

(3) Turn off common copiers and printers at the close of business unless there is a bona fide, operational necessity to keep them on.

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(4) Where possible, turn off the power to the small transformers attached to office equipment. These continue to use 1 to 5 watts of power even when the equipment is turned off. Multiplied by thousands of units, these make up a significant "ghost load."

(5) Leave PC speakers, scanners and other ancillary equipment off except when actually needed.

(6) Fax machines are authorized to be left on 24 hours a day, but users are requested to determine whether this is cost-effective for their office. If leaving a fax machine on is not mission essential and adds little value, it should be turned off.

(7) Office equipment shall be secured to the greatest degree possible over weekends, holidays, leave periods and other periods when they will not be needed.

## 5. Motors, Appliances and General Electrical

a. All new and replacement appliances and electrical equipment shall comply with current Energy Star® standards; reference (e) refers. Non-Energy Star® refrigerators and other appliances drawn from the Defense Reutilization and Marketing Office, brought from home or otherwise obtained are strictly prohibited in CNRSW facilities.

b. V-belts on motors shall be notched belts. Ganged web belts should replace individual multiple belts.

c. Motor belt tension and alignment shall be checked at installation and periodically thereafter. Alignment between motor shaft, coupling and the driven shaft of pumps shall also be checked. Assure proper lubrication of motor and/or shaft bearings.

d. When testing standby generating equipment, the electrical load shall be transferred to the emergency circuit where practical.

## 6. Water

a. Complexes shall develop local water shortage contingency plans in support of their water supply district plans.

b. The following general water conservation measures are prescribed:

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(1) Complexes will implement procedures to regularly inspect toilets, faucets, hose bibs, etc., for leaks and to arrange prompt repairs. A slow drip can waste 50 gallons or more a day, and a 1/8-inch stream can waste 2,800 gallons per day.

(2) All hoses shall be equipped with automatic shutoff nozzles.

(3) Fresh water shall not be used for hosing down streets, piers, parking lots, or buildings unless required for safety or health reasons.

(4) Complexes shall strive to meter 100 percent of water use. Water use records shall be reviewed at least monthly to detect any anomalies in water use. Apparent anomalies shall be field checked and any problems corrected. Anomalies are typically caused by unreported leaks, running toilets and over-watering of landscaping.

(5) Personnel shall report any apparent water leaks, broken sprinkler heads, wasteful watering practices and other wastes to the Complex Work Reception Desk.

(6) Contractors shall be metered for water use and shall be monitored for water waste. Such wastes shall be reported to the responsible Contracting Officer. This requirement may be waived for contracts involving only nominal use of water.

(7) If contractors are obtaining water from a fire hydrant, a hydrant meter shall be installed in order to track consumption.

(8) Complexes shall publicize the water conservation program in base newspapers, family housing newsletters, cable TV, and other media.

(9) Personnel should wash full loads in washing machines and dishwashers.

c. The following operations and maintenance water conservation measures are prescribed:

(1) Adjust building water pressure regulators so as not to exceed 80 psig.

(2) Conduct periodic leak detection surveys of the water distribution system and repair all leaks. Undetected leaks can be 40 percent or more of total base water use.

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(3) Maintain water systems in accordance with NAVFAC MO-210, Maintenance and Operation of Water Supply, Treatment, and Distribution Systems. Ensure supply pressures are properly adjusted to the minimum pressures consistent with fire fighting and operational requirements.

(4) Maintain cathodic protection systems in accordance with NAVFAC MO-307, Cathodic Protection Systems Maintenance.

(5) Ensure the greatest practical return of condensate to the steam plant, to conserve water, energy and chemicals.

(6) Retrofit toilets, urinals and flushometers to minimize water consumption.

(7) Where reclaimed water is available, evaluate the technical and economic feasibility of using it for irrigation, cooling towers and other industrial purposes.

(8) Eliminate all single pass cooling systems; convert to recirculating systems or use reclaimed water for this purpose.

(9) Maintain proper cooling tower water treatment programs and provide automatic bleed controls so as to operate cooling towers at 5-8 cycles of concentration before blowdown is required.

(10) Ensure cooling tower bleed valves work properly. One stuck valve can waste millions of gallons of water without being detected.

(11) When demolishing buildings, cut and plug abandoned water lines where they join the active system rather than just closing valves.

(12) Water softeners shall not be used, except in utility systems or for critical applications, because they waste water and introduce salts into the sewage system, reducing potential for production of reclaimed water.

(13) When purchasing new or replacement washing machines, specify energy and water efficient horizontal axis (front loading) type.

(14) Wash government vehicles in recirculating washracks. Manual washing is limited to no more than once every two weeks unless further restricted by reference (g). These limitations may be waived for certain vehicles where health, safety and

welfare are a concern, such as refuse trucks and vehicles transporting food and perishables.

(15) On-base washing of privately owned vehicles is authorized only at designated car wash stations.

(16) Manual washing, when allowed, shall be done with a hand held bucket or hose equipped with an automatic, positive shutoff nozzle for quick rinses.

(17) Aircraft washing shall be accomplished using low flow, high pressure washers, if available. Where not available, hoses shall use automatic shut off nozzles. Nozzles and hoses shall be replaced when damaged or leaking.

e. The following landscape irrigation water conservation measures are prescribed in addition to the design standards in enclosure (3):

(1) Incorporate water conservation practices into grounds maintenance contracts.

(2) Irrigation pressure regulators shall be adjusted not to exceed 80 psig.

(3) Leaking irrigation piping and sprinkler heads shall be secured until repairs are made.

(4) Sprinkler heads shall be properly oriented to eliminate overspray onto sidewalks, parking lots, streets, etc.

(5) Do not overwater. Use the minimum amount required to maintain green areas and shrubbery and eliminate run off. For large landscaped areas, such as golf courses, request a turf audit from the local water supplier or the U.S. Soil Conservation Service. To arrange for an audit in San Diego County, contact CNRSW Code N4461 at (619) 556-8569 or -6855. Bases outside the San Diego area should contact their local water supplier for this service.

(6) Evaluate the use of reclaimed water to irrigate large landscaped areas, such as golf courses.

(7) Install automatic timers and moisture sensors on sprinkler systems where life-cycle cost-effective. Uncontrolled manual watering is a likely cause of water waste.

(8) Assure sprinkler systems are not operated during or immediately after rain.

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(9) Water green areas and shrubbery between 2100 and 0900 to minimize evaporation.

(10) Hand watering shall be done with an automatic hose nozzle and completed prior to 0900.

(11) Consider drip irrigation for shrubbery instead of sprinklers.

(12) Use native or indigenous species of plants, decorative stone and xeriscaping to minimize landscaping water use.

## 7. Water Heating

a. Hot water pipes shall be insulated, especially where recirculating pumps are in use. Install an insulating blanket on older hot water heaters.

b. Replacement water heaters shall be insulated to an R-15 level or greater and incorporate low NOx burners.

c. Install solar water heating systems when feasible and cost-effective.

d. Replace electric water heaters with gas, steam, or propane heaters when appropriate and cost-effective. Existing steam heat exchangers should be replaced by natural gas water heaters in facilities where steam would normally be turned off to the building during non-heating season.

e. Consider heating or preheating water by recovering heat wasted from other sources such as air conditioners, compressors and large refrigeration units. This also lets them operate more efficiently.

f. If water must be heated electrically, install a timer in the circuit to shut down tank heaters when not required.

g. Set hot water heater temperatures no higher than 110°F, unless otherwise required for sanitation purposes.

h. Consider small under-counter water heaters or instantaneous tankless water heaters to minimize or eliminate storage losses where heated water requirements are low. Verify electrical circuit capacity prior to installing instantaneous tankless water heaters.

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i. In buildings where a hot water circulation pump is used, install a timer to deactivate pump during periods of no use.

j. New or replacement water heaters shall meet or exceed current Energy Star® energy efficiency requirements. Consider heat pump water heaters as an alternative to electric units, particularly in locations where they can help remove heat from an area, such as an interior utility room.

## 8. Space Heating

a. Electric space heating is prohibited in CNRSW facilities except as authorized by the PWO. Where authorized, these heaters must be inspected and approved by the Federal Fire Department. Trailers used in mild climates that have heat pumps and auxiliary heat strips should have the heat strips removed.

b. Space heating is authorized only during working hours and during the heating season. Set thermostats to achieve a temperature no higher than 70 degrees Fahrenheit in spaces authorized heating and 55 degrees Fahrenheit or less at night during non-working periods. Install automatic set-back thermostats except where controls are connected to EMS/DDC systems. Warehouses and similar buildings will be maintained at a temperature no higher than 55 degrees Fahrenheit during the heating season. Exceptions will only be made for medical reasons or for operation of equipment requiring higher temperatures. Authorization will be given by the PWO on a case-by-case basis.

c. Insulate pipes or ducts supplying heat. Repair or replace damaged or missing insulation as required.

d. Check control valves for leaks.

e. Establish a program to check steam traps for proper operation, at least once a year. Defective traps shall be replaced or repaired as necessary.

f. Replace air filters on central air systems quarterly during heating season.

g. Install locking devices on room thermostats to prevent tampering.

h. Exterior steam distribution systems and steam systems in buildings shall be maintained to minimize losses. All steam leaks shall be repaired and bare steam piping, including valves

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shall be insulated. Ensure condensate pumps are working properly. Report steam leaks to the Work Reception Desk. Monitor steam heat exchangers to ensure against leakage that will contaminate condensate, especially in return systems that recycle condensate to boiler makeup.

i. New or replacement space heaters, boilers and furnaces shall meet or exceed the most current Energy Star® energy efficiency requirements.

## 9. Cooling and Ventilating

a. Central air conditioning systems in administrative buildings shall be operated during working hours only and shall be set no lower than 78°F. Air conditioning systems supporting computer and other critical equipment, e.g., simulators, shall be set at a temperature in the highest third of the temperature range prescribed by the equipment manufacturer.

b. Natural cooling and ventilating (i.e., operable windows, vents) is the preferred method where conditioned air is not a requirement.

c. Window air conditioners are prohibited except for specifically authorized purposes, such as temperature and humidity control for critical equipment (personal computers are not considered critical equipment), where there is no other cost-effective way to provide the necessary cooling. Such exceptions shall be authorized in writing by the PWO and shall be posted in the space. Building monitors shall validate any window air conditioner exemptions annually. Unauthorized air conditioning units shall be removed.

d. During unoccupied hours, cooling systems shall be secured, except if required for special temperature or humidity requirements.

e. Periodically check building use to confirm continued need for air conditioning equipment.

f. Install automatic door closers on all doors leading to the exterior of an air-conditioned space. Doors and windows are not to be propped open in conditioned spaces.

g. Provide blinds, shades, solar shields, tinted glass, heat reflection glass, or plastic film on windows and glass doors

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where solar heat gain is not desired. Replace louvered windows with double glazed windows in air-conditioned spaces.

h. Where economizers are installed, check them periodically to ensure they are working, particularly in a salt air environment.

i. Repair leaking valves to prevent the loss of chilled water.

j. Ensure chilled water lines and air conditioner ducts are insulated.

k. Replace filters on a quarterly or other optimum schedule and bags annually to allow free air circulation, prevent blower failure, and optimize system efficiency.

l. Inspect ductwork annually for dirt, moisture and/or mold growth. Clean as necessary to maintain satisfactory indoor air quality (IAQ).

m. If a doorway must remain open between a conditioned and unconditioned space, such as for forklift operation, plastic strip curtains are required in the doorway.

n. Reduce size of ventilator motors and/or change sheaves to reduce the number of air changes per hour (ACH) to no more than is required by the most current American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standards.

o. Ensure proper preventive maintenance and timely corrective maintenance to enhance the efficient operation of HVAC systems.

p. Annually inspect outside air dampers to ensure proper operation, i.e., not rusted in one position, no leakage when fully closed, etc.

q. Use light colored roof coating in warehouses and air conditioned facilities to reflect sunlight and heat, when cost-effective.

r. New or replacement air conditioners shall meet or exceed the most current appliance energy efficiency requirements as per references (d) and (e).

## 10. Refrigeration

a. Maintain temperatures per NAVMEDINST P-5010-1, where applicable.

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b. Defrost manual refrigerators quarterly to avoid ice build-up, which retards the unit's efficiency. Wipe dust build-up off of coils also.

c. Replace worn and/or improper sized door seals. If needed, tighten door latches and realign doors for a better fit.

d. Install thermo-strip door curtains in all walk-in freezers and refrigerators where doors must be open for extended periods.

e. Replace light switches with 15-minute delay timers on all walk-in refrigerators where cost-effective.

f. Install door buzzer with door switch on all walk-in refrigerators and freezers as reminder for all personnel to close doors.

g. New and replacement refrigerators and freezers shall meet or exceed the most current appliance energy efficiency requirements as identified in the California Title 24 standards.

h. Procurement of new and replacement refrigerators and water coolers shall specify R-134a refrigerant.

#### 11. Building Envelope

a. Facilities having insufficient or no insulation shall be upgraded when cost-effective.

b. Light colored roofing and walls are recommended to minimize solar heat gain.

c. Envelope problems which prevent the building from being operated efficiently, e.g., a door to an air conditioned space which does not close properly, shall be reported and corrected immediately.

d. The integrity of air conditioning and heating boundaries shall be maintained as tight as possible. Doors to conditioned spaces will never be kept open for convenience or to indicate the space is "open for business".

12. Alternate Fuel Vehicles. CNRSW activities will comply with the requirements of reference (1). Specifically:

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a. CNRSW activities shall fulfill the acquisition requirements for Alternative Fuel Vehicles (AFVs) established by Section 303 of the Energy Policy Act of 1992. (75% AFVs by 1999)

b. Activities shall reduce vehicle fleets' annual petroleum consumption by at least 20 percent by the end of FY 2005 compared with FY 1999 petroleum consumption levels by substituting cars, including hybrids, for light trucks; decreasing vehicle miles traveled; and decreasing fleet size.

c. Activities shall use alternative fuels to meet a majority of the fuel requirements of those motor vehicles by the end on FY 2005.

d. Activities shall increase the average EPA fuel economy rating for passenger cars and light trucks acquired by at least 1 mile per gallon (mpg) by the end of FY 2002 and at least 3 mpg by the end of FY 2005 compared to FY 1999.

For information on AFV programs and available rebate programs, contact the CNRSW Utilities Program Manager.

### 13. Other Procedures and Guidelines

a. Energy-related work requests shall be marked "ENERGY EFFICIENCY PROJECT" for purpose of expediting and shall be given a priority based on estimated payback.

b. Complexes shall sustain an active energy suggestion program as part of existing beneficial suggestion programs. They shall solicit energy suggestions from the shops, from building operators and tenants and from the general activity population. They shall evaluate energy-related suggestions as rapidly as possible, e.g., within five working days, and make cash payments promptly for approved suggestions. Approved suggestions shall be implemented wherever applicable and shall be forwarded to the Region for possible implementation at other activities. If suggestions are implemented beyond the original scope of the suggestion, additional cash payments shall be made to the suggestor. Awards shall be highly publicized to encourage further ideas.

c. Security Departments will ensure the minimum number of interior and exterior security lights are energized for safety and security in the areas patrolled by Security. Inoperative lights will be reported to the Complex Work Reception Desk. Not all exterior lights are intended to be operated routinely at night. For example, pier-side lights marked "Loading Lights" should be used only during loading or offloading operations.

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d. Security Departments will report excessive nighttime lighting to the PWO.

e. All Region-Tenant agreements shall require the tenant to comply with current energy management directives.

f. Complexes shall audit facilities and utility systems at least every five years. Audits may be performed by the serving utility companies, by Navy energy specialists or by contractors. Within the Region, audits will be coordinated by the Regional Energy Steering Group.

g. Within six months of receipt of this instruction, complexes shall conduct walk-through's of significant facilities by Energy Management Team personnel, facility managers, energy monitors and shop personnel, as appropriate. The purpose of these walk-through's shall be to ensure that building systems and controls are operating properly and that buildings are being operated in an energy efficient manner. The walk-through's will identify measures to be taken for electrical demand reduction, gas curtailment and water contingency events. Finally, the walk-through's will identify potential energy conservation measures that can be taken within the activity's resources.

h. Complexes shall add a checklist of energy conservation items to Annual Inspection Surveys (AIS). AIS inspectors will look for energy-related deficiencies in building systems and controls, lighting, insulation and other areas in addition to the building itself. Energy deficiencies noted will be reported directly to the PWO.

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ENERGY DESIGN CRITERIA

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1. General Energy Design Criteria. Electricity and natural gas prices and supply shortfalls are matters of great concern to CNRSW, while water conservation continues to be important in our region. In the face of the severe instability in the California electricity marketplace and the very real threat of disruptions to electricity and gas services, it is vital that CNRSW facilities achieve the greatest practical energy efficiency. Further, major renovations to CNRSW facilities shall include upgrades to these same standards, minor and specific maintenance projects shall incorporate energy efficient materials and equipment, and all equipment purchases and replacements shall comply with the energy standards specified herein. The following general design criteria will be uniformly implemented and enforced for CNRSW facilities projects:

a. CNRSW new construction and major renovation projects shall meet the more rigorous of California Title 24 Non-Residential Energy Standards plus a minimum of 15 percent, or current Navy energy design standards.

b. Form DD 1391's for Military Construction projects and special projects shall specify on the form that the facility must meet the more rigorous of California Title 24 Non-Residential Energy Standards plus 15 percent, or current Navy energy design standards.

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c. New CNRSW facilities construction and major renovation projects shall exceed California Title 24 standards by at least 15 percent. Typically, the incremental cost of achieving this higher standard is low.

d. CNRSW complexes shall take full advantage of the California "Savings by Design" Program, where available through their utility service provider. This program provides design support services and significant incentive payments to the Navy and to the design team if the building exceeds California Title 24 standards by set amounts.

e. All facilities projects shall be designed to achieve the lowest life cycle cost, including utilities operating costs.

f. Equipment procurements shall comply with CNRSW energy efficient procurement policy, reference (h). New equipment shall either be in the top 25 percent of the FEMP product energy efficiency recommendations, reference (d), or shall be designated Energy Star® products as listed in reference (e).

g. Facilities projects shall be reviewed to ensure energy efficiency. Activities responsible for design of facilities shall contact the PWO, prior to the contractual award of design services, to establish the type of review, i.e., "over the shoulder" or informal, required for the type of project being implemented. Over the shoulder reviews are encouraged to facilitate the design process. If formal reviews are required, then the activity responsible for design shall coordinate with the PWO to determine the number of review sets required. This number shall be incorporated into the contract prior to award.

h. In addition to the above general design criteria, the following specific criteria are set for CNRSW facilities and equipment projects. These criteria are not all-inclusive and are intended to supplement California Title 24 and Navy energy efficiency standards. These criteria shall be incorporated into project designs and equipment procurements except where demonstrated to be life cycle cost effective.

i. New CNRSW facilities construction and major renovation projects requiring thermal energy and located at sites hosting Qualified Facility cogeneration plants, shall consider use of available steam as the lowest incremental cost energy resource.

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## 2. Lighting Criteria

a. Lighting systems in new facilities shall comply with the California Title 24 energy efficiency standards prescribed by reference (c). Lighting in buildings undergoing major renovation shall be brought up to California Title 24 standards. Lighting in other buildings should be brought up to California Title 24 standards through energy retrofit projects, wherever cost-effective.

b. Lighting systems in all CNRSW facilities shall have control systems as specified in reference (c). All spaces shall have appropriate automatic or manual controls to permit lights to be turned off whenever not required. Circuit breakers shall not be considered lighting controls. Zones shall be established in large areas so that groups of lights may be operated independently of other groups.

c. New and retrofitted high intensity discharge (HID) interior lighting, e.g., metal halide and high pressure sodium type, shall have either of the following two control systems:

(1) "Bi-level" controls, to permit operation at either half or full power, as operations permit. These controls shall enable the lights to go from half power to full power instantaneously. Bi-level controls shall be zoned to conform to work stations and shall be controlled by timer, occupancy sensor, light sensor or other control schemes.

(2) Voltage regulator systems, designed to reduce power use and light output from each HID fixture. Light output shall typically be set at 75 to 78 percent of normal without perceptible loss of light.

d. Retrofitted HID fixtures may be equipped with devices which direct more of the light output downward, so that lamp wattages may be reduced. Such devices should be considered for projects in which voltage regulator systems are to be installed.

e. Interior HID lighting shall be equipped with bi-level or voltage regulator controls.

f. Exterior building lighting, parking lot and area lighting, and street lighting shall be low pressure sodium (LPS) type except where Force Protection and other specific requirements dictate different types of lights or higher lighting

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levels. If applicable, historic zone compatible fixtures shall be specified.

g. Compact fluorescent lamps are authorized as an alternative to exterior LPS lighting, as long as the compact fluorescent wattage is lower than LPS.

h. Ball fields, driving ranges, and other outside sports areas may use metal halide lighting. Such lighting shall be photocell controlled to preclude being turned on during daylight hours and timer controlled to assure turn-off after use at night. Fixture and reflector design shall be such as to minimize glare, sky glow and light trespass.

i. Incandescent light bulbs and mercury vapor lamps are not authorized in any CNRSW facilities, including bachelor housing, except where there is no alternative product available.

j. Decorative lighting, such as exterior floodlights and downlights, is not permitted in CNRSW facilities except as authorized by the PWO.

k. Supplementary task lighting shall be used to meet special lighting requirements, such as auto repair bays.

l. Skylights shall be considered whenever feasible and cost-effective. Reflector tubes, which pass sunlight into interior spaces, may be considered where cost-effective.

m. Floors in hangars, warehouses and industrial facilities shall be highly reflective epoxy or painted white to provide reflected light in the area.

n. Exit signs shall be solid-state light emitting diode (L.E.D.) type with battery backup. Exit signs with incandescent or compact fluorescent lamps shall be upgraded to L.E.D. type. Self-illuminating radioluminous (radioactive) signs are prohibited except under unique circumstances, and only as authorized by the PWO.

o. Gas-fired decorative lighting, such as torches, are not authorized.

### 3. Motors and General Electrical Criteria

a. New and replacement motors shall be of the highest available efficiency.

b. The use of variable speed drives in HVAC is encouraged when determined to be applicable to the system design and proven economical through life cycle cost analysis.

c. Power factor controllers shall be installed in electrical circuits where advantageous.

d. New and replacement 400 HZ motor-generators shall be equipped with solid state frequency converters meeting required MIL-STD specifications.

e. New and replacement electrical equipment and appliances shall be in the top 25 percent of the energy efficient products available, as recommended by the FEMP and Energy Star® web sites, references (d) and (e). Reference (e) further provides tools to help activities analyze product life-cycle costs. Less energy efficient products may only be purchased when their life-cycle costs are more than 15 percent less than the most efficient products. These requirements apply to anyone buying equipment, including Government credit card holders.

#### 4. Water Criteria

The following general water design criteria are prescribed:

a. Metering. Complexes shall meter 100 percent of water use.

b. Landscape Design

(1) Planning and Design;

(a) Begin design with a master plan, even if funding allows only partial completion.

(b) Analyze microclimates caused by different conditions of sun and shade, ground slope, available moisture, and air movement.

(c) Divide the project into areas of low, moderate and high water use.

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(d) Consult a landscape architect registered in the state where the project is located.

(2) Turf Use;

(a) Limit turf areas to those usable for active or passive recreation only.

(b) Use indigenous ground covers as lawn substitutes that provide a green appearance but have very low water and maintenance costs.

(3) Irrigation;

(a) Install automatic timer controls on irrigation valves.

(b) Use separate valves and watering times for each type of planting, i.e., turf, shrubs.

(c) Evaluate the use of reclaimed water to irrigate non-residential landscape areas. To determine water availability and regulations in the project area, contact the local water district.

(d) Install rain shut-off devices that are wired to the automatic timer.

(e) Install a flow sensor and master valve downstream of the backflow preventer at each irrigation point of connection so the system will shut off in the event of a pipe or sprinkler head break. Irrigation timers should be chosen with a flow sensor-reading capability.

(f) Consider a central computer-controlled irrigation system for larger projects where irrigation can be programmed from a central office computer.

(4) Soil Improvements. Obtain commercial planting soils to determine the texture and organic composition of the project soil. Since different soils have different water requirements, the soils test will determine the required soil amendments to improve a clay or sandy soil for optimum water percolation and retention. Contact the University of California Cooperative Extension Farm Advisor at (858) 694-2853 or a local nursery for soil testing information.

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(5) Mulches;

(a) Use organic (such as bark mulch) or inorganic (such as indigenous or decorative stone) as an effective way to reduce evaporation by containing water in the soil.

(b) Consider replacing turf areas with mulched planter areas to reduce water use.

(c) Maintain a 2-inch depth of mulch in planter areas.

(d) Use concrete, plastic, or metal edging to contain mulch and keep it in place.

(e) Water-Conserving Plants;

(1) Group plants that have similar needs of water, sun, and soil pH (acidity or alkalinity).

(2) Confine high-water use plants in high traffic or visibility areas.

(3) Select water-conserving plants suitable for local conditions.

c. Water-Consuming Devices. The following criteria are set for water-consuming devices. Where local water district flow restrictions vary from these criteria, the more restrictive criteria shall apply.

(1) Showerheads. Water flow shall not exceed 2.5 gallons per minute (gpm) in showerheads.

(2) Faucets. Water flow shall not exceed 2.2 gpm in private lavatory faucets. Faucets in all lavatories shall be automatic cutoff type and shall be rated for 0.5 gpm. All faucets shall be equipped with aerators.

(3) Toilets. Toilets shall use no more than 1.6 gallons per flush.

(4) Urinals. Urinals shall use no more than 1.0 gallons per flush. Urinals in new facilities and facilities undergoing major renovation shall be equipped with automatic flush devices.

In locations where water supplies are scarce or expensive, waterless urinals shall be considered.

(5) Washing Machines. New and replacement washing machines shall be horizontal axis, front loading type.

d. Other Water Design Criteria

(1) Where reclaimed water is available, evaluate the technical and economic feasibility of using it for cooling towers and other industrial purposes.

(2) Single pass cooling systems and rinsing processes are prohibited, including photographic processing.

(3) Cooling towers shall be equipped with automatic bleed controls to permit operation at 5-8 cycles of concentration before blowdown is required.

(4) When demolishing buildings, cut and plug abandoned water lines where they join the active system. Do not just close valves.

(5) Water softeners shall not be used, except in utility systems or for critical applications, because they are significant water wastes and introduce salts into the sewage system, reducing potential for production of reclaimed water.

(6) Aircraft washracks shall be equipped with low flow, high pressure washers.

5. Water Heating Criteria

a. Insulate pipe in residential facilities in accordance with California Title 24, Chapter 2, Mandatory measures - Residential Manual. Insulate pipe in commercial type facilities in accordance with California Title 24, Chapter 4, Non-Residential Manual.

b. Existing storage gas water heaters with an energy factor less than 0.58 shall be externally wrapped with insulation having an installed thermal resistance of R-12 or greater.

c. Replacement water heaters shall be insulated to an R-15 level or greater and incorporate low NOx burners.

d. Install solar thermal water heating systems when feasible and cost-effective.

e. New and replacement tank water heaters shall be gas-fired, where natural gas is available. Exception: see Sect. 13 herein for steam use applications at specified locations. Electric water heaters shall only be used where there is no economical alternative. Existing steam heat exchangers should be replaced by natural gas water heaters in facilities only where steam would normally be turned off to the building during non-heating season.

f. Notwithstanding the above, instantaneous electric, tankless water heaters installed at the point of use may be used to minimize or eliminate storage and line losses where hot water requirements are low. Verify electrical circuit capacity prior to installing instantaneous tankless water heaters.

g. Waste heat recovery for heating or preheating water shall be considered where air conditioners, compressors, large refrigeration units and other sources of waste heat are available.

h. Heat pump water heaters shall be considered as one means of waste heat recovery, particularly in interior spaces where heat build-up is a problem. Heat pump water heaters should not be used in corrosive environments.

i. If water must be heated electrically, install timers in the circuit to shut down tank heaters when not required.

j. In buildings where hot water circulation pumps are used, install timers to deactivate pumps during periods of peak electrical demand.

k. New and replacement water heaters shall meet the highest Energy Star® energy efficiency standards.

## 6. Space Heating Criteria

a. Space heating systems in new facilities and buildings undergoing major renovation shall exceed California Title 24 standards by a minimum 15 percent.

b. Electric resistance space heating is not authorized except in unique circumstances and where specifically authorized

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by the PWO. Where authorized, these heaters must be inspected and approved by the Federal Fire Department. Trailers used in mild climates, that have heat pumps and auxiliary heat strips, should have the heat strips removed.

c. Programmable, automatic set-back thermostats shall be provided for stand-alone heating and air conditioning systems, except where controls are connected to EMS/DDC systems. For the Metro area, all control equipment must be compatible, on the building supervisory level, with the EMS/DDC system as prescribed by reference (f).

d. Insulate all concealed ductwork in accordance with California Title 24 Table 4-3, Chapter 4, Non-Residential Manual.

e. New and replacement steam traps shall be equipped with features that report trap failure automatically.

f. Boilers used for Heating Hot Water (HHW) or for steam heat shall incorporate low NOx burners, shall be high efficiency type, and shall comply with local Air Pollution Control District requirements.

g. New and replacement space heaters, boilers and furnaces shall meet or exceed the most current Energy Star® energy efficiency standards.

## 7. Cooling and Ventilating Criteria

a. Cooling and ventilating systems in new facilities and buildings undergoing major renovation shall exceed California Title 24 energy efficiency standards by a minimum 15 percent. California Title 24 compliance shall be demonstrated by providing California Title 24 documentation generated by a computer program certified by the California Energy Commission.

b. Air conditioning shall not be routinely installed in CNRSW facilities. Climatic, operational, quality of life and other factors shall be considered before making the decision to provide air conditioning.

c. Natural cooling and ventilating (i.e., operable windows, vents) is preferred where conditioned air is not a requirement.

d. Central air conditioning systems shall be equipped with direct digital controls and interfaced to Energy Management

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System (EMS). Controls for such systems shall comply with reference (f).

e. At specified locations, new or renovation central air conditioning systems may use centrally distributed steam as the economic choice for cooling equipment, see Section 13.

f. Window air conditioners are prohibited except for specifically authorized purposes, such as temperature and humidity control for critical equipment (personal computers are not considered critical equipment), and where there is no other cost-effective way to provide the necessary cooling. Such exceptions shall be specifically authorized by the PWO. Building monitors shall validate any window air conditioner exceptions annually.

g. When designing major alterations to a building which will significantly alter a building's energy requirements, such as removing main-frame computers or process equipment, make corresponding changes to the building's heating, ventilating, air conditioning and other systems to reflect the changed conditions.

h. Install automatic door closers on all doors leading to the exterior of an air-conditioned space.

i. Provide blinds, shades, solar shields, tinted glass, heat reflection glass, or plastic film on windows and glass doors where solar heat gain is not desired. Replace louvered windows with double glazed windows in air-conditioned spaces.

j. Consider installation of an integrated enthalpy economizer on air conditioners with 7 1/2 tons or more of cooling capacity.

k. Insulate chilled water pipe in accordance with California Title 24, Table 4-3, Chapter 4, Non-Residential Manual. Insulate all concealed ductwork in accordance with California Title 24, Table 4-4, Chapter 4, Non-Residential Manual.

l. Wind driven mechanical air turbines shall be installed in lieu of electrically powered ventilators, where feasible.

m. Demising walls (interior barriers between conditioned and unconditioned spaces) shall be fully insulated. If a doorway must remain open between a conditioned and unconditioned space,

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such as for forklift operation, plastic strip curtains are required in the doorway.

n. Install programmable thermostats on Heating, Ventilating and Air Conditioning (HVAC) systems, as recommended by Energy Star®, to properly control the system.

o. Incorporate variable air volume (VAV) systems, where applicable, in new multi-zone installations.

p. Use light colored roof coating in warehouses and air conditioned facilities to reflect sunlight and heat, when cost-effective.

q. Direct Digital Control (DDC) systems are required when upgrading, retrofitting, or replacing HVAC systems per reference (f) (San Diego area only).

r. Consider variable speed drive (VSD) for large air handling systems.

s. New or replacement air conditioners shall meet or exceed the most current appliance energy efficiency requirements as per references (d) and (e).

t. The refrigerant of choice for new or replacement air conditioners shall be R-134a. This has an ozone depletion potential (ODP) of 0.0, thus meeting current and proposed future environmental regulations.

## 8. Refrigeration Criteria

a. Maintain temperatures per NAVMEDINST P-5010-1, where applicable.

b. Defrost manual refrigerators quarterly to avoid ice build-up, which retards the unit's efficiency. Wipe dust build-up off of coils also.

c. Replace worn and/or improper sized door seals. If needed, tighten door latches and realign doors for a better fit.

d. Install thermo-strip door curtains in all walk-in freezers and refrigerators where doors must be open for extended periods.

e. Replace light switches with 15-minute delay timers on all walk-in refrigerators where cost-effective.

f. Install door buzzer with door switch on all walk-in refrigerators and freezers as reminder for all personnel to close doors.

g. New or replacement refrigerators and freezers shall meet or exceed the most current appliance energy efficiency requirements as identified in the California Title 24 standards.

h. Procurement of new and replacement refrigerators and water coolers shall specify R-134a refrigerant.

#### 9. Building Envelope Criteria

a. Facilities having insufficient or no insulation shall be upgraded when cost-effective.

b. New facilities shall be insulated to meet standards of the climate zone they are located in.

c. Light colored roofing and walls are recommended to minimize solar heat gain.

d. Windows shall be dual glazed and have an overall u-value of 0.5 or lower for new construction or in retrofit applications. Inner glazing shall be low-E type and outer glazing may be tinted as required. Reinforced vinyl window frames are preferred as they require little maintenance, do not corrode, and do not transmit heat and cold like aluminum or steel frames.

e. New windows must have the temporary National Fenestration Rating Council (NFRC) label affixed, which states the overall u-value.

f. Passive solar heating and daylighting shall be considered in the design and orientation of new facilities.

10. Renewable Energy Resources. CNRSW supports the goals of reference (a) to reduce greenhouse gas emissions through energy conservation, by reducing the burning of fossil fuels, and by reducing the source use of energy. Accordingly, the following actions are directed:

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a. Activities shall consider cost-effective applications of photovoltaic, solar thermal, wind power and other forms of renewable energy to meet their energy needs while reducing greenhouse gas emissions. These technologies are particularly cost-effective for remote locations and as an alternative to long cable runs.

b. Activities shall consider on-site fuel cell power generation applications as a cost-effective way to provide base power and thermal energy while reducing source uses of energy. This technology is rapidly becoming competitive with utility rates and is a very efficient way to generate electricity.

c. Activities shall take advantage of Federal, state and local grant and buy-down programs to off-set the cost of renewable energy projects. For information on current buy-down programs, contact the CNRSW Utilities Program Manager.

#### 11. Other Design Criteria

a. Utility metering shall be incorporated in new facility design. Utilities, except for the water supply for fire suppression systems, and sewer, shall be metered on all facilities. Meters shall have provisions for being remotely monitored.

b. New design or retrofit plans of facilities and utilities shall incorporate all applicable Department of Defense and Naval Facilities Engineering Command (NAVFAC) Sustainable Development Program requirements. Related guidelines to be incorporated shall be:

(1) NAVFAC Planning and Design Policy Statement 98-01, Design of Sustainable Facilities and Infrastructure.

(2) NAVFAC Planning and Design Policy Statement 98-02, Criteria Supporting the Design of Sustainable Facilities and Infrastructure.

(3) NAVFAC Planning and Design Policy Statement 98-03, Procurement of Sustainable Facilities and Infrastructure through Architect-Engineer (A-E) and Related Contracts.

(4) NAVFAC Planning and Design Policy Statement 98-04, NAVFAC Participation in the Affirmative Procurement of EPA Designated Products.

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(5) NAVFAC Interim Design Criteria Technical Guidelines for Energy Conservation in Existing Buildings.

(6) Naval Facilities Engineering Service Center: Navy Water Conservation Guide for Shore Activities; User Guide UG-2017-E&U.

(7) California Code of Regulations, Title 24: Energy Efficiency Standards for Residential and Nonresidential Buildings, reference (c).

c. All designs for facilities projects shall be reviewed for energy efficiency. Designs for new CNRSW facilities and for major renovations or additions to CNRSW facilities shall take maximum advantage of the "Savings by Design" programs offered by PG&E, Southern California Edison, and SDG&E. These programs offer design support services and significant incentives for building owners and designers when they exceed California Title 24 standards by at least 15 percent.

d. Purchases of ancillary building equipment and appliances shall comply with the environmentally preferable purchasing and sustainable design requirements of reference (h) and the energy efficiency standards and product recommendations of references (d) and (e).

e. Where natural gas pipelines are available, activities shall convert oil-fired boilers and furnaces to gas and remove the oil tanks. Where pipelines are not available, activities will convert such systems to propane where technically feasible and cost-effective. These actions will reduce greenhouse gas emissions, reduce the risk of oil spills and reduce environmental compliance costs.

12. Navy Energy Showcase Site. Naval Base, Ventura County is one of two Navy energy showcase sites. Building 850 at the Construction Battalion Center, Port Hueneme, is one of the showcase site's cornerstone projects. This building was built to demonstrate the state of the art in energy efficiency. The showcase web site, reference (k), helps demonstrate the Navy's aggressive leadership in energy conservation, efficient design practices, sustainable design and the benefits of effective partnering.

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CNRSW supports the Navy energy showcase program. All complexes are encouraged to take advantage of the showcase's knowledge and experience with energy technologies, sustainable design and efficient design practices and to implement these technologies and practices wherever feasible and cost-effective.

13. Qualified Facility Host Sites - Steam Use Considerations.

Special consideration shall be given in the design of all new and renovation projects with thermal duty at locations hosting Qualified Facility cogeneration projects. These locations within CNRSW are;

- Naval Base, San Diego
- Naval Base, Coronado
- Naval Base, Point Loma
- Marine Corps Recruit Depot, San Diego

The named locations receive centrally distributed steam from Qualified Facility (QF) cogeneration plants under long term contracts. Continuance of QF status is predicated on certain required annual steam usage; i.e., "useful thermal energy," as defined in 18 CFR Ch. 1 of the Public Utilities Regulatory Policies Act (PURPA) of 1978. Indiscriminant reduction of thermal use that may cause annual usage to go below the threshold is a violation of the contract(s) between the Government and the QF operator, and would trigger a default to the PURPA requirements, resulting in severe monetary penalties to the Government.

Therefore, as may be applicable within this instruction and all references;

a. Thermal duty applications for new and renovation or upgrade projects shall first consider centrally distributed steam at these locations as the lowest incremental cost thermal energy resource. Steam from these systems shall be used wherever it is economically life-cycle cost effective.

b. Projects recommending the replacement of existing steam equipment with equipment requiring another energy source shall not be authorized unless approved by the CNRSW Utilities Program Manager.

c. Designers and energy managers shall be innovative in selection of thermal applications utilizing available steam

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resources on an economic life-cycle cost basis. Examples of applications include, but are not limited to:

- Steam absorption chillers for single or clusters of buildings with cooling demand sufficient to support this type of system
- Steam coil air handlers for space heating; especially applicable if combined with chilled water coils
- Steam rehumidification of conditioned air
- Swimming pool heaters
- Domestic hot water (DHW) heating, heat exchangers
- Steam presses (laundry facilities)
- Steam tables (mess facilities)
- Steam absorption chillers for inlet air cooling to gas-fired turbine-generators and aspirated combustion engine generators
- Pre-cooling of refrigerant for large unit (walk-in) type refrigerator/freezers

