



Title	ES-301-2.02B Heating, Ventilation, and Air Conditioning (HVAC) Operations
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1) Activity Description: Heating, Ventilation, and Air Conditioning (HVAC) Operations

The Department of Aviation operates a large HVAC system from the airport's Central Plant, located at 26920 E. 86th Avenue. The purpose of the Central Plant is to provide the terminal building and concourses with hot and cold water and heated and air-conditioned air. The Central Plant includes one Bryan boiler, three IBW boilers, an HCFC-based chilled water system, and a cooling tower. The four boilers can burn either natural gas or Jet A fuel. The Central Plant is operated by the airport's Facilities Maintenance HVAC staff. There are several refrigeration and air conditioning systems within the City and County of Denver's DEN operations that contain regulated refrigerant charges and require registration and/or maintenance recordkeeping, such as leak rate calculations. See 3.01-2.02A Ozone Depleting Compound (ODC) Management.

Various DEN tenants also operate HVAC systems whose ODC emissions may be regulated by the federal Clean Air Act regulations.

2) Potential Environmental Risks

- A. The following environmental concerns are associated with these activities:
 - i) Air pollution – ODC emissions
 - ii) Improper management of used refrigerant

- B. Potential consequences from performing the activity incorrectly:
 - i) Damage to the environment
 - ii) Regulatory and judicial enforcement actions and related [financial and non-financial] penalties

3) Critical Operating Requirements

- A. Prohibited Activities
 - i) Operating equipment without applicable permits.
 - ii) Intentional venting of refrigerants is illegal under federal and state law.

- B. General Considerations
 - i) Each airport tenant, contractor, and operator conducting HVAC operations is responsible for understanding the applicable regulations and managing their activities accordingly; this Environmental Guideline is meant as guidance and does not supersede any regulations.
 - ii) Technicians who install or remove refrigerants, or maintain or repair stationary or mobile air conditioning or refrigeration equipment, must have the proper training certification.
 - iii) HVAC equipment must be considered for CDPHE registration if over 100 compressor horsepower, and leak rate calculations and maintenance records must be kept for units with more than 50 pounds of ODC refrigerant capacity.
 - iv) Records must be kept on site for three years for maintenance activities on regulated equipment and ODC refrigerant consumption.
 - v) Leak rate calculations must be performed for regulated stationary equipment each time ODCs are added to the equipment charge.
 - vi) Equipment losses of ODCs above regulatory thresholds trigger leak repairs that must be performed within the applicable regulatory timetable.

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C. Training Requirements

- i) Technicians who repair or service ODCs on HVAC equipment (CFC-12 and HFC 134a) must be trained and certified (referred to as Section 608 technician certification) by an EPA-approved organization. Training programs must include information on the proper use of equipment, the regulatory requirements, the importance of refrigerant recovery, and the effects of ozone depletion. A test is required.

D. Storage and Materials Management Requirements

- i) HVAC owners and operators should evaluate their system's emissions for possible regulation under the Clean Air Act.
- ii) HVAC chemicals should be stored so as to prevent releases and emissions.
- iii) HVAC operators should manage new and used refrigerant in accordance with federal and state ODC regulations.
- iv) Used oils should be evaluated for halogenated contaminants and handled according to appropriate federal and state regulations. Process knowledge is recognized as a potential basis for this determination.

4) Planning Requirements

- A. Properly select equipment and systems that will utilize lower impact HCFCs and that will reduce leakage by design. Equipment and systems should allow addition and removal of refrigerant while minimizing loss.
- B. Emphasize the recovery, recycling, and reuse of CFC/HCFC refrigerants. The operator should institute management systems that will emphasize recovery of refrigeration fluids that become contaminated. This includes using agents who in turn use self-certified equipment for refrigerant recovery that comply with USEPA standards pursuant to 40 CFR Part 82.
- C. Provide capability to measure CFC/HCFC refrigerant weights as added and removed from refrigeration systems. Perform leak rate calculations as required.
- D. Record training completion certificates for each technician and institute measures to ensure these are the only personnel who work on applicable systems (i.e., stationary and MVAC and MVAC-like systems).
- E. A recordkeeping system should be instituted to organize and maintain applicable records.

5) Critical Tasks

- A. The operator will conduct HVAC operations, monitoring, and recordkeeping in accordance with the state Air Quality O&M Plan and federal and state ODC regulations.
- B. The operator will operate and maintain the equipment to assure compliance with any applicable CAA laws, regulations, guidance, and permits.

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- C. Registration with CDPHE of equipment over 100 horsepower. Facilities that service mobile and stationary air conditioning and refrigeration equipment are also required to notify CDPHE of their ODC activities. The facility notification form can be obtained at <http://www.cdphe.state.co.us/ap/down/fn.pdf>.
- D. Demonstrate compliance with technician training and certification requirements prior to conducting maintenance or repair activities on stationary or mobile equipment containing regulated ODC charges.
- E. Demonstrate compliance with leak rate calculation requirements each time ODCs are added to regulated stationary equipment or systems.
- F. Demonstrate compliance with leak repair timetable when leak rate thresholds are exceeded for regulated stationary equipment.
- G. Demonstrate compliance with pre-disposal ODC removal/recovery and related documentation requirements prior to disposal of regulated ODC-containing equipment.
- H. Store refrigeration fluid containers in such a manner as to prevent or minimize the possibility of leaks (e.g., cylinders should have plugs in their outlets to back up valves).

6) **Emergency Response**

- A. If a spill occurs, refer to Environmental Guideline ES-301-5.02 Spill Response. Call DEN Communications Center immediately at 303-342-4200 for all spills.
- B. There are no specific emergency response requirements associated with the release of ODCs. However, there is a requirement to repair systems with more than 50 pounds of CFC and HCFC refrigerant capacity and that are determined to have lost a significant percentage of their charge (15% for comfort cooling and 35% for industrial applications) over a prorated annual rate since the last refrigerant addition or one year, whichever is shorter. Leaking equipment should be shut down for repairs or maintenance as soon as possible to reduce the leakage rate below the applicable threshold level. If the leak cannot be repaired within 30 days of discovery, the equipment should be permanently taken out of service until it can be either repaired or replaced.
- C. There is the possibility that the release of ODC materials in a closed area can reduce oxygen levels. This is a safety issue and should be reported to the DEN Communications Center.
- D. An R-12 (CAS No. 75-71-8) release at or above certain thresholds ($RQ \geq 5,000$ pounds) is reportable pursuant to the EPA List of Lists. There are no reportable quantities for R-22, R-414, or R-134a.

7) **Inspection and Maintenance Requirements**

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- A. Owner/operator will conduct HVAC inspections and maintenance in accordance with the state Air Quality O&M Plan, and federal and state ODC regulations.

8) **Expected Records and Outputs**

- A. Air permit records
 - i) Operator files
- B. ODC training, management and maintenance records
 - i) Operator files
- C. Any records for used oil generation
 - i) Operator files
- D. POTW discharge records
 - i) Operator files
- E. Training records for all operators/technicians
 - i) Operator files

9) **References**

- A. Phone Numbers
 - i) DEN Communications Center (for spill reporting) (303) 342-4200
 - ii) DEN Maintenance Control Center (for malfunctions) (303) 342-2800
 - iii) DEN Environmental Services (Main Line) (303) 342-2730
 - iv) John Hambright (DEN Environmental Services) (303) 342-2759
- B. Guidance Materials (list is not limited to the following)
 - i) Owner/Operator operating and maintenance (O&M) manual for all boilers.
 - ii) Manufacturer's operating and maintenance (O&M) manual for all refrigeration systems and associated cooling water systems.
- C. Training Materials (list is not limited to the following)
 - i) Plans and records for operators to comply with all applicable constraints.
- D. Related Environmental Documents (list is not limited to the following)
 - i) ES-301-4.09 Management of Petroleum Storage Tanks and Containers
 - ii) ES-301-4.11 Storage, Handling and Management of Hazardous Materials
 - iii) ES-301-2.02A Ozone-depleting Compounds Management
 - iv) ES-308-1.02A HVAC Work Instruction for Ozone-depleting Compounds
 - v) ES -308-1.02B Fleet Maintenance Work Instruction for Ozone-depleting Compounds
- E. Applicable Regulations (list is not limited to the following)
 - i) Federal air quality regulations for boilers (40 CFR Part 60, Subpart Dc)
 - ii) Federal air quality regulations for refrigerants in stationary equipment (40 CFR Part 82, Subpart F)

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- iii) State air quality regulations (5 CCR 1001-2, -3, -5, -8, -9, and -19)
- iv) State air quality Operating and Maintenance (O&M) Plan as applicable
- v) Local air quality ordinances (D.R.M.C. Title II, Chapter 4, Article III)
- vi) Federal used oil regulations (40 CFR Part 279, Subpart C)
- vii) State used oil regulations (6 CCR 1007-3, Part 279, Subpart C)
- viii) DEN rules and regulations

F. Other Documents (list is not limited to the following)

- i) None