Refrigerant Management Program

Question and Answer
Guidance Document

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Introduction

The California Air Resources Board (ARB or Board) approved the Regulation for the Management of High Global Warming Potential Refrigerants for Stationary Sources regulation, generally referred to as the Refrigerant Management Program (RMP) in December 2010 under the California Global Warming Solutions Act of 2006 (Chapter 488; Health and Safety Code sections 38500 et seq.). The regulation, which appears at sections 95380 to 95398 of Title 17, California Code of Regulations, is a set of rules that establish a limit on statewide GHG emissions from stationary facilities with refrigeration systems with more than 50 pounds of a high GWP refrigerant. Provisions of the regulation also pertain to companies and facilities that distribute and reclaim refrigerants and persons that service refrigerant containing appliances.

Purpose

ARB staff has prepared this document to describe RMP's requirements in a user-friendly format. Unlike the RMP itself, this guidance does not have the force of law. It is not intended to and cannot establish new mandatory requirements beyond those that are already in the RMP, and it does not supplant, replace, or amend any of the legal requirements of the RMP. Conversely, this guidance's omission or truncation of regulatory requirements does not relieve those subject to the regulation from their legal obligation to fully comply with all requirements of the Regulation. This guidance includes clarifying detail and examples where they might help covered entities comply with the RMP.

Intended Audience

This guidance is intended for those persons who are responsible for their company's or facility's compliance with the RMP regulation. This includes company/facility environmental coordinators, plant engineers, maintenance supervisors, or refrigeration technicians.

What This Guidance Covers

This document is focused on assisting persons and facilities affected by the regulation to comply with its provisions.

What This Guidance Does Not Cover

This guidance is not designed to answer every question relating to the RMP regulation. Users with additional unanswered questions are encouraged to pursue their questions through the program web page or the telephone (916.324.2517) and email helplines.

This guidance does not explain how to do everything required by the regulation such as how to perform a leak inspection or leak repair. The guidance assumes that its readers are properly trained in the various actions required to fulfill the activity.

This guidance does not discuss:

- Requirements of other agencies such as U.S.EPA, California air districts, etc.
- Other aspects of refrigerant recycling or hazardous substance regulations
- Disposal of appliances used for refrigeration or air-conditioning
- Requirements for air-conditioning systems
- Enforcement or other ramifications of violations of the RMP regulation

For More Information

Additional information may be found on the ARB RMP program web page at: www.arb.ca.gov/stoprefrigerantleaks. Specific questions can be asked on the program telephone help line at: 916.324.2517 or on the email help line at: reftrackinfo@arb.ca.gov.

Additional information may also be found on the RMP Refrigerant Registration and Reporting (R3) System online tool web page: www.arb.ca.gov/rmp-r3.

Refrigerant Management Program Guidance

Background

About the Refrigerant Management Program (RMP)

The purpose of the Refrigerant Management Program (RMP) is to reduce refrigerant leaks from large commercial and industrial refrigeration systems to reduce the emissions of high global warming potential refrigerants. It builds on existing federal and South Coast Air Quality Management District (AQMD) rules in place since the early 1990's. U.S.EPA Rule 608 and South Coast AQMD Rule 1415 regulated ozone depleting substance (ODS) refrigerants used in both refrigeration and air-conditioning systems. The RMP regulates both ODS and ODS replacement refrigerants. The majority of the provisions of the RMP apply to refrigeration systems only. The RMP applicability to air-conditioning systems is limited to the service practice provisions. South Coast AQMD's Rule 1415 has been modified such that Rule 1415 regulates refrigerants in air-conditioning uses and a new rule, Rule 1415.1, closely tracks the RMP and regulates refrigerants in refrigeration systems. U.S.EPA Rule 608 remains unchanged and in full effect.

At its most basic level, the RMP is an inspection and maintenance regulation. Specifically, the regulation requires periodic leak inspections and, if leaks are found, it requires those leaks to be repaired promptly. It also requires registration, recordkeeping, and reporting of the leak inspections, repairs, and purchases of high global warming potential refrigerants. Details of these requirements are covered in other sections of this guidance document.

Where can I find more information and the full text of the RMP regulation?

More information about the program and links to the RMP regulation can be found both on the program webpage (www.arb.ca.gov/stoprefrigerantleaks) and on the Refrigerant Registration and Reporting System (R3) (www.arb.ca.gov/rmp-r3) online tool page.

If I have a question about the regulation where can I get help?

Additional information about the RMP can be found on the program webpage at www.arb.ca.gov/stoprefrigerantleaks. The Air Resource Board RMP staff also

maintains a telephone hotline at (916) 324-2517 and an email hotline at reftrackinfo@arb.ca.gov.

How does ARB's rule compare with U.S. EPA's rule (Section 608) & South Coast 1415?

Similarities

- Businesses with refrigeration equipment containing more than 50 lbs. of ODS refrigerant must detect and repair leaks, use required service practices, and keep records.
- Complements the national rules by requiring leak inspections and recordkeeping, leak repair, and follow-up repair verification.

Differences

- ARB's rule addresses all high-GWP refrigerants including non-ODS (HFC) refrigerants.
- Goes beyond existing U.S.EPA rules and South Coast Rule 1415 by requiring periodic leak inspections or continuous monitoring to proactively detect leaks as quickly as possible.
- Most provisions apply to refrigeration systems only, limited to service practice requirement for air-conditioning.
- RMP and South Coast 1415.1 require reporting, U.S.EPA Rule 608 does not.

Regulated Equipment and Businesses

What types of businesses have regulated refrigeration systems?

Any facility with a stationary, non-residential refrigeration system may be affected by the RMP regulation. Some types of facilities that are likely to have regulated refrigeration systems include, but are not limited to: cold storage warehouses, food preparation and processing facilities, grocery stores and supermarkets, and facilities with process cooling equipment. Many facilities that tend to be owned or operated by small businesses such as bars and restaurants, gas stations, bakeries, and liquor stores are not expected to exceed 50 pounds of refrigerant and, thus, are not expected to be subject to the regulation, but they are not categorically excluded. If they have a refrigeration system containing more than 50 pounds of high-GWP refrigerant they are

subject. Agricultural facilities often use ammonia-based refrigeration systems; in which case they would not be subject to the regulation.

Are military installations affected by RMP?

Yes, military installations are affected by RMP. They need to register, report, and retain records like any other facility. However, the rule does not apply to tactical support equipment.

How can I determine if my business is affected by RMP?

If a business owns or operates a stationary, non-residential refrigeration system that is an industrial process refrigeration, commercial refrigeration, or other refrigeration appliance that requires more than 50 pounds of a high global warming potential refrigerant to maintain normal operating characteristics and conditions the regulation applies to them.

The regulation also applies to any person who installs, repairs, maintains, services, replaces, recycles, or disposes of a stationary refrigeration or air-conditioning appliance and to any person who distributes or reclaims refrigerants with high global warming potential.

How can I tell if my refrigeration system contains more than 50 pounds of a high-GWP refrigerant?

The amount of refrigerant charge in a refrigeration system is the sum of all the refrigerant contained in the components through which the refrigerant can pass. If a valve separates parts of a refrigeration system into what are operated as two circuits it is considered to be one system since the valve can be opened and the refrigerant can pass to the other parts. In order to be two systems there must be a fixed point through which the refrigerant cannot pass.

The total amount of refrigerant that a refrigeration system contains is called the full charge of the system. How to determine the full charge in your system is described in the "How is the full charge of a refrigeration system determined?" section elsewhere in this guideline document.

Are there requirements in the RMP regulation that apply to air-conditioning systems?

Yes. Air-conditioning systems are subject to the required service practices provisions of the regulation (section 95390). These provisions include no venting of refrigerant to the atmosphere, no additions of refrigerant to a refrigeration system known to have a refrigerant leak, evacuation of any remaining refrigerant from a non-refillable cylinder prior to disposal, and proper certification of persons conducting servicing and leak repairs to a system.

Is a system that is used for both air-conditioning and refrigeration considered a refrigeration system or an air-conditioning system?

Dual purpose systems that serve both air-conditioning and refrigeration functions are considered refrigeration systems and subject to the requirements of the RMP regulation. Systems that are used for two or more applications including air-conditioning, industrial process refrigeration, or commercial refrigeration are considered 'other refrigeration'.

What constitutes a regulated refrigeration system?

For the purpose of the RMP regulation a refrigeration system is a system that is used for industrial process cooling, commercial refrigeration, or other refrigeration purposes at a stationary, non-residential facility. Refrigeration systems containing more than 50 pounds of a high-Global Warming Potential (GWP) refrigerant are subject to all provisions of the RMP regulation. Systems used solely for air-conditioning and stationary, non-residential refrigeration systems 50 pounds and less charge size are subject only to the required service practices provisions of the regulation (section 95390). Systems using ammonia, CO_2, or any other refrigerant with a GWP less than 150 are not subject to the regulation unless that refrigerant is also an ozone depleting substance as defined in 40CFR82.3. Ozone depleting substances are subject to the regulation regardless of their GWP.

Refrigeration systems are classified into three size ranges reflecting the emission potential and complexity of the systems:

- "Small" with more than 50 pounds, but less than 200 pounds of refrigerant;
- "Medium" with 200 pounds or more, but less than 2,000 pounds of refrigerant;
- "Large" with 2,000 pounds of refrigerant or more.

What defines a refrigeration circuit: How many refrigeration systems do I have?

A refrigeration system is defined by a single refrigerant circuit. A refrigerant circuit consists of all the parts of the refrigeration system containing refrigerant that are, or can be, connected to each other. If there is a valve between two parts of the circuit both parts could be connected, therefore, it is one circuit. If the two parts are separated by a welded plate they have been totally isolated from each other and make up two circuits.

How do I determine the RMP size category of my refrigeration system?

The size category of a refrigeration system is based to the total amount, or 'full charge' of refrigerant contained in the system. This includes all equipment that is, or can be, connected to the system. If half of the system can be separated from the other half by a valve and run independently, it is still considered a single system if the valve can be opened and refrigerant can move between the halves and the size of the system is the sum of the two halves. Only if there is a hard separation between the halves can they be considered as two systems. The size category of the facility is based on the largest system at the facility determines the size category of the facility; for example: if the facility has one system with 2,500 pounds it is a large facility regardless on the number of smaller systems or the sum total of all refrigerant contained in all systems. As another example, if the facility has 2 systems each containing 1,500 pounds of refrigerant the facility is medium since the largest system is less than 2,000 pounds.

Industrial process refrigeration vs. commercial refrigeration vs. other refrigeration

An industrial process refrigeration system is directly used as part of a manufacturing process; including industrial ice machines, appliances used directly in the generation of electricity, and ice rinks. A commercial refrigeration system is one that is used in retail food (supermarkets, convenience stores, restaurants, etc.) or cold storage warehouses for perishable goods. A stationary, non-residential refrigeration system that is used in an application other than industrial process refrigeration or commercial refrigeration is classified as other refrigeration. Other refrigeration also includes systems used in two or more applications including industrial process refrigeration, commercial refrigeration, and air-conditioning. Where one appliance is used for both industrial process refrigeration and other applications it will be considered industrial process refrigeration equipment if 50% or more of its operation capacity is used for industrial process refrigeration. All of these system types are subject to the RMP regulation.

Are ice plants and cold water storage systems used for thermal storage considered refrigeration?

The answer to this question could be either yes or no depending on the use of the ice or cold water. If the ice plant or cold water storage system serves only as a thermal storage system for a comfort cooling system, it is considered part of the air-conditioning system and not a refrigeration system. Facilities will sometimes use an ice plant or cold water storage system to shift the electrical demand to off peak hours or to even out the electrical or cooling load. However, if the thermal storage is used for refrigeration in addition to air-conditioning it is considered an 'other refrigeration' system. Also, if the ice or cold water is used as an industrial or commercial product or as part of an industrial process it is considered a refrigeration system.

Does the RMP apply to my computer room air-conditioner?

A computer-room air conditioner is a central air conditioner specifically designed for use in data processing areas for the purpose of cooling objects or occupants. Systems used strictly as a computer-room air conditioner are not subject to the RMP.

Refrigerant charge

How is the full charge of a refrigeration system determined?

The full charge of refrigerant in a refrigeration system is defined as the amount of refrigerant necessary for normal operating characteristics and conditions of the system. This represents the amount of refrigerant the system was designed to contain. Although some systems will continue to operate with more or less refrigerant, such operation would not result in optimal performance.

The full charge amount of refrigerant and the method of determining the full charge must be submitted as part of the facility registration and related documents and must be made available to inspectors. The full charge of each system at a facility must be determined. The same method is not required for each system; the best method for each system should be used. Your certified technician or refrigeration service company may be able to provide you with the full charge of your system or advise you in determining it. Based on U.S.EPA compliance guidance, the following are some methods of determining the full charge; other methods may be used as long as they are fully documented:

- Use the manufacturer's information (U.S.EPA Method 1)
  - Name plate information
  - System specifications
  - Vendor literature
- Calculate the weight of refrigerant in the system (U.S.EPA Method 2)

Table 1: Example refrigerant weight calculation table

Component	Dimensions	Volume	Pounds of refrigerant
Piping			
Receiver			
Compressor			
Condenser			
Other components			
Total refrigerant			

- Measure the refrigerant put into the system (U.S.EPA Method 3)
  - Charge put into the system when new or empty
  - Remove the full charge from system and weigh
- Establish a range of refrigerant amounts in which the system operates properly, use midpoint of the range as the full charge amount (U.S.EPA Method 4)
- Combination of methods
  - For example: use the manufacturer's specifications for part of the system (i.e. receiver, compressor, etc.) and calculate the refrigerant contained in other components (i.e. piping, tubing, etc.) and add the amounts

Any time the refrigeration system is modified the new full charge should be calculated and the facility registration updated.

What is optimal charge?

The optimal charge for a refrigeration system is generally the full charge amount. It is the charge of refrigerant at which the manufacturer has determined the system operates best. This is likely to be the charge at which the system operates most energy efficiently with an appropriate reserve for fluctuations in ambient temperature and product load. If the system does not operate well when additional product is brought in and additional charge is needed, the system has not been operating at the optimal or full charge. If it is operating at the optimal or full charge, addition of refrigerant will not improve operation.

How is cooling capacity related to the full charge of the refrigeration system?

Owners and technicians often think about the size of refrigeration systems in terms of cooling capacity measured in tons rather than the pounds of refrigerant that make up the charge quantity. Each system is different and it is up to the owner to determine the actual pounds of refrigerant in their system. One of the methods discussed above should be used to determine the correct charge amount.

As a *very rough* estimate, one ton of cooling capacity will usually be approximately 3 to 5 pounds of refrigerant. By this rough estimate a system of 500 tons cooling capacity is likely a large system, 50 tons cooling capacity a medium system, and 10 tons a small system. These are very rough estimates as general guidance; a proper charge determination should be conducted. A built up refrigeration system with piping carrying refrigerant throughout the facility is likely to contain much more refrigerant than indicated by these estimates.

Registration and Recordkeeping

What needs to be registered?

There are two types of information that needs to be included in a facility's registration: the facility information and the refrigeration system information.

The company and facility information accurately identifies the facility, where it is, and how to contact officials at the facility.

The refrigeration system information identifies all the affected refrigeration systems at the facility. When the regulation requires a facility to register they must register all the

systems at the facility; i.e. in 2012 when large facilities were required to register, they were required to register all large, medium, and small systems at the facility. Likewise, in 2014 when medium facilities are required to register they must register all their small systems in addition to their medium systems. In 2016, small facilities will be required to register all their small systems.

In addition, the automatic leak detection system (ALD) should be registered to demonstrate that large systems that require an ALD actually have one. An ALD can be also be used on medium and small systems. Facilities with large systems that require an ALD can add a few sensors to the system to monitor their medium and/or small systems and take advantage of the provision that can substitute monitoring by ALD for the otherwise required quarterly and annual leaks inspections. Additional information about how to register a company and facility, the refrigeration systems, and the ALDs is included in a later sections in this Guidance Document.

When do I register my refrigeration systems?

By March 1, 2012 facilities whose largest refrigeration system is a large system (2,000 pounds or more of a high GWP refrigerant) must have registered. By March 1, 2014 facilities whose largest system is a medium system (200 or more to less than 2,000 pounds of a high GWP refrigerant) must register. By March 1, 2016 facilities whose largest system is a small system (more than 50 pounds, but less than 200 pounds of a high GWP refrigerant) must register.

The 2012, 2014, and 2016 dates are dates by which the facility must have registered its systems; if a facility wants to enter its systems into the R3 before these dates they are welcome to do so. By entering its systems into the R3 a facility can take advantage of the R3 to help them manage their refrigerant usage, track their refrigeration system operation, and maintain their records.

Are facilities that have refrigeration systems of several size categories required to register all systems when the registration and reporting requirements begin for the largest system?

Yes. The registration due dates for a facility are based on the largest system at the facility and require a facility to register the largest system as well as all other refrigeration systems affected by the regulation (greater than 50 pounds charge). In 2012 a facility that has at least one large system with 2,000 pounds or more of a high GWP refrigerant should have registered all their systems, including their medium

systems (200 – 1,999 pounds) and small systems (50 – 199 pounds). In 2014 a facility whose largest system is a medium system must register all medium systems and all small systems. In 2016 a facility whose largest system is a small system must register all small systems.

Are electronic records acceptable for on-site recordkeeping?

The records may be kept in hard copies or electronically provided they can be easily retrieved and accessible to inspectors on-site at the time of an inspection. For example, hard copy records could be filed chronologically in file folders or binders. Electronic records may be kept through the R3 tool, third-party refrigerant management software (Verisae, IHS, etc.), in-house refrigerant management software, etc. Supporting documents such as work orders and invoices should be maintained in addition to the electronic records.

Are there specific forms for the required records?

There are no prescribed forms or formats for records provided that they are available to the inspector on-site and in a form and format such that the inspector can assess if the records are complete and accurate and can assess the operation and compliance status of the refrigeration system.

What types of records need to be retained on-site?

The minimum requirements for recordkeeping are outlined in section 95389 of the regulation. In summary, these are:

- Registration information
- Documentation of ALD systems, leak inspections, and ALD audits and calibrations
- Refrigeration system service events and leak repairs including documentation of the rationale, if a leak repair could not be completed within 14 days and an extension was required
  - The service events in the records should include any service that concerned the refrigerant circuit. These records should include:
    - Date of the service
    - Description of the service

- If any refrigerant was added, the purpose of the additional refrigerant
    - Leak repair records should include such information as:
        - Date the leak was detected
        - Date the repair was completed
        - Cause of the leak
        - Description of the leak repair
        - Dates of the initial and follow-up verification tests
        - Amount of refrigerant added following the repair
- Information about the technician conducting leak repairs and services if there was the reasonable possibility that the service could release refrigerant
- Retrofit or retirement plans, if needed
- Past annual reports
- Any application for an exemption
- Invoices for all refrigerant purchases
- Amount of refrigerant added or recovered from systems and stored in inventory
- Records of shipments of refrigerants for reclamation or destruction
- Information used to determine the full charge including records of all refrigeration system component data, measurements, calculations, and assumptions

How should military installations register?

Military installations should register as if they are a company with multiple facilities within the installation. The installation (Air Force Base, Marine Base, etc.) registers using the base-wide EIN as a "company". Within the installation the separate facilities, such as the commissary, power plant, etc. that are under control of the installation are then registered as facilities under the installation "company" registration.

The independent tenant companies with the military installation, such as the SpaceX facility within Vandenberg, register as separate companies and facilities.

Leak detection and leak inspections

When are leak inspections required?

The frequency of leak inspections depends on the size of the system, if it is located within a structure, and if it is intended to be used seasonally or intermittently.

Large systems

If a large system is intended to operate year round and is located within a structure an ALD is required, periodic manual leak inspections are not required. Also, an ALD is required on the indoor components with a high potential to leak (compressor, evaporator, condenser, etc.) of a system partly indoors. Quarterly leak inspections are required on the components that are located outside.

Medium systems

If a medium system is intended to operate year round a leak inspection must be conducted every three months using a calibrated refrigerant leak detection device, a bubble test, or observation of oil residue. The inspections should be evenly distributed throughout the year. These leak inspections are not required if an automatic leak detection system monitors the system.

Small systems

If a small system is intended to operate year round a leak inspection must be conducted annually using a calibrated refrigerant leak detection device, a bubble test, or observation of oil residue. These leak inspections are not required if an automatic leak detection system monitors the system.

Seasonal or intermittently operated systems

If a system is not intended to operate year round; for example in an agricultural packing house where it is operated during the harvest season, but shut down the rest of the year; a leak inspection must be conducted within 30 days after starting operation and once every three months thereafter until the refrigeration system is shut down. The leak inspection must be conducted using a calibrated refrigerant leak detection device, a bubble test, or observation of oil residue. A leak inspection is not required if there has been a leak inspection of the refrigeration system conducted within the preceding 90 days, i.e. a relatively short time between the shut down and restart. If a leak inspection was conducted within the preceding 90 days the schedule of leak inspections established in the previous operating period is continued in the current operating period.

When refrigerant is added

Anytime 5 pounds or more refrigerant, or 1% of the full charge, whichever is greater, is added a leak inspection is required.

When oil residue is observed

Anytime oil residue is observed a leak inspection is required.

When alerted to a leak by the ALD

If an ALD alerts the operator to the possible presence of a leak, a leak inspection is required within 24 hours after the system alert. The alert may be from the direct ALD system alerting the operator to the presence of high concentrations of refrigerant vapor in the air in the vicinity of the system or from the indirect ALD system alerting the operator to operating conditions that indicate that refrigerant has leaked from the system.

What must I do if I need to add refrigerant to my system?

Any time refrigerant is added to a refrigeration system an EPA certified technician must conduct the work. In addition, if you need to add 5 pound or more refrigerant or 1% of the full charge to the system you must conduct a leak inspection of the system as part of the work. Logically, if the system is missing refrigerant it must have gone somewhere, thus an inspection needs to be conducted at the time of the refrigerant addition to determine if there is a leak in the system since refrigerant must not be added to a leaking system.

How should I conduct a leak inspection?

Leak inspections should be conducted by examining all potential leak points in the system. There are many ways of conducting this examination. The most common ways are to use a soap bubble leak detection solution, an electronic leak detection instrument, ultraviolet detection of a fluorescing solution that has been added to the refrigerant / oil in the system, or using an ultrasonic leak detection instrument. Other methods may also be used. Regardless of the method used, the method should be used according to the manufacturer's instructions.

The observation of oil residue on parts of the refrigeration system or on the floor below the system is a strong indicator that a leak is occurring. If oil is observed one of the above leak detection methods should be used to confirm the leak and determine the point at which the system is leaking. For observation of oil residue to reflect the presence of a leak the refrigeration system and the floor around the system should be kept clean of any previous oil residues.

Do leak inspections have to be conducted by certified technicians?

No, the leak inspections can be conducted by anyone knowledgeable about the refrigeration system and how it operates. However; any servicing, repairs, etc. that

would involve the refrigerant circuit and have the potential to emit refrigerant must be conducted by a certified technician.

When is an Automatic Leak Detection (ALD) system required?

An ALD may be required if the refrigeration system is a large system; i.e. it contains 2,000 pounds or more of a high-GWP refrigerant. If the large refrigeration system is indoors and operates, or is intended to operate year-round an ALD is required. If only part of the system is indoors an ALD is required on those parts that are indoors that have a high potential for leaks; i.e. compressors, evaporators, condensers, etc. The components of the system that are not indoors must be inspected for leaks at least once every three months.

An indirect, or parametric, monitoring system may be useful for systems that have only some of their components inside and most of the system outside. A facility can also apply for an alternative test method if the alternative can be demonstrated to be equally, or more effective than an ALD for the particular installation.

An ALD is not required for refrigeration systems with a refrigerant charge of less than 2,000 pounds, but one may be used. If a system with less than 2,000 pounds of refrigerant has an ALD the quarterly or annual leak inspections are not required.

What types of ALDs are available?

There are two primary types of ALD: those that monitor the concentration of refrigerants in air (direct monitoring systems) and those that monitor and interpret the status and operation of the system (indirect, or parametric, monitoring systems). Both types of monitoring systems should be calibrated or audited annually to assure that they are performing properly. The calibration or audit should be recorded as a service record in the R3 tool and reported on the Annual Report. Alternatives to the conventional direct and indirect ALD systems may be considered if they can be demonstrated in an approved written request to be equally or more effective.

Direct monitoring systems consist of either sensing modules that can be placed at specific locations to be monitored with a wire to the control panel or inlets that collect and send a sample of air from the monitored location to a central control panel containing the analysis system.

The two most common sensor types are the CMOS (ceramic metal oxide semiconductor; also referred to as solid state sensors) and NDIR (non-dispersive

infrared); there are many other sensor technologies, each with their advantages and disadvantages. The CMOS sensors tend to be less expensive than NDIR sensors and can respond to multiple refrigerant gases, an advantage if a facility uses multiple refrigerant types; but their lowest sensitivity level may be higher. They also will respond to other gases and vapors and may give false alarms in the presence of engine exhaust, solvents, paints, cleansers, etc. The NDIR sensors respond to specific refrigerant gases. If multiple gases are used in a facility, multiple NDIR sensor models may be necessary. However, being gas specific, they do not respond to the exhausts, gases, and vapors that give false alarms with CMOS sensors. The NDIR sensors tend to be more expensive than CMOS sensors and are sensitive to lower concentrations of refrigerant gases.

The list below is a partial list of some manufacturers of ALD sensors and systems. This list is not meant to be complete or to endorse or recommend any of these systems.

Bacharach, Carrier, CBISS, Chillgard, CPC, Daiken, Diebold, Emerson, Genesis, Halogard, Honeywell, IRLDS, JAM, Martek, Mc Quay, MSA, Murco, O I Analytical, SenTech, Toshiba, TQ Environmental, Trane, Yokagawa

<u>Indirect or Parametric monitoring systems</u> consist of a series of measurements and calculations that model whether refrigerant leaks are occurring. In a parametric monitoring system, sensors measure parameters such as temperatures, pressures, fluid levels, electrical power demand, refrigerant flows, etc. at critical points of the refrigeration system and transmit data to a control panel or computer. The computer will log the measurements and continuously calculate whether a leak is occurring. The computer would alert the operator if the model indicated that a leak is potentially occurring. The model and inputs used in a parametric ALD must be demonstrated to be able to promptly alert the operator of a leak.

<u>Alternative monitoring systems</u> consist of alternative processes that can be demonstrated to the satisfaction to ARB to be at least as effective as a direct or indirect monitoring system. This option may be useful for facilities at which the conventional monitoring systems are impractical or impossible to implement. A facility opting to use an alternative monitoring system must request approval of the system in a written request to ARB.

What components of the refrigeration system must be monitored with an ALD?

If a facility has installed a direct automatic leak detection system the <u>sensors or intakes should be placed</u> so that they will continuously monitor and rapidly respond to the

presence of refrigerant concentrations in air in proximity to components and in areas with a high potential for a refrigerant leak. This includes components such as compressors, evaporators, condensers, and other areas of high probability of refrigerant leaks.

An indirect monitoring system should monitor the suite of parameters that, together, would indicate the presence of a leak. An indirect monitoring system would not generally monitor a single parameter. Multiple parameters and a model consisting of a calculated relationship between them are usually necessary to get an accurate indication of whether a leak had occurred. This model would monitor the relationships between multiple temperatures, pressures, and fluid levels throughout the system. External factors such as the ambient temperature and temperatures in the refrigerated spaces are usually also important. The measured parameters and the model results should be logged by the control room computer system.

Both direct and parametric ALDs should monitor components and parameters that will rapidly and sensitively alert the operator of refrigerant leaks. If leaks occur and the ALD does not respond appropriately, modification of the ALD should be considered.

A facility with all components outside except the evaporators should have an ALD on the evaporator. The ALD can be a direct system with sensors placed in the vicinity of the evaporator or it can be an indirect system if the refrigeration system has pressure, temperature, and other automatic outputs that would signal the operator in the event of a leak. A facility can also apply for an alternative test method if the alternative can be demonstrated to be equally, or more effective than an ALD for the particular installation. Substitution of an alternative test method must be demonstrated to the written satisfaction of the Executive Director to be equally or more effective than an ALD.

The components that are outside must be inspected for leaks at least every three months.

What is the required detection limit and alarm set points for an ALD?

A direct ALD must accurately detect the concentration in air of the appropriate refrigerant to a level of 10 parts per million and alert the operator when the concentration meets or exceeds 100 ppm (Section 95385(a)(5)).

An indirect ALD must automatically interpret measurements of the refrigeration system and alert the operator when the measurements indicate the loss of 50 pounds or 10% of the refrigerant, whichever is less (Section 95385(a)(6)).

If I receive an alert from my ALD, what should I do?

If the ALD alerts the operator to the presence of a leak, a leak inspection should be conducted within 24 hours of the alert. The leak inspection should use a calibrated leak detection device or a bubble test to confirm the leak and determine the location of the leak.

Do I need an ALD for a refrigeration system that is not operated year-round?

No, refrigeration systems that are not intended to operate year-round are not required to have an ALD; however, one may be installed at the owner's option. An example of a facility which is likely to have seasonal refrigeration systems is an agricultural packing house that operates during the harvest season and, after the produce is shipped out at the end of the season, sits idle until the next harvest season.

If a system that is not operated year-round does not have an ALD it must be inspected for leaks within 30 days of starting operation for the season and every three months while operating. If the system was operating and inspected within the previous 90 days before starting operation for the season the 30 day inspection is not required. The system will continue to be inspected every three months based on the schedule of the prior operational period, in which case the next inspection is due as if the shutdown period between seasons does not exist.

Are annual audits and calibrations required if the ALD manufacturer certifies that they are not required?

No, formal audits and calibrations are not required if the ALD manufacturer certifies that the system remains accurate without annual calibrations. The ALD should still be audited to the extent that the facility should confirm, at least annually, the ALD is operating as it should and is producing appropriate and accurate readings. This annual confirmation should be entered in the ALD section of the R3 Leak Inspections and Service Records tab. Select "Others" in the Type of Service field and note in the comments that this is a self-calibrating ALD system.

When registering the ALD system, select the 'Self-calibrating" monitor type in the System Type field. Records must be retained on-site that verify this claim and that the ALD is being operated in the proper manner which will maintain the manufacturer's certification. Unless these records are maintained on site, the annual audits and calibrations will be required. Periodic audits by the facility could be used to verify this.

Although it may seem unnecessary to add a record indicating that no annual audit or calibration was required, unless at least one service record is entered annually for each ALD, your facility will be automatically flagged by the R3 system for missing the required annual ALD inspection.

How do I conduct leak detection and monitoring on a low pressure refrigeration system?

Low-pressure chillers are typically centrifugal chillers operating under a vacuum in the evaporator section of the system. The condenser and compressor sections could be at a slightly negative pressure or up to 15 psig positive pressure. By the nature of the systems being under a vacuum, any leaks in the low-pressure portions of the system will draw in atmospheric air and moisture. A purge unit will remove air and other non-condensables from the refrigeration systems. Moisture is typically removed by a filter dryer.

One of the best indicators of leaks in low pressure systems is how often the purge system operates. A purge system that operates frequently is a strong indicator that a leak is occurring. On a well maintained refrigeration system without leaks the purge unit will record little or no purge time for months on end.

Effective monitoring of a low pressure chiller may be a hybrid of conventional concentration monitors on the high pressure portions of the system above atmospheric pressure and parametric monitoring of the purge unit on the low pressure portions of the system below atmospheric pressure. A calibrated electronic leak detection device or soap bubble solution should be used to detect leaks in any section of the system at positive pressure. In addition to the inspections and maintenance of the main refrigeration system, the purge system, being itself a refrigeration system, should be regularly inspected and maintained.

For additional information, please see Appendix A of this guidance document.

Leak Repairs

What is the time limit for completing leak repairs?

Refrigerant leaks must be repaired within 14 days of detection. In specific situations additional time is allowed.

Is there relief from the time limit if a technician is not available or parts are not available?

Yes, in specific circumstances more than 14 days is allowed to complete the repairs. Written records must be kept that document conditions that justify an allowance of more than 14 days to complete the repairs.

- 45 days are allowed for the completion of the repair if <u>one or more</u> of the following conditions apply:
  - A certified technician is not available.
  - The parts necessary to repair the leak are unavailable. A written statement from the refrigeration system or repair part vendor must be kept in the facility records stating that the parts are not available.
  - The leak repair requires an industrial process shutdown that results in a process temporarily ceasing to manufacture the intermediate or final product.
- 120 days are allowed for the completion of the repair if <u>all</u> of the following conditions apply:
  - The facility is subject to Mandatory Greenhouse Gas Reporting requirements.
  - The refrigeration system is an industrial process refrigeration appliance.
  - The leak repair requires an industrial process shutdown that results in a process temporarily ceasing to manufacture the intermediate or final product.
- An indefinite time period is allowed to complete the repair if the refrigerant is evacuated and the system is mothballed. During the time the system is mothballed the clock on the repairs is temporarily stopped, the time limit resumes on the day the system resumes operation. System mothballing applies if the system is intentionally shut down for at least 60 days and the refrigerant is evacuated from the system or the affected component.

Who can conduct the leak repairs?

Refrigerant leaks must be repaired by technicians holding an applicable EPA certificate issued in accordance with 40 CFR 82.161. An apprentice repair technician can work on the repair if they are under the direct supervision of a technician holding an EPA certificate.

The certified technician making the repair must also hold a valid C38 California contractor's license or be employed by a contractor with these qualifications. If the

refrigeration system is also used in an air-conditioning application, a C20 contractor's license is acceptable. The contractor's license is not required if the technician is an employee of the facility; or if the repair costs less than $500 for all labor, materials, and all other items.

Following the guidance from the U.S.EPA, a certified technician is not required to perform service, maintenance, or other activities that are not reasonably expected to release refrigerant. Tightening nuts and bolts on flanges and working on electrical systems would fit this criterion. Doing repairs on an evacuated system also would qualify; however, a certified technician would be required to evacuate and refill the system. A certified technician would be required for any repair that could reasonably release refrigerant. In addition to working on a system that is charged with refrigerant and evacuating and refilling a system, any activity in which hoses and gauges are attached to the system is considered to have the reasonable potential to release refrigerant and would require a certified technician. If the hoses and gauges are not properly attached or removed there is the potential for release. The brief puff of refrigerant inherent in properly attaching and removing the hoses and gauges is not considered to be a release of refrigerant.

The following table summarizes common maintenance and repair activities and whether or not a certified technician is required for the activity.

Activity	Is a certified technician required?	
	Yes	No
Evacuating the refrigerant	X	
Adding refrigerant	X	
Changing the oil	X	
Adding oil	X	
Replacing a gauge	X	
Changing or calibrating a DP cell	X	
Changing a pressure relief valve	X	
Drawing a sample of refrigerant or oil	X	
Helping to dismantle a system for disposal, if that person's work may reasonably result in a release of refrigerant	X	
Any of the tasks listed above, performed under the direct supervision of a certified technician	X	
Maintenance that would not reasonably release refrigerant (such as painting, leak-checking, some electrical work, and some insulation work)		X
Fixing leaks by tightening nuts or bolts, if no specific reason to think the activity may go wrong and increase the rate of release		X
Any work on the system after the refrigerant has been evacuated to the extent required by the regulation		X

Source: U.S.EPA

Can an apprentice or trainee technician work on my refrigeration system?

Yes. An apprentice or trainee can work on a refrigerant system when a certified technician is required if they are registered in an apprenticeship and training program. They must be under direct supervision of a certified technician. This provision is limited to two years, after which the apprentice or trainee must pass their certification test. The apprenticeship program must be registered with the national Bureau of Apprenticeship and Training or the California Apprenticeship Council.

In an emergency can a trained, but not certified technician repair my refrigeration system?

Yes. Here again the U.S.EPA offers guidance. In a bonafide emergency, such as if a major leak occurs in the middle of the night on a Sunday night a certified technician may not be available to immediately respond. The EPA has reasoned that it is better to have a trained, but not certified technician make repairs than the system be allowed to release large quantities of refrigerant. This guidance carries several caveats: the technician must be competent and well trained, the incident must be a true and immediate emergency, the leak must be a major leak requiring immediate attention, and a certified technician should review the work as soon as possible. This provision would only apply to the immediate repair of the system to stop the leak, the recharging of the system to replace lost refrigerant must be conducted by a certified technician. In addition, a detailed explanation (including the exact time and nature of the incident and repair) of the reasons and conditions for using a trained, but not certified technician should be made in the leak repair record recorded in R3 and in the on-site records.

What if I'm unable to successfully repair the system?

If a leak repair is unsuccessful within the allowed 14 day (or 45 or 120 days if allowed) time period the user is directed to continue to attempt to repair the system. If it still cannot be repaired at the conclusion of the allowed time period the facility must either obtain an exemption if they are qualified for one, or formulate a retrofit or retirement plan. An exemption is only given in response to a written request and only under very specific and limited conditions.

What are the initial and follow-up verification tests?

The initial and follow-up verification tests are tests to confirm that the system has been successfully repaired.

The initial verification test is an initial indicator whether the repair has fixed the leak. If the refrigerant charge was removed from the system or component the initial verification test is conducted before the system or component is recharged. If the system or component was not evacuated the initial verification test is conducted as soon as practicable after the repair has been made. The system is usually pressurized, but has not attained normal operating conditions.

The follow-up verification test is a test conducted after the system or component has been put back in operation and has attained normal operating conditions. This test demonstrates that the repair continues to hold and will stop the leak when the unit is placed back in normal operation. The follow-up verification test can be conducted on the same day as the repair is made if the system returns to normal operating conditions that quickly or at a later date. It must be conducted within 30 days of returning to normal operation.

Annual Reports and fees

When do I submit an Annual Report?

Facilities with refrigeration systems must submit an Annual Report between January 1 and March 1 of each year. Large facilities were required to begin submitting their Annual Reports in 2012 for the operating year 2011. Medium facilities begin submitting their Annual Reports on the same schedule beginning in 2014. Although small facilities are required to submit a one-time registration by March 1, 2016, they will not be required to submit Annual Reports.

Before an Annual Report can be generated the registration for the facility and its refrigeration systems must be complete and up to date. In addition, all service records for the refrigeration systems and ALD systems must have been entered in the R3.

Distributors, wholesalers, and reclaimers must also submit an Annual Report by March 1 of each year. All distributors, wholesalers, and reclaimers were required to submit their reports beginning in 2012.

How do I submit the Annual Report?

The Annual Report may be submitted by mailing a printed hard copy to the ARB; however, the preferred and simpler way is to use the R3 tool to submit it online. The R3 tool will automatically summarize all the service records that have been entered into the tool and present them in the proper format with a few clicks of the mouse. The only information that will need to be entered in the tool while submitting the report is the amount of refrigerant purchased during the year, the amount stored in inventory for future use in the system, and the amount of refrigerant that was disposed of. Additional information on how to submit the report is available in the R3 tool User's Manual and in an additional section later in this Guidance Document.

When do I pay the Annual Implementation Fee?

For large and medium facilities the Annual Implementation Fee is due on the same schedule as the Annual Report; i.e. by March 1 of each year. Small facilities are not required to pay annual fees.

How much is the Annual Implementation Fee?

The Annual Implementation Fee is a fixed amount regardless of the number of refrigeration systems at the facility and based on the largest system at the facility. For facilities whose largest system is a large system the fee is $370. For facilities whose largest system is a medium system the fee is $170.

How do I pay the Annual Implementation Fee?

The Annual Implementation Fee may be paid by credit card online using the R3 tool, or by printing the invoice and mailing a check to the ARB. In most cases the online credit card payment method is easiest. In addition, by using the online credit card payment method the facility's records in the R3 are immediately marked as paid. If the check method is used the facility's records are not marked as paid until the check is received by ARB and entered into the R3 tool by ARB accounting division. The user's credit card information (credit card number, etc.) is not retained by ARB. Credit card transactions are processed by a secure third-party credit card processing company. Additional information on how to submit the report is available in the R3 tool User's Manual and in an additional section later in this Guidance Document.

Enforcement

Who is going to enforce the regulation?

The RMP is a statewide regulation and, at this time, the majority of the enforcement will be done by ARB Enforcement Division.

The South Coast Air Quality Management District has passed an equivalent local rule, Rule 1415.1, and can enforce the regulation through this local rule. The District coordinates its enforcement with ARB to ensure statewide consistency in how the regulation is enforced.

What are the penalties for not being in compliance with the regulation?

Fines for non-compliance are based on the penalties set forth in sections 42400 through 42405 of the California Health and Safety Code. There is a separate violation for each day that a violation continues, such as a late report, so penalties grow with time. When enforcing the regulation, ARB Enforcement Division follows their enforcement policy document.

South Coast AQMD

Background

In the 1990's South Coast AQMD passed Rule 1415 to reduce the emissions of Class I and Class II refrigerants in stationary, non-residential refrigeration and air-conditioning systems containing more than 50 pounds of refrigerant. These refrigerants are substances with the potential to deplete the ozone layer. Facilities with refrigeration systems or air-conditioning systems using these substances were required to register and report their refrigerant use and leakage to the District beginning in 1992. They also were required to repair leaks within 14 days of finding the leak. Many of the requirements of Rule 1415 were adapted in ARB's Refrigerant Management Program.

When ARB passed the RMP regulation, South Coast AQMD amended Rule 1415 to regulate both ODS and alternative high global warming potential (high GWP) refrigerants in air-conditioning applications only. A new rule, Rule 1415.1, was passed by South Coast to regulate all high GWP refrigerants in refrigeration systems, closely following the RMP regulation. Rule 1415 remains in effect for air-conditioning systems at facilities in the South Coast AQMD jurisdiction.

Do I still need to comply with South Coast AQMD Rule 1415?

Yes. Facilities in the South Coast AQMD air district with systems using high GWP refrigerant that are used solely for comfort cooling, i.e. air-conditioning, must continue to comply with [Rule 1415](#). Facilities should continue to register their air-conditioning systems with the District.

Do I need to register and report my refrigeration systems with both South Coast AQMD and ARB?

No. Facilities in the South Coast AQMD should register and report with the District until such time as they phase into registering and reporting to ARB. Facilities with large refrigeration systems registered and began and reporting to ARB in 2012. Facilities with medium systems will register and begin reporting to ARB in 2014. Until the 2014 registration date, medium facilities must continue to register with the District. Facilities whose largest system is a small system will register with ARB in 2016. Until 2016 small facilities will continue to register with the District. Once facilities register and begin reporting to ARB they do not need to submit a registration to the District.

Note that air-conditioning systems at facilities in the South Coast AQMD continue to be regulated under District Rule 1415 and those facilities should continue to register and report their air-conditioning systems to the District.

Refrigerant Registration and Reporting System (R3) Guidance

Login and accounts

Who should create a user login account on the R3?

Companies and facilities with refrigeration systems, refrigerant distributors and wholesalers, and refrigerant reclaimers should create a login account on the R3 so they can enter their facility registration information, refrigeration system inspection and repair records, and ALD system service records; file annual reports; and pay fees. The general public does not need to create a login account; there are a number of reports that are available to the general public directly from the initial page of the R3 without logging into the system.

The login, account management, and registration process is completely controlled by the user, ARB does not create or maintain user accounts. Although persons with an ARB Admin level account can assist and reset a user's account if there are problems.

How do I log into the R3 for the first time?

The first person to login to the R3 tool for a company will create a Company Admin level user account. Such a user has privileges to enter and edit all information about the company and any facility under the company. They can also create the following additional users: additional Company Admin users with the same privileges as themselves; Facility Admin users who have similar privileges, but limited to the individual facility; Company Staff level users and Facility Staff level users who have less access rights; and Service Personnel who have basic rights sufficient to enter service records into the R3.

If the company is a distributor, wholesaler, or reclaimer, the first login account is created as a Distributor/Wholesaler Admin or a Reclaimer Admin. That initial user can create additional Distributor/Wholesaler Admins or Reclaimer Admins.

When the initial user creates additional users of any level that new user is assigned a machine generated password and they are sent an email with the new account login information. When the new user first logs into the R3 system using the emailed login information they are asked to create two security questions and to change the computer generated password to one of their choosing.

How do I find help while using the R3 tool?

Help buttons (displayed as small circled question marks ❓), are provided throughout the R3 tool. Clicking on one of the buttons brings up a popup page of help topics. On many pages there is also a button near the top of the page to give help at the page level. There is a complete User Manual available through the R3 Home red bar menu options. When clicking to continue to the next page, if a required entry is missing or not formatted correctly the program will alert the user with a statement at the top of the page.

Data entry

What fields in the R3 tool are mandatory to complete?

The R3 tool has certain fields marked with an asterisk (*) as those fields which are required by the program before the information on that page of the R3 can be saved or in order to move to the next page. However, nearly all the rest of the fields on each page of the R3 are required by the regulation. To be properly registered, a facility must complete all the information.

The company level information (except EIN) is not required by the regulation, but is required by the R3 to create the company / facility hierarchy structure which allows companies to manage their subsidiary facilities. At the facility level all information is required by the regulation except the contact person's position. At the system registration level all information is required by the regulation except the location description (although the location of the system on a floor plan uploaded into R3 is required by the regulation), and the operational status of the system. Full documentation of the ALD is required by the regulation recordkeeping requirements. Entry in the R3 tool will help fulfill that recordkeeping requirement. The R3 uses the ALD system information entered to relate the system to the refrigeration systems that are required to be monitored and to generate the Annual Report. The ALD system is required to be in place and operated in accordance with the regulation and all service records of audits, calibrations, and other service are required in the Annual Report.

Facilities completing the registration by XML upload should check each page of the R3 registration to be sure all information required by the regulation has been entered. Since the XML process is quite rigorous in its formatting and uploading, and the refrigerant management software vendors may have variations in how they store data, certain fields of the XML are termed 'optional' for the XML process, those fields may

have to be manually entered after the XML upload to completely and properly register the facility and ensure compliance with the regulation.

What information should I have ready when I go to R3 to register?

Before a user begins to register their company and facility specific information should be on hand. Drop down lists have been used in as many places as possible for consistency and to simplify data entry.

Company registration

- Type of company – Is the company a company with refrigeration systems, a distributor or wholesaler of refrigerants (in this case, distributor refers to a company that distributes refrigerants, not refrigerated goods like frozen fish), or a refrigerant reclaimer?
- EIN (federal tax ID number) – This 9 digit number is used within the R3 tool to assure uniqueness of the company records.
- Will more than one facility be registered under the company? - The company / facility registration process is a two-step process; first a company registration is created describing the higher level, or corporate level, entity and then the individual, or store level, facilities are created under the company banner.
    - o For example: a supermarket chain would register the chain name (maybe something like the Safeway supermarket chain) at the company level and each local store as a facility.
- Is the person authorized to create the registration? – Only persons who are authorized by the company should create the registration. The initial person to create the company registration becomes the initial system user with a 'company admin' type user rights. They can then create additional users at company and facility user types up to and including other company admin users.
- Company contact person – The person at the company with responsibility for operation of the refrigeration system. This can be the same or a different person from the initial user; this is up to the company. A login account is not automatically created for the company contact person. If an account is desired for this person, the initial user can create one for them.
    - o For example: The initial user may be the environmental person for the company or the refrigeration system manager and the company contact person may be the company manager.
- Company address
- Reporting and payment responsibility – Will the annual reports and annual fee payments be handled at the company level or the facility level? If there are

multiple facilities under the company will each facility file the annual report and pay the fee themselves or will it be done collectively by the company?

<u>Facility site registration</u>

- Facility name – Whatever the company calls the facility.
- Start date – The date when the facility began operation. This is particularly important for facilities that began operation since the regulation went into effect (January 1, 2011). If the proper date when operation began is not entered ARB will assume that the start date predated the regulation and that the facility needs to file their Annual Report and pay the annual fees for previous years.
  - o For example: if a facility began operation in 2013 and correctly entered the start date of operation they are not considered delinquent for the 2011 and 2012 annual reports and fee payments.
- Facility contact person – The person at the facility with responsibility for the refrigeration system. It is up to the facility if this person has a user account on R3.
- Mailing and location addresses – Oftentimes a facility will receive its mail at a different address than the physical location of the facility, thus both addresses are needed. If they are the same there is a convenient check box that automatically fills out the address.
- NAICS and SIC codes – The business type as classified by the North American Industrial Classification System code and Standard Industrial Classification code. If you don't know the number click on the Browse button to search for your business type or click on the help button to go to the <u>US Census Bureau</u> and <u>Department of Labor</u> web sites for more information.

<u>Refrigeration system registration</u>

- Refrigeration system ID – Whatever you choose to call the system.
- Installation date – Like the company and facility start dates, this date notes when the system began operation. This can be important for newly installed systems and would note when the leak inspection and repair record should begin. Also, if a medium facility installs a new large system it will change the RMP size classification of the facility with the ensuing changes in ALD requirements, leak inspection requirements, reporting requirements, and fee amount.
- Manufacturer, Model, Model Year, and Serial Number – These describe the refrigeration system type.
- Equipment type – Is the system used as a freezer, chiller, or refrigeration system?

- Location description – This is a text field to describe where in the facility the system is located.
- Location floor plan – This is an upload of a plan of the building showing the location of the system. The locations of Automatic Leak Detection (ALD) system inlets or sensors should also be noted on the plan if an ALD is in use. It doesn't need to be an elaborate or architect's plan; a simple line drawing will suffice. Several file types are supported for these plans: jpg, jpeg, png, gif, pdf, doc, xls, docx, xlsx.
- Temperature class – Is the relative temperature of the application for high, medium, or low temperature?
- Operation – Describe the operational status of the system. If the system is not currently operating, i.e. shut down or mothballed, etc. please return to the R3 system registration and update the status when the system is put back in operation.
- Refrigerant type and amount – Enter the type and amount of refrigerant used in the system.
- Means by which charge amount was determined – How was the charge amount determined?

Automatic Leak Detection (ALD) system registration

- ALD system ID – Whatever you choose to call the system.
- Installation date – Like the company and facility start dates, this date notes when the ALD system began operation.
- System type – ALD systems can be divided into two types: direct systems that measure refrigerant in air and indirect (parametric) systems that measure operating conditions and parameters changes in which can indicate that a leak is occurring. Some direct monitors are certified by the manufacturer to be self-calibrating to not need annual calibrations. If a self-calibrating monitor type is selected records must be retained on-site that verify this claim and that the ALD is being operated in the proper manner which will maintain the manufacturer's certification.
- Detection limit and alarm set point – The RMP regulation requires that an ALD be able to detect 10 ppm refrigerant in air and alert the operator if the concentration exceeds 100 ppm.
- Concentration monitor type – Direct ALD systems may deploy sensors that return an electronic signal to a central control system at various monitoring points around the refrigeration system or they may deploy inlets that bring a sample of the air at the sampling points to a central control system that also contains the analysis equipment.
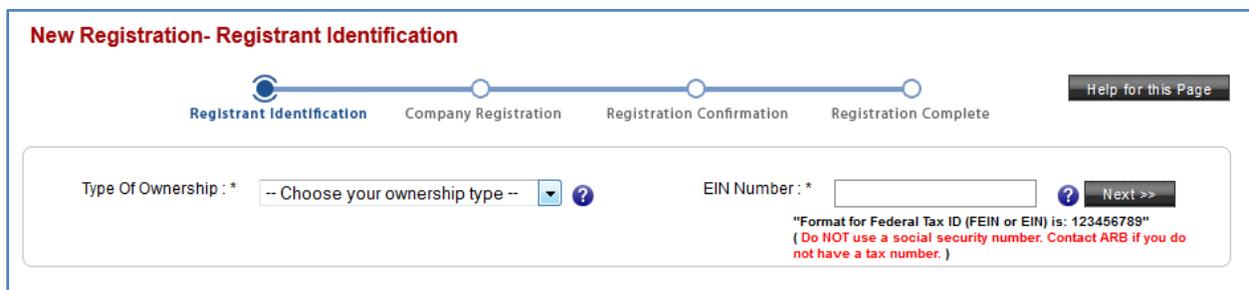- ALD system manufacturer

- Type and manufacturer of the sensors
- Number and location of the sensors – How many sensors are deployed in the system and a text description of where they are. If the locations are included on the facility floor plan required in the refrigeration system registration the description of their locations is simplified.
- Refrigeration system associated with the ALD – Which refrigeration system(s) are monitored by the ALD? A pick list of the refrigeration systems that have been registered is presented; the user can select one or multiple refrigeration systems from this list.

How do I create a company registration?

The company / facility registration process is a two-step process; first a company registration is created describing the higher level, or corporate level, entity and then the individual, or store level, facilities are created under the company banner. Using a grocery chain example, the company level is the corporate home office and the facility level is each individual local store or warehouse which has the affected refrigeration systems.

The company registration process is described below. Users can also use the help buttons (small circled question marks ❓) provided on data entry screens throughout the tool. Please note: when clicking to continue to the next page of the registration, if a required entry is missing or not formatted correctly, the program will alert the user to the problem with a statement at the top of the page.

Beginning at the initial login page of the R3 tool, a new user should click on the 'Sign Up for New Registration' link in the blue box on the right side of the page. This brings up the Registrant Identification page. Select the type of company: a Company with

Refrigeration Facility, Refrigerant Distributor/Wholesaler, of Refrigerant Reclaimer and enter the company's 9 digit Federal Tax ID number (EIN), this number is only used internally in the R3 to prevent multiple records of a single company and is not publicly

divulged. Click on 'Next' and answer the two identification questions. Continue by clicking on the 'Continue' button.

The top part of the Company Registration page is to create the initial user account (see the 'How do I log into the R3 for the first time?' section of this manual); note that the telephone number is entered as 9 digits without punctuation and the user name must be

User Profile

Salutation : * [Mr ▼]   First Name : * [   ]   Last Name : * [   ]
Email : * [   ]
Verify Email : * [   ]   Telephone : * [   ] - [   ]
                                                    (Format XXXXXXXXX)

Username : * [   ]   Password : * [   ]   Confirm Password : * [   ]
(Minimum 6 characters)
Hint Question 1: * [What is your mothers maiden name ▼]   Hint Question 2: * [In what city was your father born? ▼]
Hint Answer 1: * [   ]   Hint Answer 2: * [   ]

at least 6 letters or numbers, the only punctuation allowed is a period. The lower portion of the page is to create the Company profile. Fill out the lower portion of the page and clink on 'Next'. After clicking on 'Next' a confirmation page will appear, read and accept the 'Terms and Conditions' statement and click on the 'Submit' button. The company registration is now completed. The user can proceed to the facility registration process to enter their facilities with refrigeration systems.

Company Profile

Company Name : * [   ]   EIN : * [*******321]

Contact Person Information

Salutation : [Mr ▼]   First Name : * [   ]   Last Name : * [   ]
Position : [   ]   Phone : * [   ] - [   ]
                             (Format XXXXXXXXX)
Email : * [   ]

Mailing Address Information

Street Address 1 : * [   ]
Street Address 2 : [   ]
City : * [   ]   State : * [Please Select... ▼]   Zip : * [   ]

Billing Address Information ❓

☐ Billing address is same as mailing address.
Street Address 1: * [   ]
Street Address 2 : [   ]
City : * [   ]   State : * [Please Select... ▼]   Zip : * [   ]

Payment Responsibility (if applicable) ❓

Who is responsible for making payments? ⦿ Company ○ Facility

[<< Back] [Next >>] [Cancel]

How do I create facilities in my company?

Once the company registration is completed, the facility can be created by the Company Admin by entering the information in the facility management process or by batch upload via the XML process.

To create the facility through the facility management process the Company Admin begins at the home page after logging into the R3. Click on the Manage Facility link either on the quick links on the left side of the page or on the dropdown via the Registration tab in the red bar at the top of the page. The resulting Facilities page will list all facilities registered for the company. This page will be blank the first time a user comes to it since no facilities have been entered yet. To add a new facility, click on the 'Add New' button below the list of facilities. Enter all the information on the popup form shown below. If the contact person, mailing address, or location address is the same as the company person or address the check box can be used to fill in the fields from the company registration information. The NAICS code and SIC code can be filled in either by typing the number, if known, of selecting from a browse popup window.

Click on the 'Save and Submit' button to save the new facility information and return to the facility list page, the new facility will appear on the list.

Although all information on the popup form is required by the regulation, only the fields marked with an asterisk (*) are required by R3 to complete the date input. This allows a user to get the basics completed and gives them time to gather the additional information. To be completely registered and in compliance, all data fields must be completed. As with other data input pages, help is available by clicking the circled question marks ( ) and, where applicable, convenient dropdown lists are provided.

How do I register refrigeration systems for a facility?

Once the company and facility registration is completed, the refrigeration systems at the facility can be added by the Company Admin or Facility Admin by entering the information in the system management procedure or by batch upload via the XML process.

To create a new refrigeration system record at the facility through the facility management process begin at the home page after logging into the R3. Click on the 'Manage Facility' link either on the quick links on the left side of the page or on the dropdown via the 'Registration' tab in the red bar at the top of the page. The resulting 'Facilities' page will list all facilities registered for the company, click on the appropriate facility. The facility can also be directly accessed by clicking on the linked facility name in the summary block at the bottom of the home page.

To add a new refrigeration system, select the 'Refrigeration System' tab and click on the 'Add New' button below the list of refrigeration systems. Enter all the information on the popup form. Although all information on the popup form is required by the regulation, only the starred fields are required by R3 to complete the data input. This allows a user to get the basics completed and gives them time to research the additional information. To be completely registered all data fields must be completed. As with other data input pages, help is available by clicking the circled question marks ( ). Where applicable, convenient dropdown lists are provided to aid in data entry.

After entering the refrigeration system information, click on the 'Save & Submit' button or, if additional systems are to be entered, the 'Save & Add More' button. The new refrigeration system will appear in the list on the 'Refrigeration System' tab.

How do I enter Automatic Leak Detection (ALD) systems for a facility?

Once the company and facility registration is completed and the refrigeration systems at the facility have been entered, the ALD system information can be entered by the Company Admin or Facility Admin by entering the information in the system management process or by batch upload via the XML process.

To enter a new ALD system record at the facility through the facility management process, begin at the home page after logging into the R3. Click on the 'Manage Facility' link either on the quick links on the left side of the page or on the dropdown via the 'Registration' tab in the red bar at the top of the page. The resulting 'Facilities' page will list all facilities registered for the company, click on the appropriate facility. The facility can also be directly accessed by clicking on the linked facility name in the summary block at the bottom of the home page.

To add a new ALD system, select the ALD System tab and click on the 'Add New' button below the list of ALD systems. Enter all the information on the popup form. In the 'Refrigeration System' field select one or more refrigeration system(s) that the ALD monitors.

Help for this Page

Add New Leak Detection Equipment(If Applicable)

ALD System ID : *
Installation Date : *
System Type : * Please Select...
Detection Limit : 10
Alarm Set Point : 100
Concentration Monitor Type : Please Select...
Concentration Monitor Manufacturer : Please Select...
Number of Sensors :
Sensor Type : Please Select...
Sensor Manufacturer :
Location of Sensors/Inlets :
Refrigeration System : * System 1
Webinar2012 Facility 2 System 2

Save & Submit   Save & Add more   Cancel

Although all information on the popup form is required by the regulation, only the fields marked with an asterisk (*) are required by R3 to complete the date input. This allows a user to get the basics completed and gives them time to gather the additional information. To be completely registered all data fields must be completed. As with other data input pages, help is available by clicking the circled question marks (❓). Where applicable, convenient dropdown lists are provided to aid in data entry.

After entering the ALD system information, click on the 'Save & Submit' button or, if additional systems are to be entered, the 'Save & Add More' button. The new ALD system will appear in the list on the 'ALD System' tab.

What information should I have ready when I go to R3 to enter leak inspection and service records?

Before a user begins to enter their leak inspection and service records specific information should be on hand. Drop down lists have been used in as many places as possible for consistency and to simplify data entry. Separate areas have been provided for the service records for the refrigeration system and the ALD system. Both direct and indirect ALD systems must be audited or calibrated annually. Formal audits and calibrations are not required if the ALD manufacturer certifies that the system remains accurate without annual calibrations; however, the ALD should still be audited to the extent that the facility should confirm, at least annually, that the ALD is operating as it

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should and is producing appropriate and accurate readings. This annual confirmation should be entered in the ALD section of the R3 Leak Inspections and Service Records tab. Select "Others" in the Type of Service field and note in the comments that this is a self-calibrating ALD system.

Refrigeration system records

- Type of system – Refrigeration system should be selected here
- Date of service – Enter the date the service was completed
- Type of service – Select the type of service provided
- Leaks detected – If leaks were detected during the service or the service was a leak repair click on the Yes button. Selecting yes will cause several additional fields specifically related to leak repairs to appear on the form (fields noted with * below).
- Added refrigerant amount – Enter the amount of new refrigerant charged into the system. Do not include refrigerant that was removed from the system at the beginning of the service.
- Removed refrigerant amount – Enter the amount of refrigerant that was removed from the system and not returned. Do not include refrigerant that was removed at the beginning of the service and returned to the system.
- Net refrigerant amount – This field will be automatically calculated; no data entry is needed. For a leak repair this is assumed to be the net amount of refrigerant released into the atmosphere.
    - Example 1 – if a facility removes 400 pounds of refrigerant at the beginning of servicing a system, repairs a leak, and returns all 400 pounds back into the system and adds an additional 100 pounds the net leak amount will be 100 pounds. In the Added Refrigerant Amount field enter 100 pounds since this is the amount of new refrigerant used and in the Removed Refrigerant Amount field enter 0 pounds since all the refrigerant was returned to the system.
    - Example 2 – if a facility removes 400 pounds of refrigerant at the beginning of servicing a system, repairs a leak, adds 500 pounds of new refrigerant, and sends the 400 pounds removed at the outset of servicing to a reclaimer the net amount will be 100 pounds. In the Added Refrigerant Amount field enter 500 pounds since this is the amount of new refrigerant used and enter 400 pounds in the Removed Refrigerant Amount field since this is the amount that was removed and not returned to the system.
- Refrigerant type – This field will be prefilled with the type of refrigerant used in the system from the system registration records.

- Leak detection method – Select the leak detection method used in this service event to look for leaks in the system.
- Purpose of added or removed charge – Select the reason refrigerant was added or removed. If refrigerant was added for seasonal adjustment a like amount should eventually be removed at the end of the season. If at the end of the season the facility does not need to remove refrigerant there must be a leak that reduced the charge to the off-season amount. Continual additions of refrigerant for seasonal adjustment without removals will be a flag that a leak is occurring. Since a person must not add refrigerant to a system known to have a leak Topping Off is prohibited unless the additional charge is required to maintain operation while preparing or conducting a leak repair. If Topping Off is necessary to maintain operation, a leak inspection and leak repair must be conducted within 14 days since a leak is likely occurring.
- Extra time needed for retrofit / retirement plan – If the system cannot be successfully repaired a retrofit / retirement plan must be formulated. Enter the amount of time that will be needed.
- Cause of refrigerant leak* – Select the leaking component from the list.
- Date leak detected* – Enter the date the leak was detected.
- Date leak repaired* – Enter the date the leak was repaired.
- Days to repair* – This field will be automatically completed from the detected and repaired dates. Unless very specific conditions are met, leaks must be repaired within 14 days of detection.
- Initial verification test date* – An initial verification test must be conducted after repairing a leak to test whether or not the repair was successful. The test must be conducted prior to the replacement of the full charge and before the system, or portion of the system, being repaired is placed back in operation.
- Follow-up verification test date* – A follow-up verification test must be conducted after the system is returned to service and is operating normally to test whether or not the repair is holding at operating conditions. The follow-up verification test must be conducted within 30 days of returning the system to operation.
- Description of leak repair* – Enter a text description of the repair.
- Technician name – Enter the name of the technician who conducted the repair.
- Technician certificate number – If the service concerned the refrigerant circuit and had the potential to release refrigerant or involved adding or removing refrigerant a certified technician is required. Enter the technician's U.S.EPA certificate number. Do not enter social security numbers; some of the early U.S.EPA certificates use the technician's social security number. If a Social Security number is used for the Certificate Number, enter the name and address of the certifying program and the date of certification.
- Technician company name and technician email are optional fields.

- Additional technician information – If more than one technician worked on the service, enter the name, certificate number, and certificate type of the other technicians with comma separated values. Additional information about the technicians working on the system can also be entered here.
- Additional notes – This is a space for notes about the service event.
- Click on the Save and Submit button to save the record.

* required for leak repairs only

ALD system service records

- System type – ALD system should be selected here.
- ALD system – Select which ALD system to enter the service information about.
- Date of service – Enter the date when the service occurred.
- Type of service – Select the type of service from the list.
- Detection limit after service – Enter the estimated detection limit. The regulation requires that a direct ALD system be able to detect 10 ppm refrigerant.
- Alarm set point after service – Enter parts per million of the alarm set point after the service. The regulation requires that a direct ALD system be set to alert the operator when a refrigerant concentration of 100 ppm is reached. An indirect ALD system must be set to alert the operator when measurements indicate a loss of 50 pounds of refrigerant or 10 percent of full charge, whichever is less.
- Click on the Save and Submit button to save the record.

How do I enter required leak inspection and service records for refrigeration systems and ALD systems at a facility?

Once the facility has been fully registered with all its refrigeration systems and ALD systems the user can enter the service records for the refrigeration systems and ALD system. This is probably the most common interaction a user will have with R3. The service records can either be manually entered individually via the R3 data entry process or in a batch process via an XML upload.

To manually add the required leak inspections (e.g. quarterly, annual, etc.) or new service records at the facility through the facility management process, begin at the home page after logging into the R3. Click on the 'Manage Facility' link either on the quick links on the left side of the page or on the dropdown via the 'Registration' tab in the red bar at the top of the page. The resulting 'Facilities' page will list all facilities registered for the company, click on the appropriate facility. The facility can also be directly accessed by clicking on the linked facility name in the summary block at the

bottom of the home page. Once the facility has been selected, add new service records by clicking on the 'Leak Inspection and Service' tab. The resulting page is divided into two sections, the top section lists the refrigeration system service records and the lower section lists the ALD system service records.

To enter a refrigeration system service record click on the 'Add New' button provided below the top, 'Refrigeration System Servicing', section of the page. On the resulting window, select the refrigeration system for which the service record is being entered from the dropdown list of systems at the facility and the date of the service event. Select the type of service from the dropdown list (see the 'What refrigeration system and ALD system service records should be entered?' section of this *Guidance Document* for the types of service records that should be entered). If leaks were detected during the service or this service event is a leak repair click on the 'Yes' button in the 'Leaks detected' field; additional fields will appear in the window to enter the details of the leak repair. Enter the amount of refrigerant that was added to the system

| Facility Information | Refrigeration System | ALD System | Leak insp. & Service | File Annual Report | Annual Fee Payment |

Refrigeration System Servicing   2 Record(s) Found

	Service Date	Facility Name	Refrigeration ID	Refrigeration Type	Leaks Detected
☐	08/15/2012	Webinar2012 Facility...	System 1	R-134a - HFC-134a	No
☐	09/14/2011	Webinar2012 Facility...	System 1	R-134a - HFC-134a	Yes

« Previous   Next »

[Add New]   [Delete]

Leak Detection System Servicing   1 Record(s) Found

	Service Date	Facility Name	ALD system ID	Service Type
☐	07/06/2011	Webinar2012 Facility...	ALD System 1	Callibration

« Previous   Next »

[Add New]   [Delete]

and the amount of refrigerant that was removed prior to beginning the service. In these fields enter the amount of new refrigerant used and the amount that was removed and disposed of. Do not enter the amount of refrigerant that was temporarily removed

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before the service and returned to the system after the repair. If more than one technician worked on the repair, enter the primary or lead technician in the technician fields and enter the other members of the repair team in the 'Additional Technician Information' text box. After all information has been entered, click on the 'Save & Submit' button. The new service record will appear in the list of service records in the 'Refrigeration System Servicing' box.

To enter an ALD system service record click on the 'Add New' button below the lower, 'ALD System Servicing', section of the page. On the resulting window select the ALD system for which the service record is being entered from the dropdown list of systems at the facility and the date of the service event. Select the type of service from the dropdown list. After all information has been entered, click on the 'Save & Submit' button. The new service record will appear in the list of service records in the 'ALD System Servicing' box.

What refrigeration system and ALD system service records should be entered?

The service records entered in R3 should include:

- Periodic and other leak inspections required by the regulation,
- Refrigeration system repairs, maintenance, and
- Leak repairs that concern the refrigerant circuit and have the potential to release refrigerant.

The general repairs, maintenance, and leak repairs must be recorded in R3 and reported in the annual report if they involved the addition of five pounds or more, or one percent of the full charge amount, whichever is greater. Repairs and maintenance that do not concern the refrigerant circuit or do not have the potential to release refrigerant, such as electrical repairs, do not need to be entered unless there is a potential or actual release of refrigerant or refrigerant was added.

The required quarterly and annual leak inspection should be recorded regardless of whether they found a leak or not. If a facility is subject to quarterly leak inspections there should be at least four leak inspection records in the R3 and on-site records and they should be evenly spaced throughout the year. A facility subject to annual leak inspections should have at least one annual record each year at approximately yearly intervals in the R3 and on-site records.

Automatic leak detection system audits, calibrations, repairs, and routine maintenance events also need to be entered. Unless the manufacturer certifies that the system does not require it, an ALD must have an annual audit and/or calibration. Even if an ALD system is self-calibrating, at a minimum, the service records should reflect that the ALD system has been confirmed to still operate properly. An annual service record for the ALD system should be completed, with the type of service noted as "Others", and a comment to the effect that the ALD is certified by the manufacturer to not need an annual audit or calibration, and the system is operating properly and producing appropriate and accurate readings. See also previous Guideline section titled "Are annual audits and calibrations required if the ALD manufacturer certifies that they are not required?"

If leak inspections are conducted more frequently than required by the regulation not every leak inspection needs to be recorded in R3. For example, some facilities survey the system for leaks daily or weekly. If a facility does frequent leak inspections they will be more likely to quickly find leaks and be able to repair them before losing large amount of refrigerant, but entry of all inspections into R3 may be unnecessary and burdensome. Any leak inspection that finds a leak should be entered into R3 and a leak repair initiated. The facility should pre-designate which inspections will serve as the official quarterly or annual inspections, for example: designate the first leak inspection of each quarter as the official scheduled leak inspection; and enter the results of that leak inspection in R3. The official leak inspections should be regularly spaced throughout the year. Leak inspections are required when additional refrigerant is added and must also be entered. The facility should maintain records of all leak inspections, whether they are the official, scheduled inspection or not.

If leak inspections are conducted more frequently than required by the regulation, do they all have to be entered in the R3 and which ones would count as the required leak inspection?

If leak inspections are conducted more frequently than required by the regulation, not every leak inspection needs to be recorded in R3. If a facility does frequent leak inspections they will be likely to quickly find leaks and be able to repair them before losing large amount of refrigerant, but entry of all inspections into R3 may be unnecessary and burdensome. However, any leak inspection that finds a leak should be entered into R3 and a leak repair initiated. The facility should **pre-designate** which inspections will serve as the official quarterly inspections, for example: the first leak inspection of each quarter; and enter the results of that leak inspection in R3. The official leak inspections should be regularly spaced throughout the year. The facility should maintain records of all the leak inspections, whether it is the official scheduled

inspection or not. In addition, anytime 5 pounds or 1% of the full refrigerant charge, whichever is greater, is added to the system a leak inspection must be conducted and the results recorded in the R3.

What date do I use for the Date of Service?

The Date of Service is the date the service is provided, i.e. when the leak detection inspection, repair, or other service is conducted. If the service takes several days the date to enter is the date the repair or other service is completed.

How do I enter multiple leaks found on the same system found and repaired at the same time?

If distinctly separate leaks have been found and are being repaired at the same time they should be entered as separate service records. For example: if the quarterly leak inspection has found a leak in the compressor, evaporator, and a valve on the liquid line each should be entered as a separate record. However, if the leaks are related they can be entered on a single service record with further description and details in the Description of Leak Repair field. An example of this may be if several leaks were found in the evaporator during the quarterly leak inspection. If a leak is found during a leak inspection, but before the repair can be completed, another leak is found they are separate leaks and should be recorded in separate service records even if they are in the same piece of equipment.

How do I enter multiple technicians working on the system?

If more than one technician was involved in working on the system, enter the name and certification of the lead technician in the technician fields and the name, certificate number, and certificate type of other technicians working on the system in the Additional Technician Information field.

Reports, invoices, and fee payments

How do I create and submit an Annual Report?

To create the Annual Report, begin at the home page after logging into the R3. Click on the File Annual Report link either on the quick links on the left side of the page or on the

File Report link on the dropdown via the Annual Reporting tab in the red bar at the top of the page. The resulting Facilities page will list all facilities registered for the company, click on the appropriate facility. The facility can also be accessed by clicking on the Manage Facility quick link on the left side of the Home Page or directly by clicking on the linked facility name in the summary block at the bottom of the home page.

On the Manage Facility page, select the File Annual Report tab and click on the year link (in blue type with an underline) to file a report for that year. The R3 will collect most of the data needed for the Annual Report from the registration and service information that has been entered.

If the facility purchased the system during the year being reported, click on No to the ownership question and enter the date when the system was acquired. Next is a series of five verification questions, click on each linked question to assure yourself that the information in R3 is current and accurate then click on the verification check box.

The lower part of the page contains a refrigerant purchase and use section. The form will contain a line for each refrigerant used at the facility, based on collected information from the refrigeration system registrations; additional refrigerant lines can be added by selecting the Add Rows box for refrigerants used in systems not affected by the regulation.

| Facility Information | Refrigeration System | ALD System | Leak insp. & Service | File Annual Report | Annual Fee Payment |

File Reports For "rajeev facility6"

Year Of Filing : 2012

Did you own this facility on Jan 01 of Year of filing ○ Yes ○ No

Use the following links to be sure the data being submitted is correct. A check in each check box is your certification that it is correct.

☐ Verify Company Information
☐ Verify Facility Information
☐ Verify Refrigeration System Information
☐ Verify Automatic Leak Detection System Information (if applicable)
☐ Verify Servicing & Leak Repair Information

Refrigerant Purchase and Use Information must be filled in using 2 decimal values, for example, 1500.00. No blanks accepted, use 0.00.

Refrigerant Purchase and Use Information ⓘ

Type	Total Purchased (lbs.)*	Total Charged (lbs.)* - New refrigerant added to refrigeration systems	Total Recovered (lbs.)* - Removed and not returned to refrigeration systems	Total Stored (lbs.)* In inventory, not in refrigeration systems	Total Shipped (lbs.) for Reclamation or Destruction*	Reason	Delete
CARE 30 - Low-GWP hydrocarbon blend							

Add Rows: +

Comment :

[<< Back] [Save] [Review & Submit] [Cancel]

Enter the total weight, in pounds, of each type of the refrigerant purchased during the calendar year in the Total Purchased field.

In the Total Charged field enter the total weight, in pounds, of the refrigerant of each type added to all refrigeration systems using that type of refrigerant. This includes refrigerant added to refrigeration systems less than 50 pounds charge capacity at the facility in addition to the registered refrigeration systems. The Total Charged field is prepopulated with the sum of the refrigerant charged into the systems recorded in the service records. This field is editable. If you know that this sum is not accurate, enter the proper amount. When the field is edited a popup box will ask why the value has been changed, select the proper response.

Enter the total weight, in pounds, of each type of refrigerant recovered during the calendar year from systems using that type of refrigerant. This also includes the refrigerant recovered from refrigeration systems less than 50 pounds charge capacity in addition to the registered refrigeration systems. The Total Recovered field is also prepopulated with the sum of the refrigerant recovered from the systems recorded in the service records and is editable. Like the Total Charged field, if you know that this sum

is not accurate, enter the proper amount. When the field is edited a popup box will ask why the value has been changed, select the proper response.

Enter the total weight, in pounds, of each type of refrigerant stored on-site or off-site for use at the facility on the last day of the year in the Total Stored field. This also includes refrigerant used in refrigeration systems less than 50 pounds charge capacity in addition to the registered refrigeration systems.

Enter the total weight, in pounds, that was shipped during the calendar year to be reclaimed or destroyed in the Total Shipped for Reclamation or Destruction field. Again, this also includes refrigerants used in refrigeration systems less than 50 pounds charge capacity in addition to the registered refrigeration systems.

Once the refrigerant usage data for all refrigerants used at the facility has been entered comments can be entered in the comment field and the Annual Report saved. Click on the Save button to save the draft Annual Report for later review. The Save button does not file the report, but allows a person entering the information to have the draft report reviewed by management before filing. It is important to remember that once the report has been submitted it cannot be changed, so a final review is important.

Click on the Review and Submit button to save the draft report and proceed in filing the report. Clicking on the Review and Submit button brings up a second page of the report that shows all the information included in the report. Near the bottom of the page is a check box that must be clicked on to certify that the report is complete and accurate. There also is a check box that may be clicked if some of the information in the report is confidential. If the confidentiality box is checked a popup window will appear in which the specific information that is confidential and the legally valid reason why it is confidential must be identified.

Confidentiality Statement

Important Notice: Public Disclosure of Submitted Information

All information provided to ARB will be part of a public record and subject to public disclosure unless the person submitting the information asserts a claim of confidentiality by selecting "Yes" below and providing the necessary descriptions of the data and basis for its confidentiality. By selecting "Yes," you are asserting that your submission contains information that is trade secret or that it otherwise contains information that is not public information under California law. Selecting "Yes" does not prevent ARB from releasing some of the information that you are submitting without further notice to you; even with your claim of confidentiality, ARB will release emissions data (which are public under

Do you claim any of this information is confidential under California law? ○ Yes ● No

Certification of the Submittal

Important Notice: Certification of Submitted Information

By submitting my electronic signature via the Air Resources Board's Refrigerant Management Program reporting tool, I hereby certify that this report has been prepared in accordance with the sections 95380-95398, title 17, California Code of Regulations, and that the statements and information contained in the report are true, accurate, and complete. As a User, I agree that documents submitted with electronic signatures, either scanned or using digital ink, or any other electronic format approved by ARB, will be considered valid for certification. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information.

☐ I accept Terms and Conditions.

[<< Back] [Submit] [Cancel] [Print]

After the Annual Report has been reviewed and the check box to accept the Terms and Conditions checked to certify that the report is complete and accurate, click on the File Report button to file the report. Remember, once the report is submitted it cannot be changed. After the report is filed the R3 program will proceed to the Annual Fee Payment tab where the user can generate their invoice and make payment of the annual implementation fee.

How do I account for the inventory of refrigerant stored off-site?

The amount of refrigerant stored both on-site and off-site on the last day of the calendar year that is intended for use at a facility should be entered on the Annual Report in the refrigerant summary section. This refers to refrigerant stored in canisters and tanks at the facility or at another location. It does not include the refrigerant that is in refrigeration systems.

What if I find additional service records or additional information about a service event after filing my Annual Report?

When a user files the Annual Report they certify that it is accurate and complete. Once the Annual Report has been submitted it is final, there is no mechanism to file an

amended Annual Report. If; however, additional information comes to light at a later date, it is important that the record in the R3 is accurate and complete. Additional service records should be entered to record the new information. If the information is an update of an existing service record, a new service record with the same date should be entered to correct the old record and notes entered in the comments field to explain that this is an update of an existing record and explain the reason the update is needed. The existing service record should not be altered since it is part of the Annual Report as submitted.

How do I create and print an invoice?

The ARB does not mail you an invoice; you generate your own invoice through the R3.

Before you can generate an invoice and make your annual fee payment the Annual Report for the facility must be filed. If you have just finished filing your Annual Report you will be forwarded to the Annual Fee Payment tab on the Facility Management page. Otherwise, beginning at the home page after logging into the R3, click on the Make Payments link on the quick links on the left side of the page or on the Make Payments link on the dropdown via the Payments tab in the red bar at the top of the page. The Make Payments tab can also be found by clicking on the Manage Facilities quick link on the left side of the Home Page. The resulting Facilities page will list all facilities registered. A user with a Facility Admin level login will only see their own facility while a user with a Company Admin level login will see all facilities in the company. A Company Admin may create a single invoice for multiple facilities by clicking on the check box for each facility they wish to include on the invoice. Click on the check box for the appropriate facility or facilities and click on the Make Payment button. On the resulting Payment Details page click on the Generate Invoice button. Please note that once the invoice is generated it cannot be changed. Click on the Print Invoice button to display and print the invoice. Once the invoice has been generated it can be printed at any time by clicking on the linked invoice number on the Annual Fee Payment tab of the Facility Management page.

How do I pay the invoice?

After generating an invoice, payment can be made by the on-line credit card method or by sending a check to the ARB.

To pay by credit card click on the Pay Now button on the Payments Checkout page. This function will take you to a secure third-party payment screen, fill out the form and submit the payment. For security reasons, the ARB does not keep any information

about your credit card. Credit card payments are made through a secure third party payment system, ARB will be notified by the third party payment system that you have made your payment. Your account on the R3 will be credited with payment as soon as the credit card payment is approved, usually almost immediately.

To pay by check, include a copy of the invoice with your check and mail it to the ARB. If payment is made by check your account on the R3 will be credited with payment when the check is received by ARB and input into the system by the ARB Accounting department.

If you need to add ARB as an approved vendor before paying the annual fee, the ARB taxpayer identification number (employer identification number) is 68-0288069. A W-9 form (Request for Taxpayer Identification Number and Certification) can be provided upon request. Additional pertinent W-9 information is listed below:

- Name (as shown on tax return): California Air Resources Board
- Federal Tax Classification: Other
- Address: 1001 I Street; Sacramento, CA 95814
- Certified (date): 2-22-12

Where do I send the invoice and payment?

If paying by check, the address to send the invoice and payment is on the invoice:

Air Resources Board
Attn: Accounting
P.O. Box 1436
1001 I St, Floor 20
Sacramento, CA 95812-1436

The XML Batch Upload Process

Background

What is the XML process?

The XML data upload process is a means of uploading facility registration information and service records in a batch process. The process allows a company or facility to enter a lot of information at once. It is a very powerful process and is a great labor saver for companies and facilities with a lot of data to enter in the R3 tool. A prime example of a company that the process is useful for is a company with a number of facilities; such as a supermarket chain.

The latest information about the XML process, the latest XSD template for the XML, and an example XML are all available on the R3 login page and, after logging in, on the red registration tab.

Is the XML process right for me?

The XML process is somewhat complex and is very sensitive to formatting. If a company or facility has a significant amount of data to enter it can be useful, but preparing the file for upload can take a person with good computer skills. It is recommended that the company or facility consult with their IT department to set up the file. Companies and facilities using a refrigerant management software package such as Verisae or A Cook and others may be able to have the software vendor provide the XML file. ARB has worked with several of these vendors in developing the XML process and they are quite well versed in the requirements.

Using the XML Upload Process

How do I register my facility using the XML upload?

To construct the XML to register a facility the user must first create an initial login and company profile. The user creating facility registration records via the XML process must be of the Company Admin user type. The R3 XML process uses the user's company profile to relate the facilities created to the user's company.

The first step in the XML upload process is to test the XML upload file. On the initial page of the R3 tool before you log in use the 'Test your XML' tab on the row of red tabs. If the XML is properly structured the tool will respond that the upload file is OK. This does not mean that the data is accurate, just that it is formatted correctly. If there are errors in the upload file the tool will respond with a description of the errors.

Once the upload file is properly formatted and has been reviewed for accuracy it can be uploaded into R3. In the Registration tab in the red tabs select the 'Batch upload (XML)' option. Enter the title which will be used in the R3 tool for the upload. And browse to the file on your computer for the XML file. Click on the 'Upload' button to upload and enter the XML file data. Once the data has been uploaded it is the user's responsibility to review the data that has been entered for completeness and accuracy.

How do I make the XML upload file?

(text to come)

Appendices

Appendix A

Low pressure refrigeration systems: leak detection and monitoring

Low-pressure chillers are typically centrifugal chillers operating under a vacuum in the evaporator section of the system. The condenser and compressor sections could be at a slightly negative pressure or up to 15 psig positive pressure. By the nature of their being under a vacuum, any leaks in the low-pressure portions of the system will draw in atmospheric air and moisture. A purge unit will remove air and other non-condensables from the refrigeration systems. Moisture is typically removed by a filter dryer.

During the periodic leak inspections required by the RMP regulation an overall visual inspection of the system may give an indication if leaks are occurring. A calibrated electronic leak detection device or soap bubble solution should be used to detect leaks in any section of the system at positive pressure. One of the best indicators of leaks will be how often the purge system operates. A purge system that operates frequently is a strong indicator that a leak is occurring.

Referring to a pressure-temperature chart for R123, a common refrigerant used in low-pressure systems, for a common ambient temperature in a chiller room of 70 degrees a corresponding pressure of minus 6.6 inches of vacuum is indicated. When the chiller is off the entire chiller is at this temperature and pressure; which means that, if there is a leak anywhere on the machine, air is entering the chiller. When the chiller is operating, a common temperature in the evaporator would be 38 degrees with a corresponding pressure of -18.7 inches of vacuum. The condenser of this system would have a temperature of approximately 96 degrees which would have a corresponding pressure of +4.6 psig. When the chiller is operating, and if leaks are in the evaporator or low-pressure sections, air would be introduced into the system; however, if the leaks are in the condenser or compressor sections refrigerant would leak out of the system due to the positive pressure in these sections.

The purge unit is a small independent, adjunct refrigeration system that separates the non-condensables from the refrigerant and recondenses and collects any refrigerant in the exhaust vent stream and vents the remainder of the non-condensables (mostly air). The collected refrigerant is typically returned to the chiller. When air or non-condensables are present, the purge system demonstrates their presence by running the "pump out" compressor. The amount of time the pump out compressor runs is a measure of the presence of a leak, how bad it is and whether it is getting worse over time. A chiller with no leaks would have no pump out time. A chiller with a very small

leak might have 5 minutes of pump out time in a 24-hour period. A chiller with a very large leak might have 20 minutes of pump out time in a 24-hour period or might pump out constantly.

Typically, the purge units have an activated carbon or molecular sieve secondary adsorption canister to significantly reduce the refrigerant emissions. Without the secondary adsorption canister from less than one to many pounds of refrigerant could be vented with each pound of air purged from the system. The secondary adsorption canister should reduce emissions to less than 0.01 pounds (and often much less) of refrigerant per pound of air.

Accumulation of non-condensable gases such as air in the system will cause an increase in condensing pressure in the chiller and result in the loss of operating efficiency. In some installations this increase in condenser pressure and loss of efficiency can be used to trigger the purge unit.

In other installations the purge unit is on whenever the chiller is running or is always on even if the chiller is not running. In these cases the purge unit pump out will cycle based on the temperatures and pressures within the purge unit which indicate if non-condensables are being purged from the refrigeration system. With no leaks, although the purge system is on, the pump out will rarely operate to remove non-condensables.

An additional mode of operation for the purge unit is an adaptive mode which uses the history of the refrigeration system and purge unit to initiate purge unit operation. Which will then operate until it senses no additional non-condensables.

Excessive or increased purge run time and abnormally high condenser pressures could be a sign that there is a leak in the refrigeration system. On a well maintained refrigeration system without leaks the purge unit will record little or no purge time for months on end.

While conventional leak inspections methods using electronic 'sniffers', soap bubbles, or oil residue; leak monitoring; and leak testing may not be effective on the low-pressure portions of the system, a parametric monitoring program that includes monitoring purge frequency, purge time, ultrasonic leak detectors, and system temperatures and pressures will alert the operator to leaks. Some types of secondary exhaust adsorption canisters may require replacement based on purge run time, others will be automatically regenerated. However, these systems should be monitored and regularly repaired or replaced to assure that the purge unit exhaust is not venting refrigerants.

The conventional leak inspections and monitoring should still be conducted on the portions of the system that are above atmospheric pressure such as the condenser and compressor.

Effective monitoring of a low-pressure chiller may be a hybrid of conventional concentration monitors on the high-pressure portions of the system and parametric monitoring of the purge unit on the low-pressure portion of the system.

When a leak is indicated in the low pressure portion of the chiller the system may require pressurization to look for the leak if it cannot be identified through ultrasonic testing. System pressurization can be accomplished by pressurizing the system with an inert gas such as nitrogen or by heating the chilled water in the evaporator, raising the unit pressure into a positive pressure (refer to pressure temperature chart). Raising the chilled water temperature to something above 82 degrees would put it into a positive pressure. A temperature of 100 degrees would yield a pressure of 6.1 psig which is usually sufficient to leak check reliably with an electronic halogen leak detector. After the leaks have been repaired another pressurized leak check may be required. If the refrigerant charge was removed the system needs to be evacuated to remove all non-condensables and moisture. While the system is evacuated a standing vacuum test should be conducted by holding the vacuum for 12 hours at 500 microns and noting any change in pressure. Changes in pressure during the standing vacuum test indicate leaks while under vacuum if all moisture has been removed. Moisture in the system can lead to a misrepresentative standing vacuum test and should be removed before charging the system.

If the purge unit indicates non-condensables with the chiller off or shortly after start-up but not after sustained chiller operation the leak is likely on the high-pressure portion of the system. Conversely, if the purge system indicates non-condensables after sustained operation of the chiller, but not with the chiller off or upon start-up the leak is likely in the low-pressure portion.

In addition to the inspections and maintenance of the main refrigeration system, the purge system, being itself a refrigeration system, should be regularly inspected and maintained.

Additional information on system leak inspections, leak tests, and monitoring for low-pressure refrigeration systems can be found in ANSI/ASHRAE Standard 147-2002.