1. Soap Bubble Test

A simple leak test method can be performed by applying a soap bubble solution to potential leak sources and seeing if bubbles form. This is an inexpensive method that should not pose any explosion hazard and can provide a qualitative estimate of a leak rate. This method cannot work as a dynamic test for systems under vacuum, leak points cold enough to freeze the solution, or points that are inaccessible because of insulation, tightness of space, or some other constraining factor. However, a soap bubble test could be used as a dynamic test in other circumstances. It can also serve as a static test if the insulation is removed, and the system is at an acceptable temperature and under pressure.

2. Electronic Leak Detectors

Electronic leak detectors identify the presence of specific refrigerants and give a reading on the degree of a leak within a range allowed by the detector, usually by an audible alarm that may be accompanied by lights. These detectors have movable probes that can be put into some places where a soap bubble test would be difficult. For example, an electronic detector can be used for the underside of a fitting. However, the effectiveness of electronic leak detectors can be reduced by the presence of insulation, particularly if the insulation was blown with an ozone-depleting substance. Other limitations include the potential for false readings due to previously leaked refrigerants soaking the insulation. Also, the usefulness of these detectors is limited because the point at which a leak is shown may not be the actual spot at which the leak occurred. In some instances, a space between the insulation and the pipe is caused by irregularities in the outer configuration of a pipe, such as flanges or valves. Some electronic detectors heat the sampled gases before analyzing them. Therefore, there could be a risk of explosion under certain conditions. Despite these limitations, in many circumstances, electronic leak detection represents a useful static or dynamic test option.

3. Ultrasonic Detectors

Ultrasonic detectors respond to the high frequency noise generated by a leak. In some instances, these detectors may be appropriate for static or dynamic tests. One major advantage of these detectors is the ability to detect leaks from several feet away. This is particularly useful for leaks that may occur in otherwise inaccessible locations. However, facilities may often

generate background noise that could interfere with the effectiveness of the ultrasonic detectors. Where appropriate, these detectors can be used to perform either static or dynamic tests.

F. Failed Verification Tests

Through this action, EPA is proposing that an industrial process refrigeration system, if taken off-line, not be brought back on-line until a static test indicates that the repairs undertaken have been successfully completed. EPA is further proposing that a dynamic test be performed within 30 days to verify that the leaks have been successfully completed. Since a static test typically does not occur during steady-state operations, test results may not be consistent with the results of the more reliable dynamic test. EPA has considered the possibility of a system failing the dynamic test after the system has been brought back on-line or after the repairs have been made. EPA believes that if a system fails a dynamic test, appropriate action must be taken. EPA is proposing to allow the owners or operators of the system to attempt repairs a second time or take other corrective action that will result in an overall leak rate that does not exceed 35 percent per year. If none of these approaches is successful, then owners or operators of the system would be required to retrofit or retire the facility.

1. Requirement to Retrofit or Retire the Leaking Equipment

EPA is proposing that if the dynamic test indicates that the repairs have not been successfully completed, the owner would be required to retrofit or replace the equipment within one year of the failure to verify that the repairs had been successfully completed or within such longer time period as may be granted under this proposal. EPA believes that where the leak rates for industrial process refrigeration equipment continue to exceed 35 percent per year, it is necessary to retrofit or retire the facility, which could include replacing the existing equipment. Furthermore, within 30 days of a failed dynamic test, the owners or operators of the industrial process refrigeration facility would be required to submit to EPA a plan for retrofitting or retiring the leaking equipment. This requirement would be similar in scope to that described in §82.156(i)(3) of the final rule published May 14, 1993. However, in this case, a copy of a retrofit/replace/ retire plan would be submitted to EPA, rather than just be available to EPA upon request. In addition, the plan would include information concerning the repairs

attempted to date, and the parameters used for the unsuccessful dynamic test.

2. Option for Second Repair Attempt

EPA recognizes that in some cases the industrial process facility may discover, through its failed repair efforts and verification tests, another means for repairing the refrigerant leaks; or perhaps the repairs undertaken by the facility were merely not completed successfully. For example, if the leak was in the valve packing, it is possible that the gland nut was not tightened sufficiently. Therefore, repeating the process of tightening the gland nut may lead to a successful dynamic test. EPA also recognizes the large costs involved with retrofitting or retiring certain industrial process refrigeration systems. Therefore, due to the complexity of adequately finding and repairing leaks, EPA believes that in certain circumstances it may be reasonable to allow the owners and operators of the industrial process refrigeration equipment to have a second opportunity to complete repairs.

EPA is proposing that the owner or operator of an industrial process refrigeration unit be relieved of the obligation to retrofit or replace the equipment if a second attempt to repair the same leaks that were the subject of the first repair attempt is undertaken within 30 days of the failed dynamic verification test or within 120 days in the case of repairs for which an industrial process shutdown is necessary, and is successful subject to the same verification requirements as the first attempt at repair. The owner or operator would be required to notify EPA within 30 days of the successful dynamic verification test and the owner or operator would no longer be subject to the obligation to retrofit or replace the equipment that arose as a consequence of the initial failure to repair the leaks successfully. EPA believes that it is necessary to allow for a second repair attempt and believes that the speed with which this proposed second repair attempt must be accomplished will reasonably limit the amount of refrigerant potentially released to the atmosphere.

3. Option To Reduce Other Equipment Leaks

EPA believes it possible, that while the particular leak originally identified by the owners or operators of the industrial process facility cannot be successfully repaired, other leak sources could be eliminated or practices changed to reduce the annual leak rate to below 35 percent. EPA believes it is not possible to establish a zero leak rate