(5) Location of leaks(s) to the extent determined to date;

(6) Any repair work that has been completed thus far and the date that work was completed;

(7) Plan to fix other outstanding leaks to achieve a rate below the applicable allowable annual leak rate;

(8) Reasons why more than 30 days are needed:

(9) Estimate of when repair work will be completed;

(10) If time changes for original estimates, documented reason for changes;

(11) Dates and types of static and dynamic tests performed; and

(12) Test results for both the static and dynamic tests.

All the above information would be maintained by the industrial process refrigeration facility on-site. Information discussed in (1) through (9) would be submitted as part of the original notification to the Agency. This information would be submitted within thirty days from the time the leak was detected. The information requested in item (10) would only be submitted as necessary. The information in items (11) and (12) would be submitted within thirty days of completing repairs on all appropriate leaks. EPA does not believe that these reporting or recordkeeping procedures place undue burden on the affected community. EPA believes that documenting the services performed by repair personnel is normally kept by the owners and operators of industrial process refrigeration equipment. However, EPA requests comment on these recordkeeping and reporting requirements.

C. Repairs Requiring a Process Shutdown

In order to complete many types of repairs, an industrial process refrigeration system may be required to shut down. EPA proposes to define a process shutdown as when, for purposes such as maintenance or repair, a process temporarily ceases to operate or manufacture whatever is being produced at the particular facility. A typical manufacturing process may consist of the coordination and integration of a chemical reaction, separation, and heating or cooling activities. Since many facilities do not have back-up refrigeration systems, a shutdown of the refrigeration unit in order to facilitate the repair of leaks could require the curtailing or cessation of production. For the purposes of this proposal, EPA does not believe a process shutdown occurs when a system is temporarily taken off-line for reasons such as a power outage. Nor does it

constitute a system mothballing of a facility discussed in II. K.

The costs of a shutdown can be enormous. During the time when the process is shut down, no product will be produced. This results in lost sales. For example, one company estimates that the cost of a three-day shutdown of a particular process facility was \$137,000. This estimate included lost profits due to products that either would not be made at all, or would be off-grade during the start-up and shutdown, plus maintenance charges incurred by the facility. Another facility estimated that to complete all necessary leak repair work should take two days, but could reasonably be expected to take as many as six days depending on the number or type of additional leaks discovered during the repair operations. The lost profits could be as much as \$171,000 per day for that facility.

In most cases shutting down a process cannot be done in an instant. It may require hours or days to completely shut down all the process equipment while avoiding any runaway chemical reactions that could lead to fires, explosions, or other immediate hazards to human health and the environment. It may take several days to release or control hazardous energy and clean out pipes, storage tanks, and other appropriate equipment to allow for a safe working environment. Therefore, EPA believes it is necessary to propose additional time to complete all necessary leak repair work for an industrial process refrigeration facility where a process shutdown is necessary.

EPA is proposing a 120-day repair period, rather than a 30-day repair period, in instances where an industrial process shutdown is needed to repair a leak or leaks from industrial process refrigeration equipment. EPA believes that the need to plan a process shutdown, ensure appropriate personnel are available, lessen environmental impacts and risks to human health, and to the extent possible, lessen the economic impact, warrant the proposal of such additional time. Although the system itself may not need to be shut down for the entire 120 days in order to make the repairs, the actual timing of beginning the shutdown may be longer in order to avoid safety hazards and severe economic disruptions. EPA believes that facilities have every incentive to make repairs expeditiously, both because leaking refrigerant is very costly and because production, once offline, is severely curtailed or halted until the system comes back up. Therefore, EPA is proposing to allow 120 days for the owners or operators of industrial process refrigeration facilities in

instances where an industrial process shutdown is needed to repair a leak or leaks from industrial process refrigeration equipment. EPA requests comments on the appropriateness of this proposed provision.

D. Determining the Full Charge of an Industrial Process Refrigerant System

Section 82.156(i) requires that leaks be repaired if the equipment is leaking at a specified rate in relation to the total charge of the equipment. In order to ensure that additional time to repair leaks is warranted and to ensure that the leaks are fully repaired, EPA believes it is necessary to establish the correct full charge of refrigerant for industrial process refrigeration systems prior to determining the leak rate for the equipment. Refrigerant is contained as a liquid, gas, or two-phase mixture in reservoirs, equipment, and various amounts of piping. The equipment vendors may calculate the refrigerant capacity for the devices they sell; however, such calculations may not include all of the piping the system contains, as well as any piping that may be added by the owner or operator that may differ from the original engineering designed, and therefore increase the full charge of the equipment.

One company recently completed construction and installation of an industrial process refrigeration unit that was supposed to hold 70,000 pounds of refrigerant. In this case, the owner suspected a problem and performed its own calculations, estimating a full charge of 96,000 pounds of refrigerant. When the company filled the system for the first time, the system took 150,000 pounds of refrigerant. Had the owner filled the system to the manufacturer's specifications, the system would not have functioned well and the owner may have added refrigerant, presumably attributing the need for additional refrigerant to leaks.

For older refrigeration systems, the full charge may not have been generally known. When those systems were built there were no regulatory requirements that stipulated that owners or operators should know exactly how much refrigerant constituted a full charge. Many refrigerants were inexpensive to add or replace. Therefore, the owner or operator may not have required that the full charge be recorded routinely. Since the full charge was performance-based, it may have varied with season, ambient temperature, or production rate.

EPA proposes the following methods for owners and operators of industrial process refrigeration systems to determine the full charge and requests comments on a methods. EPA has