

atoms are held on the surface of the material by a chemical bond with the adsorbing agent and decay to stable xenon. A second HEPA filter, following the adsorber, is purely a redundant safety item which will capture particles if a failure occurs in the first filter.

### 3.3 RWR-1<sup>TM</sup> Components Descriptions

The RWR-1<sup>TM</sup> System can be divided into three major subsidiary systems as shown on Figure 3-1. These are the (1) feed, (2) incineration/ calcination and (3) off-gas cleanup systems. Table 3-1 lists the components which make up the complete RWR-1<sup>TM</sup> System. Noted are those items which are always furnished and those which are optional. The standard system components are shown in Figure 3-2.

The feed system delivers radwaste to the incinerator/calciner where the volume reduction takes place at elevated temperatures. Off-gas from the incinerator/calciner is scrubbed and filtered to remove pollutants before leaving the system via the stack. Radioactive residues leave the system as dry granular solids which are packaged for further processing or storage.

#### 3.3.1 Feed System

The feed system consists of three distinct subsystems, which supply the incinerator/calciner with three types of waste: low-level combustible waste, spent resins and sludges, and liquid waste.

##### 3.3.1.1 Combustible Feed Subsystem

The combustible feed sub-system consists of a shredder, a storage hopper, a mechanical feed device and an isolation valve. The initial step in handling combustible waste is to reduce the size of the individual pieces of waste so that it can be transported into the incinerator efficiently. This is accomplished with a shredder located directly above the storage hopper so that the shredding and hopper loading operations

The high-temperature process vessels, the incinerator/calclner vessel, the dry cyclone, and connecting pipes will be insulated to limit building air conditioning requirements. The incinerator and much of the off-gas cleanup system will be made of corrosion-resistant material as discussed in Section 3.6.

#### 3.3.4 Component Design

The RWR-1<sup>TM</sup> System is classed as a radioactive waste system and as such will be designed within the guidelines of the USNRC Effluent Treatment System Branch Technical Position ETSB No. 11-1. (Rev. 1) as discussed in Section 2.5 of this report. The recommendations from Table 1 of ETSB No. 11-1 are presented in Table 3-2.

The major system components as shown in Figure 3-1 are listed in Table 3-3. The operating conditions and volume are listed for each item.

#### 3.4 Off-gas Cleanup System

A large part of the RWR-1<sup>TM</sup> System is devoted to cleaning the off-gas stream after it leaves the incinerator/calclner. The components of this system have been described in Section 3.3, and the processes which take place in these components are discussed in Section 3.2. The components have been selected and designed to clean the off-gas in a highly efficient manner so that the emissions to the atmosphere are "as low as is reasonably achievable". Decontamination factors (DFs) are determined in Section 4.2. Two values of each DF are given, a value which is expected when the RWR-1<sup>TM</sup> System is in actual operation at a utility plant, and a lower, more conservative, value used in computing releases to the atmosphere. The overall DFs used in calculating emissions are  $4 \times 10^4$  for particulate material and  $1 \times 10^4$  for iodine.

Table 3-4

RWR-1<sup>TM</sup> Major Component Materials List

This Table contains proprietary information