In an effort to balance the economic impact on the compact product manufacturers and the consumers benefit from improvements in energy efficiency in these products, the Joint Comments proposed an energy level approximately 5 percent below the 1993 standards for all eight compact type refrigerator-freezers and freezers. (Joint Comments, No. 49 at 17).

The Department agrees with the Joint Comments statement that there are fewer design options available for improving the energy efficiency of compact refrigerator products. The Department also recognizes that there is relatively little opportunity for energy savings from the compact classes, given that they consume only 2.6 percent of total energy used by residential refrigerator products. Therefore, the Department has analyzed compact refrigerators, freezers, and refrigeratorfreezers separately and is proposing separate energy efficiency standards for the compact refrigerator products.

c. Household Freezers. The Joint Comments stated "The category of household freezers includes three product classes defined as: chest freezers with manual defrost; vertical freezers with manual defrost; and vertical freezers with automatic defrost. As a group, the freezer product classes have technical and marketing constraints unique to their individual markets. These design constraints are amplified by the fact that the 1993 NAECA energy efficiency standards imposed an additional 14% stricter target on household freezers than refrigerator/freezers. Energy efficiency gains on household freezers out pace those for any other appliance standard in the U.S. Some parties believe that as a direct partial consequence of the 1993 NAECA standards, three companies terminated production of these products." (Joint Comments, No. 49 at

18). "The number of energy saving options applicable to household freezers is almost as limited as those for compact refrigerator/freezers. The options applied by LBL in its "max tech" analysis included increased wall and door thicknesses, higher EER compressors, improved gaskets, and enhanced performance of evaporator and condenser coils. In the automatic defrost vertical freezer product class, adaptive defrost and more efficient motors are applied. These latter options are not used on manual models." (Joint Comments, No. 49 at 18).

The Joint Comments stated the CFC replacement issue has been especially difficult to resolve on freezer products. The preferred refrigerant replacement, HFC-134a, "has an additional 3 to 4 percent energy penalty inherent in its performance at temperatures necessary for household freezer products as compared to refrigerator-freezers." (Joint Comments, No. 49 at 19). "The most common replacement for CFC-11 in the blowing agent for foam insulation is hydrochlorofluorocarbon (HCFC)-141b. Since this chemical is basically in a liquid phase while exposed to temperatures produced in household freezers, the liquid thermal conductivity is especially important in its performance as an energy efficient CFC-11 replacement. As applied to household freezers, however, this particular CFC-11 replacement carries an approximate 5 to 6 percent energy penalty when applied to household freezers." (Joint Comments, No. 49 at 19)

"Freezers are an optional commodity in a typical U.S. household. They are basically sold in the replacement market, and due to the price sensitivity of this market, there is a reduced opportunity to pass through costs of energy improvements to the consumers. Thus, if regulatory induced costs cannot be passed on, the product line becomes relatively unprofitable." (Joint Comments, No. 49 at 19)

After carefully reviewing the feasibility and energy efficiency options in the max tech analysis, and considering inputs from refrigerator manufacturers and compressor manufacturers, the Joint Comments proposed standards levels for freezer products. The proposal is based on most of the design options identified by DOE in the 1993 Advance Notice, but with the more conservative industry estimates of energy savings. (Joint Comments, No. 49 at 20).

The statements made by the Joint Comments concerning freezers support the Department's analysis.

d. Manual and Partial Defrost Refrigerators and Refrigerator-Freezers. The Joint Comments stated: "There are only a few models with a small market niche in this declining product category. The percentage of U.S. sales in these product classes is 1.7 percent and falling. Data and analysis on elementary engineering and economic issues are difficult to obtain. However, nonindustry participants felt that it is important to recommend a relatively stringent U.S. standard on this product class because of the potential impact on similar products produced in or for lessdeveloped countries." (Joint Comments, No. 49 at 20). The Joint Comments believe it is likely these less-developed countries will adopt similar standards. Because of the limited availability of

data and the small market, the Joint Comments proposed an energy consumption standard for manual and partial defrost refrigerator-freezers that is 10 percent lower than they proposed for Class 3 refrigerator-freezers (automatic defrost with top-mounted refrigerator-freezer without through-thedoor ice service). (Joint Comments, No 49 at 20).

"The energy consumption differential between automatic defrost and nonautomatic defrost units has been declining over time, and is expected to decline further as adaptive defrost options become incorporated into the automatic defrosting systems. The standards proposal is based on a judgment of all the participants that a 10% energy consumption difference for a given adjusted volume accounts for the relatively irreducible minimum change in energy consumption relating to a member's decision not to use automatic defrost." (Joint Comments, No. 49 at 20).

An analysis of the energy savings options available for the manual and partial defrost refrigerators and refrigerator-freezers by the Department supports the level of standards proposed by the Joint Comments parties. However, the concern raised by Joint Comments parties regarding the potential impact on similar products produced in or for less-developed countries was not considered by DOE.

e. Non-HCFC Products. The Joint Comments propose establishing separate classes for refrigerator products which do not use HCFCs. "These non-HCFC classes would permit 10% greater energy use than the comparable HCFCusing classes to provide industry with a known, feasible way of meeting the standards before 2003." (Joint Comments, No. 49 at 21). The Joint Comments parties recommended that less stringent standards, which would expire 6 years after their effective date, be established for the HCFC-free refrigerator classes. It is anticipated that alternative design options will be available by this time. (Joint Comments, No. 49 at 21).

The Joint Comments recommended that the following conditions apply to the standards for the HCFC-free classes:

"(1) 18 months prior to the total phaseout by EPA of HCFC–141b in January 1. 2003. to wit. July 1. 2001:

"(2) 18 months prior to any earlier phaseout date or restriction on use of HCFC's in refrigerator-freezer foam set by EPA; or

"(3) After the granting of a petition by DOE which demonstrates that HCFC– 141b is in very short supply or economically infeasible to use due to,