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Modeling Xenon Purification Systems in a Laser Inertial Fusion Engine ANN HOPKINS, CHARLES GENTILE, Princeton Plasma Physics Laboratory — A Laser Inertial Fusion Engine (LIFE) is a proposed method to employ fusion energy to produce electricity for consumers. However, before it can be built and used as such, each aspect of a LIFE power plant must first be meticulously planned. We are in the process of developing and perfecting models for an exhaust processing and fuel recovery system. Such a system is especially essential because it must be able to recapture and purify expensive materials involved in the reaction so they may be reused. One such material is xenon, which is to be used as an intervention gas in the target chamber. Using Aspen HYSYS, we have modeled several subsystems for exhaust processing, including a subsystem for xenon recovery and purification. After removing hydrogen isotopes using lithium bubblers, we propose to use cryogenic distillation to purify the xenon from remaining contaminants. Aspen HYSYS allows us to analyze predicted flow rates, temperatures, pressures, and compositions within almost all areas of the xenon purification system. Through use of Aspen models, we hope to establish that we can use xenon in LIFE efficiently and in a practical manner.

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