U.S. DEPARTMENT OF ENERGY
NUCLEAR ENERGY RESEARCH INITIATIVE
ABSTRACT

PI: Ronald G. Ballinger **Proposal No.: 2000-105**

Institution: Massachusetts Institute of Technology

Collaborators: Northern Engineering & Research

Title: Balance of Plant System Analysis and Component Design of Turbo-machinery for High Temperature Gas Reactor Systems

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The purpose of this project will be to develop systems analysis tools for the evaluation of turbo-machinery and BOP power conversion in high temperature gas cooled reactor systems. These tools will then be used to develop optimized power conversion systems for high temperature gas-cooled reactor systems. Current concepts for high temperature gas cooled reactor systems call for modular designs with electrical output in the 110 MWe range. Key questions which must be addressed in order for such systems to be adequately evaluated include: (1) can a helium power turbine be developed in the 110 MWe range, (2) can advanced compact heat exchanger technology be used in the design of intermediate heat exchangers (for indirect cycle plants) and/or recuperators (direct and indirect cycle plants), (3) can structural and materials issues be adequately characterized to allow for detailed life-cycle analysis, (4) how do specific component designs impact overall cost.
