GA-A23811

GT-MHR COMMERCIALIZATION STUDY

Technical Progress and Cost Management Report for the Period
August 1 through August 31, 2002

by
GT-MHR Staff

Contact: A. S. Shenoy

Prepared under
Oakland Operations Office
Program DE-AC03-01SF22343
for the U.S. Department of Energy

General Atomics Project No. 30103
DATE PUBLISHED: September 2002

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**GT-MHR Commercialization Study
Monthly Technical Progress and Cost Management Report
for August 2002**

Contract No. DE-AC03-01SF22343
Submitted to: DOE - Oakland Operations Office
By: General Atomics

PART 1 – Technical Progress

Summary

- Investigations are in process to determine if fuel compacts which have been subjected to slight irradiation to demonstrate the absence of as-build fuel particle coating defects. Petten has previously indicated that they do not want to receive irradiated material. However, they are being asked to reconsider because the radioactivity is very low.
- GA personnel attended the fuel program plan development meeting at ORNL on August 13 and 14. Subsequent to the meeting, GA developed a rewrite of the fuel supply sections of the plan (Section 3.1 and Appendix A) to incorporate new information and logic changes agreed to at the ORNL meeting.

Task 1 – Fuel Irradiation

Although preparations have been made to send unirradiated compacts to Petten for the HFR-EU2 irradiation test, GA would like to send seven compacts having slight radioactivity along with eight unirradiated compacts to provide a total of 10 compacts for testing plus 5 spares. The slight radioactivity in seven of the compacts is from exposing the compacts to low irradiation in a TRIGA reactor in 1995 to confirm the absence of any as-built coating defects.

The activity for all seven irradiated compacts, decayed to 6/1/02, is 4.98×10^6 Becquerel (Bq) where, 1 Curie = 3.7×10^{10} Bq. Eighty-eight percent of the activity (4.39×10^6 Bq) is primarily from U-234 present in unirradiated uranium fuel. The primary fission product activity in the slightly irradiated compacts is only 12,536 Bq per compact. Of this total, the most abundant fission products are Cs-137 (3,119 Bq/compact) and Pm-147 (2,575 Bq/compact).

Petten personnel have previously advised GA that they would prefer not to receive irradiated compacts since their capsule assembly area is not licensed to handle irradiated material. Nevertheless GA would prefer to have compacts in HFR-EU2 that have a known Release to Birth (R/B) ratio. Based on the mean R/B for the seven compacts measured, the R/B per compact for Kr-85m is 1.8 x

10^{-8} . One failed particle would result in a R/B of 1.2×10^{-6} for Kr-85m. These results indicate the complete absence of defective particles in the seven compacts. Use of these compacts would thus eliminate any concern that particles exist with as-built defects in seven of the 10 compacts to be irradiated in HFR-EU2.

The radiation level in terms of millirem/hour (mr/hr) is currently being measured on the seven compacts so that we can again contact Petten to advise them of the insignificant health hazard associated with handling these seven compacts.

In the meantime, we are asking the Petten Authorities to advise us of the Dutch shipping requirements (ADR (1999) marginal 2704, schedule 12, par. 2a) that exempt the packaging requirements if the fissile material is less than a certain weight level. The requirement is similar to the U.S., DOT regulation 49CFR Part 173.453 and 173.403, which we satisfy for shipments within the USA.

The shipment of compacts to Petten is currently delayed until we have determined the answers to the questions concerning use of slightly radioactive compacts and the Dutch shipping regulations. .

Task 2 – Fuel Manufacturing Process Improvement

This task has been completed.

Task 3 – NRC Interaction

This task is not currently funded.

Task 4 – Plant Cost Evaluation

This task has been completed.

Task 5 – Waste Disposal Assessment

This task has been completed.

Task 6 – Final Report and Recommendations for Further Development Activities

This task covers all of the commercialization study project management and project development activities. During August, routine reviews of project activities were performed and the monthly report for July was prepared.

In August, a contract modification was received providing \$127,791 in addition to the \$150,000 received in July to fully fund Tasks 1, 6 and Task 7 for the current performance year (July, 2002 to June 2003) of this contract.

Task 7 – DOE Fuel Plan

GA personnel Don McEachern, John Saurwein, David Hanson, Bill Scheffel, and Matt Richards attended the fuel program plan development meeting at ORNL on August 13 and 14. Subsequent to the meeting, John Saurwein provided a rewrite of the fuel supply sections of the plan (e.g., Section 3.1 and Appendix A) to incorporate new information and logic changes agreed to at the ORNL meeting. GA personnel also reviewed and commented on the other sections and appendices of the draft fuel program plan, which had been prepared based on the deliverables submitted by the five working groups formed at the INEEL meeting in May.

Part 2 - Cost Management

During August 2002, a contract modification was received providing \$127,791 in additional funding for continuation of Tasks 1 and 6 and the addition of a new task (Task 7) for participation in the preparation of a coated particle fuel development plan for DOE. With this additional funding, the total budgeted funding is \$977,791.

Item	Total Expenditures, K\$	
	August 2002	Inception to Date ¹ , Totals
Task 1 – Fuel Irradiation	3.3	57.7
Task 2 – Fuel Manufacturing Process Improvement	(0.8)	203.4
Task 3 – NRC Interaction	0.3	143.7
Task 4 – Plant Cost Evaluation	0.1	87.3
Task 5 – Waste Disposal Assessment	0.1	102.7
Task 6 – Final Report and Recommendations	3.7	124.3
Task 7 – DOE Fuel Plan	82.9	100.9
Totals	89.6	820.0

Note:

1. Work started June 18, 2001.