HERC Project Status Report
Idaho Incubation Fund Program
Quarterly Progress Report
January 1, 2012

Proposal No.	**AHRC25**
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Name of Institution:	**Idaho State University/ Idaho Accelerator Center**
Project Title:	**Commercialization of Copper 67**

1 PROJECT STATUS REPORT MILESTONES

This is a quarterly status report beginning FY 2012 for the HERC funded project, Commercialization of Copper 67. The project proposal listed the following major project milestones:

1). Completion of internal infrastructure, 2). Testing of all discrete production steps followed by production of trial samples 3). Approval of tissue, animal and human trial samples, 4). Delivery of approved quantities to researchers for human trials.

Each of these key milestones will be detailed below with progress.

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2 PROJECT STATUS REPORT – Milestone review

For the three months ending December 31st, 2011, (Q2 FY 2012), the following items were completed against the project plan:

1). **Completion of internal infrastructure**

a). The high capacity chiller for the 10 kW accelerator was installed and completed in December. The chiller was tested with satisfactory results. Additional wiring for beam control was completed. These items included wiring for focusing elements, flags, and cameras. Power supply wiring was begun but not completed. Beam alignment was delayed due to the discovery of an out-of spec bend on the SLAC accelerator guide. We determined that the first course of action will be to attempt to correct the bend with the stabilizing beam. If the SLAC cannot be corrected, the accelerator will likely be delayed for more than 6 months, or, its performance will be much lower than expected. Due to delays with the guide and in completing critical control and safety elements, testing of the accelerator is delayed until February, 2012.

b). Accelerator end station shielding is delayed until guide alignment and initial testing is complete.

c). The isotope target design was modified for the use of special ceramic crucibles to withstand the high heat and corrosive effects of the activated materials. Initial testing will use the ceramic crucibles without the special target holder.

d). Furnace equipment to support the initial physical separation process was ordered from MTI (using other funds). The furnace was set up, and profiling and programming were complete. We designed and built an initial vacuum system for the furnace. We have acquired some specialized ceramic ware to be used in the furnace.

e). Column equipment for chemical separation set-up for initial testing.

2). **Testing of all discrete production steps followed by production of trial samples.**

The production process has never been tested and completed in its entirety by anyone (to our knowledge). The process involves these steps: starting material preparation, material activation, physical separation, chemical separation, volume reduction, packaging and shipping. The process is both complicated and technically challenging. In addition to the process development, each step must be optimized for future low cost production. We believe that the long term

economic feasibility of the process will be largely determined by the innovative approaches we find to produce this material at significantly lower cost than any other technology.

a). The starting material preparation involves filing the target with a very high purity element in its natural form. Our initial tests to be run in Q3 will use the newly acquired furnace to fill a ceramic crucible with molten metal. We have acquired some sample crucibles and found a method to seal them during the activation.

b). The activation step will be tested when the accelerator is commissioned. We hope to be testing in March, 2012.

c). The physical separation test involves a vacuum sublimation of the activated sample. In Q3, we will prepare non-activated samples for testing. The separation test must recover all of the newly acquired medical isotope without wasting the starting material. This is critical for cost control of the project. No literature is explicit on the sublimation we are attempting, therefore, we will need to develop the process from first principles. We hope that we will generate intellectual property during the development.

d). The initial testing of the chemical separation process and volume reduction followed the work of Brookhaven National Lab and was completed in October and November. This is a two column process followed by drying of the material. We have shown that the two column process is feasible for separation of copper from the starting material, with recovery in the 80% range. However, the process uses high volumes of acids, is expensive, and very difficult to volume reduce. We have investigated methods for volume reduction such as microwave and freeze drying, however, none has proven satisfactory as of yet. The process is not feasible for use within our business partner's hot cell and we expect to investigate different methods for chemical separation and volume reduction in Q3.

Milestones 3) and 4 are planned for Q4 FY 20112.

3 FINANCIAL

We continue to use other funds for materials and engineering time. The consultant is performing research and design as well as business negotiations with our partner. Burn rate is expected to be approximately $12,500 per quarter and we continue to be well below that spend

rate. We anticipate that spend will increase in Q3 and Q4 as more labor is applied

Project Budget/Financial Status as of Q1, FY 2012

Budget Item	Planned Budget	Actual spend to date	Variance/Explanation
Salary	16,800	0	Expense will begin Q2
Consulting	30,000	13,600	Below budgeted spend
Travel expenses	3000	0	Below budgeted spend

4 INTELLECTUAL PROPERTY, APPLICATIONS, INDUSTRY INVOLVEMENT

We have not filed any patents or trademarks on our work yet. We hope to discover patentable intellectual property as we refine our methods. Since we are early in some of the crucial work, we

We have completed a Development Agreement with International Isotopes Incorporated (INIS) of Idaho Falls. The agreement creates a partnership to develop the Cu67 business and share in the returns. INIS agrees to make available expertise and equipment for the development of the technology as well as be the distributor of product to key researchers. The agreement makes available over $1M of capital equipment and many additional man-years of expertise to the ISU/Idaho Accelerator team. An announcement of the partnership was publically released in November, 2011.

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