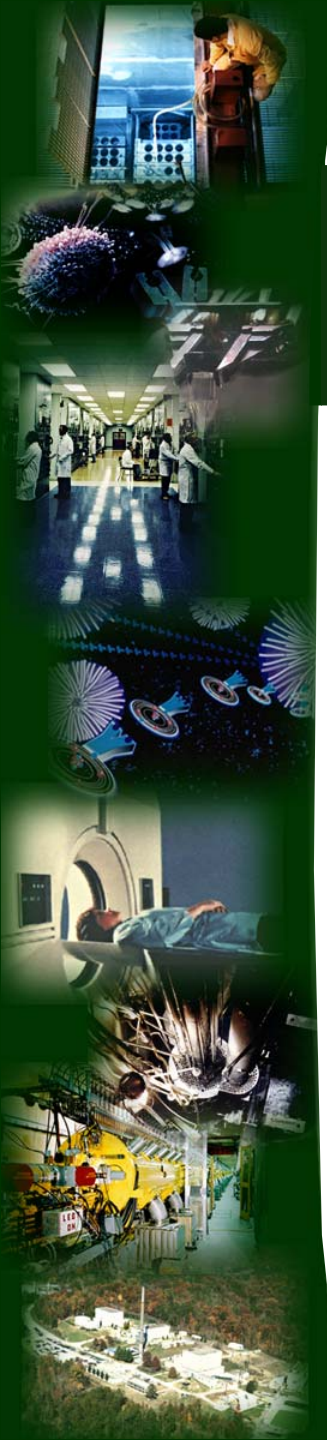

Isotopes for Life

Nuclear Energy Protocol for Research Isotopes

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April 16, 2002

Nuclear Energy Protocol For Research Isotopes

Why NEPRI?

- **NEPRI implements DOE funding priorities for fiscal year 2003**
- **NEPRI will**
  - Bring order to DOE's responses to requests for research isotopes
  - Introduce a high-quality peer review to the selection of research isotopes
  - Enable DOE to concentrate on operating its unique isotope production facilities

Nuclear Energy Protocol for Research Isotopes

Changes in fiscal year 2003

Before 2003

- Use appropriated funds to cover several facets
  - Maintain infrastructure for isotope production
  - Support research through ANMI grants
  - Produce research isotopes
- Working capital available
  - Product isotopes in advance of collecting customer payments
  - Pay for an isotope batch even if only part of batch is sold
- Isotopes selected for production based on an informal understanding of need

Starting in 2003

- Appropriated funds singly focused
  - Maintain infrastructure for isotope production
- No working capital
  - Customers must provide entire budgetary resource before a production run is started
  - Customers must subscribe an entire isotope batch
- Isotopes selected for production using a rigorous peer-review process

Nuclear Energy Protocol for Research Isotopes

Features

- Peer-review isotope selection process based on merits of research
- Research isotope customers must file EOI if they want DOE to produce their isotopes
- Only NEPRI-listed research isotopes will be considered for production by DOE
- Letters of financial commitment required between June 1 and September 1 to schedule isotopes for production
- Requires advance payments for all isotopes before production begins
- Production under NEPRI starts in October 2002

Nuclear Energy Protocol for Research Isotopes

Annual Timeline -- 2002

✔ Feb 8	**Notification of NOPI in *Federal Register* et al.**
✔ Feb 18	**NOPI on Industry Interactive Procurement System (IIPS)**
Mar 29	**Deadline for Expressions of Interest**
May 10	**Extended deadline for Expressions of Interest**
May 22	**Isotope Review Advisory Panel recommends lists of commercial and NEPRI isotopes**
June 1	**DOE publishes commercial and NEPRI lists**
June - Sept 1	**DOE accepts advance payments or letters of financial commitment**
Sept. 1-30	**Production runs scheduled & conflicts resolved**
Oct. 1	**DOE begins production of selected isotopes**

The NEPRI Process

Step 1: **Notice of Program Interest (NOPI)**

Step 2: **Review of Expressions of Interest (EOI)**

Step 3: **Generation of the NEPRI list of isotopes**

Step 4: **Publication of NEPRI list**

Step 5: **Production of NEPRI isotopes**

Step 1: Notice of Program Interest (NOPI)

- **NOPI to poll research community to find what research isotopes are in demand**
- **Notification of NOPI appears in**
  - Federal Register
  - FedBizOps (formerly Commerce Business Daily)
- **NOPI posted on IIPS, asks researchers to file EOI that identifies**
  - What isotopes are needed, how much, and when
  - What organizations supports the research with what resources
  - What is the research, its significance, approach and expected outcomes
- **Research must be peer reviewed; if not, DOE will peer review it**

Step 2: DOE Review of Expressions of Interest (EOIs)

In May, DOE shall compile the Expressions of Interest and eliminate any that request isotopes that the DOE cannot make with existing facilities or are already commercially available.

Step 3: The NEPRI List of Research Isotopes

- **Preliminary list of isotopes and EOIs submitted to Isotope Review Advisory Panel (IRAP)**
- **Panel composed of 5 members**
  - 1 from NERAC
  - 1 from NIH
  - 2 from research institutions
  - 1 from commercial sector
- **Panel ranks EOIs on scientific merits and returns recommended list of research isotopes to DOE**
- **IRAP reviews list of DOE commercial isotopes**

Step 3: Continued

DOE takes IRAP-recommended list of NEPRI isotopes and approves final list based on

- Feedback from research community
- Availability of facilities and production capacity
- Whether or not the research is supported by an active DOE grant*

***DOE recognizes that many grants are multi-year. DOE's intent is to produce the isotope for the life of the grant.**

Step 4: Publication of NEPRI List

- **In June, DOE announces the final approved NEPRI list of isotopes**
  - *Federal Register, FedBizOps*
  - DOE stakeholder meetings
  - Professional society meetings and publications
  - DOE Nuclear Energy web page
- **The list of commercial isotopes is collaterally published**

Step 5: Production of NEPRI Isotopes

- DOE must receive funding commitments in order to schedule production
- Commitments accepted between June 1 and September 1
- Production begins in October once cash advances are made
- If insufficient funds received, production will be postponed

Advance Payments

The Nuclear Energy Protocol for Research Isotopes Policy requires:

- Customer must provide advance cash payments to cover isotope production costs for both research and commercial products and services.
- A budgetary resource must exist before work can begin.
- No isotope program funds will be expended on the development or production of these isotopes.
- Progress payments may be made if the work exceeds 60 days or $25,000. The advance must be sufficient to permit the work to proceed for 30 days.
- This policy aligns with DOE M 481.1-1A and some of the procedure may be incorporated into the program.

Prices

- Research prices will be based on product cost for batch
- Customer (primary) must cover entire batch product or service cost

Nuclear Energy Protocol for Research Isotopes

NERAC Action Needed

Approve creation of Isotope Review Advisory Panel (IRAP) as a NERAC Subcommittee

Nuclear Energy Protocol for Research Isotopes

Backup

Customer Issues

- No commitment by DOE to produce any isotope for three years to meet grantee's needs.
- Prices to researchers can change depending on number of customers per isotope batch.
- Researchers must order isotopes many months before scheduled use.
- Some state universities are prohibited by law to provide an advance payment.
- If production is cancelled because of insufficient advances, then isotope based research will be delayed or cancelled.
- Difficulty in registering on the IIPS.
- Many researchers believe this EOI to be a solicitation announcement

Operational Issues

- Working capital/contingency funds will be needed for customer refunds, delays in scheduling, production problems and material and supplies.
- Variable cost for beam time may need to be spread over fewer isotopes resulting in higher prices.
- If long lead time for cash deposits and making funding available to the labs cannot be reduced, advance payments will be required sooner than 30 days before production.
- Advance payment requirement may result in decrease of sales. This will curtail work and lead to loss of technical staff.
- Long production lead time will require payments far in advance of delivery.
- No flexibility in the NEPRI process to accommodate changes in research needs.

FY 2002 Isotope Cost Data Adjustments
W-188/Re-188 and Generator (Pressed) Example

Production Activity	Unit of Allocation	ORNL Cost		Revised Cost
Target Fabrication	per mg/Hour	7,038		7,038
Target Inventory	per mg/Hour			
Irradiation-parasitic	per Cycle/Hour	5,078		5,078
Dedicated Hot Cell	per Cell Hour	19,762		-
Common Hot Cells	per Cell Hour			
Chemical Processing	Per Hour	36,940		36,940
Waste Mgmt/Disposal	Per Cell Hour	4,072		2,036
Quality Assurance	Per Cell Hour	2,006		1,003
Compliance & Safety	Per Hour/Cell Hour			
Compliance & Safety	Per Hour/Cell Hour	22,889		4,578
Packaging	Per Hour	5,465		5,465
Program Mgmt	Per Hour/Cell Hour	11,039		5,520
Total Cost of Isotope Production - per Run		**114,289**		**67,657**
# Runs Expected		**8**		**8**
Estimated Cost Per Run		**114,289**		**67,657**
Hot Cell Depreciation	8%	**1,581**		
Sales & Services Fee	6%	**6,952**	6%	**4,059**
Added Factor (Contingency)	3%	**3,685**	8%	**5,737**
Est'd Cost per Run, incl. All fees		**126,507**		**77,454**
# mCis/Run - Produced and Sold (Average)		12000		12000
ORNL Cost per mCi		$ 10.54		$ 6.45

Current Price per 1 Ci (1000 mCi) $7,800 or 7.80 mCi

FY 2002 Isotope Cost Data Adjustments
Ac-225 Example

Production Activity	Unit of Allocation		ORNL Cost		Revised Cost
Target Fabrication	per mg/Hour				
Target Inventory	per mg/Hour				
Irradiation-parasitic	per Cycle/Hour				
Dedicated Hot Cell	per Cell Hour		21,181		-
Common Hot Cells	per Cell Hour				
Chemical Processing	Per Hour		16,408		16,408
Waste Mgmt/Disposal	Per Cell Hour		4,364		2,182
Quality Assurance	Per Cell Hour		2,151		1,076
Compliance & Safety	Per Hour/Cell Hour				
Compliance & Safety	Per Hour/Cell Hour		23,170		4,634
Packaging	Per Hour				
Program Mgmt	Per Hour/Cell Hour		23,895		11,948
Total Cost of Isotope Production - per Run			**91,169**		**36,247**
# Runs Expected			**12**		**12**
Estimated Cost Per Run			**91,169**		**36,247**
Hot Cell Depreciation		8%	**1,694**		
Sales & Services Fee		6%	**5,572**	6%	**2,175**
Added Factor (Contingency)		3%	**2,953**	8%	**3,074**
Est'd Cost per Run, incl. All fees			**101,388**		**41,496**
# mCis/Run - Produced (Average)			36		36
ORNL Cost per mCi			$ 2,816.34		$ 1,152.65
Current Price per mCi			$620		

FY 2002 Isotope Cost Data Adjustments
Cu-67 Example

Production Activity	Unit of Allocation		BNL Cost		Revised Cost
Target Fabrication	per Target				
Target Inventory	per Target		4,268		4,268
Irradiation-parasitic	per Slot Hour		8,034		8,034
Dedicated Hot Cell	% Dedicated HC		24,507		-
Common Hot Cells	Per HC Day		2,076		-
Chemical Processing	Per Hour		16,617		16,617
Waste Mgmt/Disposal	Per Run/Batch		31,361		15,681
Quality Assurance	Per Hour		43,127		21,564
Compliance & Safety	20%-equally distributed		8,660		1,732
Compliance & Safety	80%-Per Run		36,024		7,205
Packaging	Per shipment		3,612		3,612
Program Mgmt	Per Run		23,646		11,823
Total Cost of Isotope Production - all Runs			**201,932**		**90,535**
# Runs Expected			**4**		**4**
Estimated Cost Per Run			**50,483**		**22,634**
Hot Cell Depreciation		8%	**532**		
Sales & Services Fee		6%	**3,061**	6%	**1,358**
Added Factor (Contingency)		3%	**1,622**	8%	**1,919**
Est'd Cost per Run, incl. All fees			**55,698**		**25,911**
# mCis/Run - Produced (Average)			100		100
BNL Cost per mCi			$ 556.98		$ 259.11
Current Price per mCi			$104		