

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

水&液态排放物辐射监测器

## REAL-TIME CONTINUOUS

实时、连续监测

Model ~ Nex-Beta

### FEATURES: 特点

- AVAILABLE IN DESKTOP OR PORTABLE SYSTEMS
- 桌面式或便携式
- MEASURES AT OR BELOW EPA/DHS PAG LEVELS  
Protective Action Guideline levels and Military Drinking water limits
- 测量符合环保局/国土安全局饮用水行动指南标准
- REAL TIME, IN-LINE, CONTINUOUS
- 实时，在线连续监测
- HIGH SENSITIVITY TO BETAS (low sensitivity to Gammas)
- 对β灵敏度高（对伽马灵敏度低）
- NO REAGENT TANKS TO FILL
- 无需添加试剂
- NO WASTE STREAM
- 无废水流
- EASY CALIBRATION
- 容易标定
- PREVENT ACUTE HEALTH EFFECTS
- 预防急性健康影响
- REDUCE RISK OF CHRONIC EXPOSURE
- 减少慢性辐射暴露风险
- WORLD'S ONLY PAG-LEVEL **β WATER MONITOR**
- 世界上唯一一台行动指南标准的β水监测器



**NEX-BETA** allows radiation users to be good community members by  
controlling & measuring their effluent.

**NEX-BETA**允许用户通过控制和测量其排放物而成为社区好成员



**TECHNICAL ASSOCIATES**  
**OVERHOFF TECHNOLOGY**

Divisions of



US NUCLEAR CORP

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

水&液态排放物辐射监测器

## REAL-TIME CONTINUOUS

实时、连续监测

Model ~ Nex-Beta

### APPLICATION: 应用

#### USERS: 用户

- Hospitals
- 医院
- Power Plants
- 核电站
- Oil & Gas Extraction
- 油&气开采
- National Laboratories
- 国家实验室

#### USE FOR: 用途

- Internal Testing
- 内部测试
- Locate Problems / Leaks
- 锁定问题/泄露
- Develop Compliance Strategies
- 发展合规性策略

#### DETECT: 检测

I-131, Sr-90, Sr-89, Cs-137, Cs-134 etc.



**The PRIMARY Radioactive contaminants in water are Beta emitters.  
NOW there is instrumentation to detect these Beta emitters in water.**

水中主要辐射污染物为贝塔发射物

现在有了检测这些水中贝塔发射物的仪器

- Monitor drinking water against **any & all Beta Emitter Contaminants** except H-3, C-14, S-35
- 监测除了H-3, C-14, S-35以外的饮用水中任何β发射污染物
- Monitor for contamination in ground or surface water
- 监测地面和地表水污染



**TECHNICAL ASSOCIATES**  
**OVERHOFF TECHNOLOGY**

Divisions of



US NUCLEAR CORP

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

## 水&液态排放物辐射监测器

### REAL-TIME CONTINUOUS

### 实时、连续监测

#### Model ~ Nex-Beta

- Monitor liquid-waste-stream from laboratory or plant
- 监测实验室或核电站液态流出物

NUCLIDE	BETA ENERGY	SECONDARY BETA
Sr-89	1,481 KeV	
Sr-90	546 KeV	
Y-90	2270 KeV	
Mo-90	1230 KeV	
Tc-99	292 KeV	
I-131	606 KeV	
Cs-134	662 KeV	
Cs-136	341 KeV	650 KeV 7%
Cs-137	514 KeV	1176 KeV 7%

Many labs, universities, hospitals, government and pharmaceutical facilities handle some liquid radioactivity. Some portion of this is collected as radioactive waste and sent for storage or burial. But a significant portion goes down the drain directly or into short term storage tanks. More and more of this is being seen as a hazard by regulators or community members.

许多实验室，大学，医院，政府和制药厂需要处理液态辐射污染物，其中一部分被当做辐射废物收集并进行储存或填埋，但是绝大部分被直接排放掉或放进临时存储罐。管理者和社区居民视越来越视之为放射危害

The solution is for the various facilities to quantitate these materials to make sure the liquid effluent or waste water is being disposed of into the correct flow path.

各单位解决办法是对这些物质定量确保这些液体排放物或废水进入正确处理流程。

Technical Associates Models, the **NEX-BETA** and **NEX-BETA-ABG**, are designed especially for this purpose of quantitating waste water and liquid effluent.

TA公司NEX-BETA和NEX-BETA-ABG为废水和液体排放物进行定量而设计

### PROBLEM: 问题

Ground water and drinking water sources are vulnerable to contaminants coming from a variety of sources.

These include but are not limited to hospitals, power plants, oil exploration and other industrial uses, accidental or knowing contamination by individuals, groups, and from naturally occurring radioactive materials (NORM).

This is especially true for Isotopes: I-131, Sr-90/Y-90, & Cs-137.



**TECHNICAL ASSOCIATES**  
**OVERHOFF TECHNOLOGY**

Divisions of



US NUCLEAR CORP

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

## 水&液态排放物辐射监测器

### REAL-TIME CONTINUOUS

### 实时、连续监测

#### Model ~ Nex-Beta

地下水和饮用水水源易受到各种来源污染，包括但不限于医院，核电站石油开发和和其它行业。来自个人、团体和自然存在的辐射材料(NORM)事故污染，尤其是这些核素: I-131, Sr-90/Y-90, & Cs-137.

As yet very few water districts have real-time radiation monitors in place to protect the water and the public. 然而极少有供水部门实时监测水中辐射来保护水源和公众。

### SOLUTION: 解决方案

For the first time in a **Continuous Real-Time radiation water monitor** the Model **NEX-BETA** solves this problem by continuously monitoring the water using ultra-sensitive, Beta radiation detector.

型号**NEX-BETA**连续实时监测器，通过使用极灵敏β辐射探头，连续监测水中污染物来解决这个难题。

The information from this detector is analyzed and displayed in units of picoCuries per liter. The count times are user settable & calculations are automatically updated every 2 minutes, every hour and every day. Measurements of radiation concentration and total discharge are logged 24 hr/day, 7 day/week.

来自监测器的信息被分析、以单位pCi/L显示，计数时间可用户设定，每两分钟、每小时、和每天或每周自动更新。辐射浓度测量结果和总排放每天24小时，每周7天记录

The longer update times correspond with greater precision and increased sensitivity. Sensitivities in the daily updates each meet or exceed the DHS Protective Action Guideline Levels (PAG) for drinking water. Please see attached chart of measurements.

更新时间越长，数据越精确，灵敏度越高。每日更新的灵敏度符合或超过DHS饮用水行动准则标准；请见测量表。

Using TA Tried and True sample collection & measurement technology this detector measures Beta emissions from any radioactive liquids.

这款监测器应用了TA公司的 Tried and True取样&测量技术，可以测出任何排放辐射污染物，测量任何辐射液体中β发射物。

### DESCRIPTION: 描述

Model **NEX-BETA** is a Beta detector water monitor /controller for measuring of Beta emitting radio nuclides. The electronics are microprocessor with LED/LCD display with plug in modules facilitating quick change or addition of functions at a later date. Modular design allows for rapid repair by module replacement in the field.

型号**NEX-BETA**是测量发射β辐射核素β探头水辐射检测仪/控制仪，电子学是带LED/LCD显示的微处理器，插入式模块进行快速更换及以后功能拓展，模块式设计允许通过现场更换模块达到快速维修目的。

The modular system is covered by TA's unique exchange warranty system in addition to the full one year warranty. On-site service contracts available in many areas.

此模块系统在TA一整年保修范围内，许多地区提供现场服务合同。

The Beta flow cell is easily changed via quick disconnect fittings. All connections are sealed against leaks. The standard water moving system is based on a high precision pump. It has a 10 liter per minute capacity. System



**TECHNICAL ASSOCIATES**  
**OVERHOFF TECHNOLOGY**

Divisions of



US NUCLEAR CORP

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

## 水&液态排放物辐射监测器

### REAL-TIME CONTINUOUS

### 实时、连续监测

#### Model ~ Nex-Beta

can also be operated using city water pressure in which case no pump is required.

β 气流室通过断开装置很容易更换，所有连接均密封防泄漏。标准水动系统基于高精泵，容量每分钟10升。可以使用城市水压来操作系统，这种情况下则不需要泵。

A wide range of pump capacities are available to meet users specific needs. The system electronics is mounted in a rugged cabinet. It comes complete with all cabling tubing and connectors in place and is ready to operate.

115 Volt 60Hz is standard; 220 Volt 50/60 Hz is optional.

提供各种容量的泵以满足用户特殊需求。系统电子学安装在坚固机箱内，所有管线和连接件准备就绪。

标准115V 60Hz，可选购220V 50/60 Hz或电池。

#### **Beta Detector Assembly: β 探测器组件**

- Beta Detector: Consists of a light-tight detector assembly which interfaces with the sample via quick disconnect coax cables and medical grade hoses. The sample is viewed by a matched pair of 5" diameter photo-multiplier tubes.
- β 探测器：密光探测器组件通过快速断开同轴线和医用级管子与样品相接，样品由一对匹配的直径5"光电倍增管观察。
- Beta Scintillation detector has 1,100cm<sup>2</sup> sensitive area.
- β 闪烁探测器灵敏面积1,100cm<sup>2</sup>

**The Beta pulse analysis portion** of this system conditions and analyzes the output from the photo-multiplier tubes by pulse height, duration and coincidence.

In this way the system is able to eliminate counting most background and noise counts.

此系统β脉冲分析部分通过脉冲高度，持续时间和一致性来影响并分析光电倍增管输出。由此系统排除大部分本底和噪音计数。

Sensitivity is enhanced by the use of stochastic resonance plus high gain, low noise PM tubes and pre-amps. 通过使用随机共振，加上高增益·低噪音PM管和前置放大器来灵增强敏度。



**TECHNICAL ASSOCIATES**  
**OVERHOFF TECHNOLOGY**

Divisions of



US NUCLEAR CORP

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

## 水&液态排放物辐射监测器

### REAL-TIME CONTINUOUS

### 实时、连续监测

Model ~ Nex-Beta

DETECT 探测	PAG LEVEL 准则标准	LOWER LIMIT of SENSITIVITY 灵敏度下限	TOP OF RANGE 上限	SENSOR / METHOD USED 探测方法		MAINTENANCE for finished water 出厂水
		True for both models 两款型号均适用			<b>TIME</b> 时间	<b>ACTION</b> 方式
<b>Beta</b>	<b>K-40</b> 30,000 pCi/l			5" dia. Dual PM Tube 1000ml chamber 直径5"双PM管 1000毫升室	3--6 mo 3-6月	Replace particulate pre- filter cartridge 更换粒子前置过滤 芯
30 min 30分钟 24 hr 24小时		30,000 pCi/l 10,000 pCi/l	$2 \times 10^7$ pCi/l	1100cm <sup>2</sup> Beta Scintillator $\beta$ 闪烁体1100cm <sup>2</sup>		
<b>OPTIONS:</b> 选项		<b>LOWER LIMIT</b> 下限	<b>TOP OF RANGE</b> 上限			
<b>DETECT</b> 检测						
<b>Tritium</b> 氚		20,000pCi/l	$1 \times 10^6$ pCi/l	Crushed scintillation bed of crystals 碎闪烁晶体床		Replace ion exchange cartridge 更换离子交换过滤芯
<b>Radon</b> 氡		100pCi/liter	2000pCi/liter		1-3 mo	Clean or replace vapor trap 清洗或更换捕水器
<b>PRE- CONDITION</b> 前提条件						
<b>Expel Radon</b> 排氡					1-3 mo	Clean or replace vapor trap 清洗或更换捕水器



**TECHNICAL ASSOCIATES**  
**OVERHOFF TECHNOLOGY**

Divisions of



US NUCLEAR CORP

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

## 水&液态排放物辐射监测器

### REAL-TIME CONTINUOUS

### 实时、连续监测

Model ~ Nex-Beta

#### SPECIFICATIONS:

**Alarms:**

**报警:**

**Sample temperature standard:**

**样品温度标准:**

**Ambient temperature:**

**环境温度:**

**Optional:**

Cooler model **Cool-33** for detector & sample is used in case of higher sample or ambient temperatures.

**选购:** 在较高样品温度或高温环境下可选购 Cool-33

#### SIZE AND WEIGHT:

**Dimensions:**

**尺寸:**

**Electronics:**

**电子学:**

**Shipping weight:**

**邮寄重量:**

#### 规格

Each alarm activates a relay. Relay alarms are available to the user.

每次报警激活继电器，提供继电器报警

Up to 80° F liquid. (optional to higher temperatures)

液体到 80° F (可选购更高温度)

65 - 100° F (wider temperatures ranges optional)

65 - 100° F (可选更高温度范围)

#### 尺寸和重量

One assembly: 14" wide x 29" tall including wheels  
Electronics may be separated from detector electronics.

组件14" 宽 x 29" 高，包括轮子

7" wide x 10" tall (23lbs)

7" 宽 x 10" 高 (23磅)

Standard unit: 22Kg - excluding optional shielding

标准22公斤-不含选购的屏蔽

**NOTE:** Optional thin Lead Sheet for shielding can be shipped with or shipped separately or  
overseas customers may wish to buy the lead sheet locally.

注: 选购的薄铅屏可随机或单独邮寄，或者海外客户可就地购买

#### Data - Analysis - Display - Archive - NEX-BETA

The concentration and total activity released and  
MDA levels are continuously calculated and recorded.  
All data can be saved to the hard drive in spreadsheet  
format.

浓度，总活度和最小检出值持续计算记录  
所有数据以电子表格格式存入硬盘



NEX-BETA Electronics



**TECHNICAL ASSOCIATES**  
**OVERHOFF TECHNOLOGY**

Divisions of  US NUCLEAR CORP

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

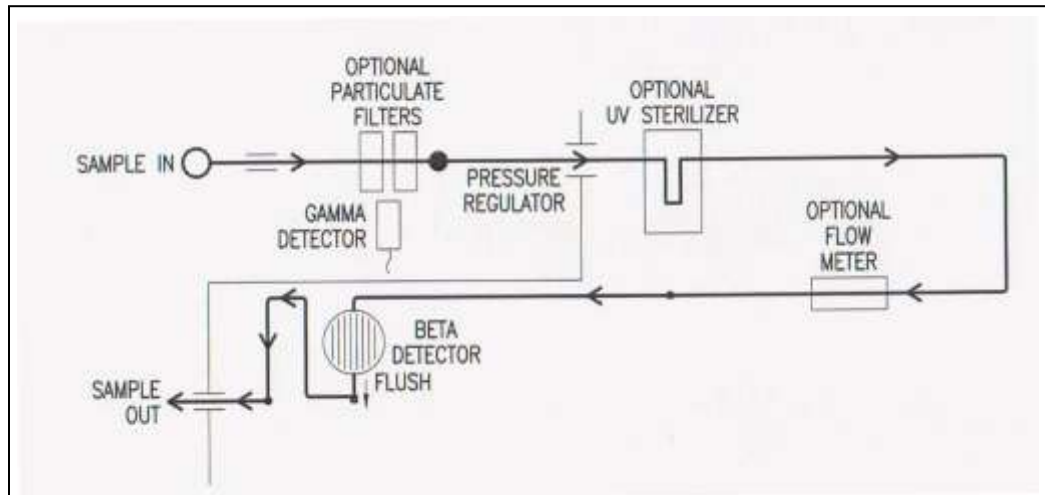
水&液态排放物辐射监测器

## REAL-TIME CONTINUOUS

实时、连续监测

Model ~ Nex-Beta

### FLOW CHART



#### Flow Path 流路

- Water Inlet port
- 入水口
- Pressure relief valve
- 压力释放阀
- Particulate Pre-Filter (with optional Gamma Detector) Ultra Violet Sterilizer (Optional)
- 粒子前置过滤器 (可选伽马探头) 紫外线杀毒器 (选购)
- Mass Flow Meter (Optional)
- 流量计 (可选)

Discharge water is clean and can go back into drinking water line.

排放水干净可直接排放到饮用水管线

No liquid scintillant or reagents are added

无需液体闪烁剂或添加剂

No toxic or radioactive waste of any kind.

无毒无任何其它放射废物



**TECHNICAL ASSOCIATES**

Divisions of



US NUCLEAR CORP

**OVERHOFF TECHNOLOGY**

7051 Eton Ave., Canoga Park, CA 91303

818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)



# RADIATION MONITOR FOR WATER & EFFLUENT DISCHARGE

水&液态排放物辐射监测器

## REAL-TIME CONTINUOUS

实时、连续监测

Model ~ Nex-Beta

	NEX-BETA
<b>Read-out Units (Typical)</b> 读出单位（典型）	Bq/m <sup>3</sup> pCi/l
<b>Measures</b> 测量	Waterborne Concentration 水中浓度
<b>Upgraded Hardware</b> 硬件升级	Calculations by Imbedded Processor in NEX-BETA-9 由嵌入式处理器计算
<b>Available options</b> 可选项	Optional Electronic mass flowmeter 可选电子流量计



**TECHNICAL ASSOCIATES**

Divisions of



US NUCLEAR CORP

**OVERHOFF TECHNOLOGY**

7051 Eton Ave., Canoga Park, CA 91303  
818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)

**Table 4-1.** Derived Response Levels (DRLs) Associated with a Committed Effective Dose (CED) of 0.5 rem Resulting from 1 Year of Ingestion

DRLs (pCi/L)			DRLs (pCi/L)			DRLs (pCi/L)		
Column 1: Radionuclide	Column 6: Without Radioactive Decay	Column 7: With Radioactive Decay Only	Column 1: Radionuclide	Column 6: Without Radioactive Decay	Column 7: With Radioactive Decay Only	Column 1: Radionuclide	Column 6: Without Radioactive Decay	Column 7: With Radioactive Decay Only
H-3	4.42E+06	4.54E+06	Sn-125	6.01E+04	1.58E+06	Hg-203	9.69E+04	5.29E+05
C-14	3.19E+05	3.19E+05	Sn-126	3.87E+04	3.87E+04	Tl-204	1.56E+05	1.70E+05
Na-22	5.80E+04	6.61E+04	Sb-124	7.29E+04	3.11E+05	Pb-210	2.65E+02	2.70E+02
P-32	7.71E+04	1.37E+06	Sb-126	7.53E+04	1.54E+06	Bi-207	1.46E+05	1.47E+05
P-33	7.53E+05	7.50E+06	Sb-127	1.11E+05	7.28E+06	Bi-210	1.41E+05	7.11E+06
S-35	2.39E+05	7.31E+05	Te-127	1.10E+06	7.12E+08	Po-210	1.53E+02	3.33E+02
Cl-36	1.99E+05	1.99E+05	Te-129	2.94E+06	1.53E+10	Ra-226	6.59E+02	6.59E+02
K-40	3.00E+04	3.00E+04	Te-129m	6.23E+04	4.68E+05	Ac-227	5.76E+02	5.85E+02
Ca-45	2.60E+05	5.13E+05	Te-131m	9.49E+04	1.92E+07	Th-227	2.05E+04	2.77E+05
Sc-46	1.25E+05	3.97E+05	Te/I-132	4.86E+04	3.78E+06	U-235	3.96E+03	3.96E+03
Ti-44	3.19E+04	3.20E+04	I-125	1.20E+04	5.12E+04	U-238	4.15E+03	4.15E+03
V-48	9.34E+04	1.46E+06	I-129	1.75E+03	1.75E+03	Np-237	1.73E+03	1.73E+03
Cr-51	4.79E+06	4.37E+07	I-131	8.49E+03	2.67E+05	Np-239	2.32E+05	2.49E+07
Mn-54	2.57E+05	3.74E+05	Cs-134	9.63E+03	1.13E+04	Pu-236	2.13E+03	2.40E+03
Fe-55	5.57E+05	6.31E+05	Cs-136	6.01E+04	1.16E+06	Pu-238	8.12E+02	8.15E+02
Fe-59	1.03E+05	5.91E+05	Cs/Ba-137	1.36E+04	1.38E+04	Pu-239	7.37E+02	7.37E+02
Co-58	2.47E+05	9.09E+05	Ba-133	1.21E+05	1.25E+05	Pu-240	7.37E+02	7.37E+02
Co-60	5.39E+04	5.76E+04	Ba-140	7.12E+04	1.41E+06	Pu-241	3.89E+04	3.99E+04
Ni-63	1.22E+06	1.22E+06	La-140	9.16E+04	1.38E+07	Pu-242	7.77E+02	7.77E+02
Zn-65	4.69E+04	7.54E+04	Ce-141	2.60E+05	2.03E+06	Am-241	9.07E+02	9.08E+02
Ge-68	1.44E+05	2.16E+05	Ce-143	1.65E+05	3.04E+07	Am-242m	9.69E+02	9.71E+02
Se-75	7.09E+04	1.70E+05	Ce/Pr-144	3.53E+04	5.33E+04	Am-243	9.12E+02	9.12E+02
Rb-86	6.59E+04	8.92E+05	Nd-147	1.71E+05	3.94E+06	Cm-242	1.58E+04	3.12E+04
Sr-89	7.20E+04	3.63E+05	Pm-145	1.60E+06	1.63E+06	Cm-243	1.24E+03	1.26E+03
Sr-90	6.65E+03	6.73E+03	Pm-147	7.09E+05	8.07E+05	Cm-244	1.51E+03	1.53E+03
Y-90	6.88E+04	6.53E+06	Pm-149	1.86E+05	2.13E+07	Cm-245	8.90E+02	8.90E+02
Y-91	7.81E+04	3.41E+05	Pm-151	2.53E+05	5.41E+07	Cm-246	8.94E+02	8.94E+02
Zr-93	1.67E+05	1.67E+05	Sm-151	1.89E+06	1.89E+06	Cf-252	1.95E+03	2.21E+03
Zr-95	1.92E+05	7.73E+05	Eu-152	1.35E+05	1.39E+05			
Nb-94	1.06E+05	1.06E+05	Eu-154	9.07E+04	9.43E+04			
Nb-95	3.14E+05	2.26E+06	Eu-155	5.66E+05	6.07E+05			
Mo-99	3.06E+05	2.81E+07	Gd-153	6.65E+05	1.07E+06			
Tc-99	2.88E+05	2.88E+05	Tb-160	1.15E+05	4.15E+05			
Ru-103	2.52E+05	1.62E+06	Ho-166m	9.34E+04	9.35E+04			
Ru/Rh-106	2.64E+04	3.65E+04	Tm-170	1.40E+05	3.20E+05			
Ag-110m	6.65E+04	1.06E+05	Yb-169	2.60E+05	2.06E+06			
Cd-109	9.26E+04	1.20E+05	Hf-181	1.65E+05	9.84E+05			
Cd-113m In-	8.05E+03	8.26E+03	Ta-182	1.20E+05	2.97E+05			
114m Sn-	4.54E+04	2.33E+05	W-187	2.94E+05	7.47E+07			
113	2.51E+05	6.20E+05	Ir-192	1.35E+05	4.77E+05			
Sn-123	8.82E+04	2.01E+05	Au-198	1.80E+05	1.69E+07			



**TECHNICAL ASSOCIATES**

Divisions of



US NUCLEAR CORP

**OVERHOFF TECHNOLOGY**

7051 Eton Ave., Canoga Park, CA 91303

818-883-7043 (Phone) 818-883-6103 (Fax)

[tagold@nwc.net](mailto:tagold@nwc.net)

[WWW.TECH-ASSOCIATES.COM](http://WWW.TECH-ASSOCIATES.COM)