Date of Issue:
26 September 2014

SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

Product Identifier

SRM Number: 4358
SRM Name: Ocean Shellfish Radionuclide Standard
Other Means of Identification: Not applicable.

Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use in tests of measurements of radioactivity contained in matrices similar to the sample, for evaluating analytical methods, and as a calibrated "real" sample matrix for laboratory intercomparison. A unit of SRM 4358 consists of approximately 150 g of shellfish powder that was freeze-dried, pulverized, bottled, and sterilized.

Company Information

National Institute of Standards and Technology
Standard Reference Materials Program
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2. HAZARDS IDENTIFICATION

Classification

Physical Hazard: Not classified.
Health Hazard: Not classified.

Label Elements
Symbol
No Symbol/No Pictogram

Signal Word
No Signal Word.

Hazard Statement(s): Not applicable.

Precautionary Statement(s): Not applicable.

Hazards Not Otherwise Classified: Not applicable.

Ingredients(s) with Unknown Acute Toxicity: Not applicable.

3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Substance: Shellfish powder.

Other Designations: Not applicable.

Radiological information is provided in this SDS for information for the user. This product contains environmental level quantities of radioactive material. This SRM is designed for use only in a radiochemistry facility experienced in the handling of radioactive materials. All appropriate precautions for the handling of radioactive materials should be in place at all times. At a minimum, the basic radiation safety principles of time, distance, and shielding, and appropriate radiation contamination control should be practiced to avoid/minimize any external and/or internal exposure. Consult with your safety office for your facility's radiation safety requirements/precautions specific to the radionuclide(s) (including its activity and chemical/physical form) in this SRM.

SRM 4358 contains several radionuclides with an individual massic activities as high as 0.16 Bq•g^{-1}.

Radionuclide	CAS Registry	EC Number (EINECS)	Nominal Mass Concentration (%)
^{241}Am	Not applicable	Not applicable	<0.0001
^{239,240}Pu	Not applicable	Not applicable	<0.0001
^{238}Pu	Not applicable	Not applicable	<0.0001
^{238}U	Not applicable	Not applicable	<0.0001
^{234}U	Not applicable	Not applicable	<0.0001
^{235}U	Not applicable	Not applicable	<0.0001
^{232}Th	Not applicable	Not applicable	<0.0001
^{230}Th	Not applicable	Not applicable	<0.0001
^{228}Th	Not applicable	Not applicable	<0.0001
^{228}Ra	Not applicable	Not applicable	<0.0001
^{137}Cs	Not applicable	Not applicable	<0.0001
^{210}Pb	Not applicable	Not applicable	<0.0001
^{90}Sr	Not applicable	Not applicable	<0.0001
^{40}K	Not applicable	Not applicable	<0.0001
^{244}Cm	Not applicable	Not applicable	<0.0001
^{242}Cm	Not applicable	Not applicable	<0.0001
^{241}Pu	Not applicable	Not applicable	<0.0001
^{226}Ra	Not applicable	Not applicable	<0.0001
^{214}Pb	Not applicable	Not applicable	<0.0001
^{214}Bi	Not applicable	Not applicable	<0.0001
^{212}Pb	Not applicable	Not applicable	<0.0001
^{208}Tl	Not applicable	Not applicable	<0.0001

Notes:

(1) SRM 4358 is a fine powder with a readily respirable particle size. This material has not been tested as a whole. This SRM is a naturally occurring complex mixture that may contain harmful substances and should be handle with care; these substances are in concentrations below the reportable limits for hazardous components (1 %) and carcinogens (0.1 %), as required by OSHA, 29 CFR 1910.1200.

(2) Decay products are present in different stages of equilibrium with their parent nuclide and are not accounted for in the component listing.

4. First Aid Measures

Description of First Aid Measures:

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

Skin Contact: Rinse affected area with copious amounts of water followed by washing with soap and water for at least 15 minutes while removing contaminated clothing. Seek medical attention, if needed.

Eye Contact: Immediately flush eyes, including under the eyelids with copious amounts of water for at least 30 minutes. Seek immediate medical attention.

Ingestion: Contact a poison control center immediately for instructions.

Most Important Symptoms/Effects, Acute and Delayed: Skin or eye mechanical irritation.

Indication of any immediate medical attention and special treatment needed, if necessary: If any of the above symptoms are present, seek medical attention if needed.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Negligible fire hazard. See Section 9, "Physical and Chemical Properties" for flammability properties.

Extinguishing Media:

Suitable: Use extinguishing media appropriate for surrounding fire.
Unsuitable: None listed.

Specific Hazards Arising from the Chemical: None listed.

Special Protective Equipment and Precautions for Fire-Fighters: Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA).

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 1 Fire = 0 Reactivity = 0

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: This product contains environmental level quantities of radioactive material. **DO NOT touch spilled material.** Immediately notify safety personnel of a spill.

Methods and Materials for Containment and Clean up:

Radiological Emergency Procedures

*The following is a guide for first responders. The following actions, including remediation, should be carried out by qualified individuals. In cases where a life-threatening injury occurs, concurrent with personal contamination, treat the injury **first**.*

Do not touch damaged packages or spilled material. Handle as a radioactive material spill.

Spill and Leak Control

- Alert and clear everyone from the area affected by the spill.
- Take actions to limit the spread of contamination.
- Summon aid.

Damage to the Radioactive Source

- Evacuate the immediate vicinity around the source.
- Place a barrier at a safe distance from the source.
- Identify area as a radiation hazard.

Suggested Emergency Protective Equipment

- Gloves
- Footwear covers
- Outer layer or easily removed protective clothing (as situation requires)

7. HANDLING AND STORAGE

Safe Handling Precautions: Handle in accordance with good laboratory practices. This product is intended for use only by people trained in the safety and handling of chemicals, radioactive materials, and laboratory preparations. See Section 8, "Exposure Controls and Personal Protection".

Storage: Store and handling in accordance with all current regulations and standards. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: No occupational exposure limits have been established for shellfish powder. This material is a particulate matter and adequate inhalation/respiratory protection should be used to minimize exposure. The exposure limits for Particulates Not Otherwise Regulated (PNOR) are applicable.

OSHA (PEL): 15 mg/m^3 (TWA, total particulates)
OSHA (PEL) 5 mg/m^3 (TWA, respirable particulates)

NIOSH (REL): 10 mg/m^3 (TWA, total particulates, 8 h)
NIOSH (REL): 5 mg/m^3 (TWA, respirable particulates)

Exposure Limits For Radionuclides:

Radionuclide	$ALI_{(ing)}$	$ALI_{(inh)}$
^{241}Am	8E-1µCi or 29.6 kBq (Bone surface)	6E-3 µCi or 0.222 kBq (Bone surface)
^{239,240}Pu	8E-1µCi or 29.6 kBq (Bone surface)	6E-3 µCi or 0.222 kBq (Bone surface)
^{238}Pu	9E-1µCi or 33.3 kBq (Bone surface)	7E-3µCi or 0.259 kBq (Bone surface)
^{238}U	1E+1µCi or 370 kBq (Bone surface)	1E+0µCi or 37.0 kBq (Bone surface)
^{234}U	1E+1µCi or 370 kBq (Bone surface)	1E+0µCi or 37.0 kBq (Bone surface)
^{235}U	1E+1µCi or 370 kBq (Bone surface)	1E+0µCi or 37.0 kBq (Bone surface)
^{232}Th	7E-1µCi or 25.9 kBq (Bone surface)	1E-3µCi or 0.037 kBq (Bone surface)
^{230}Th	4E+0µCi or 148 kBq (Bone surface)	6E-3µCi or 0.222 kBq (Bone surface)
^{228}Th	6E+0µCi or 222 kBq (Bone surface)	1E-2µCi or 0.37 kBq (Bone surface)
^{228}Ra	2E+0µCi or 74.0 kBq (Bone surface)	1E+0µCi or 37.0kBq
^{137}Cs	1E+2µCi or 3.7 MBq	2E+2µCi or 7.4 MBq
^{210}Pb	6E-1µCi or 22.2 kBq (Bone surface)	2E-1µCi or 7.4 kBq (Bone surface)
^{90}Sr	3E+1µCi or 1.11 MBq (Bone surface)	2E+1µCi or 740 kBq (Bone surface)
^{40}K	3E+2µCi or 11.1 MBq	4E+2µCi or 14.8 MBq
^{244}Cm	1E+0µCi or 37 kBq (Bone surface)	1E-2µCi or 0.37 kBq (Bone surface)
^{242}Cm	3E+1µCi or 1.11 MBq (Bone surface)	3E-1µCi or 11.1 kBq (Bone surface)
^{241}Pu	4E+1µCi or 148 kBq (Bone surface)	4E-1µCi or 1.48 kBq (Bone surface)
^{226}Ra	2E+0µCi or 74 kBq	6E-1µCi or 22.2 kBq
^{214}Pb	9E+3µCi or 333 MBq	8E+2µCi or 29.6 MBq
^{214}Bi	2E+4µCi or 740 MBq	8E+2µCi or 29.6 MBq (St. wall)
^{212}Pb	8E+1µCi or 2.96 MBq (Bone surface)	3E+1µCi or 1.11 MBq
^{208}Tl	N/A	2E+2µCi or 7.4 MBq

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin and Body Protection: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Descriptive Properties

Appearance (physical state, color, etc.):	fine powder
Molecular Formula:	not applicable
Molar Mass (g/mol):	not applicable
Odor:	not available
Odor threshold:	not available
pH:	not available
Evaporation rate:	not applicable
Melting point/freezing point (°C):	not available
Relative Density (g/L):	not available
Vapor Pressure (mmHg):	not applicable
Vapor Density (air = 1):	not applicable
Viscosity (cP):	not applicable
Solubility(ies):	not available
Partition coefficient (n-octanol/water):	not available
Particle Size:	not available

Thermal Stability Properties

Autoignition Temperature (°C):	not available
Thermal Decomposition (°C):	not available
Initial boiling point and boiling range (°C):	not available
Explosive Limits, LEL (Volume %):	not available
Explosive Limits, UEL (Volume %):	not available
Flash Point (°C):	not available
Flammability (solid, gas):	not available

10. STABILITY AND REACTIVITY

Reactivity: Stable at normal temperatures and pressure.

Stability: X Stable _____ Unstable

Possible Hazardous Reactions: None listed.

Conditions to Avoid: Avoid generating dust.

Incompatible Materials: None listed.

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition will produce oxides of carbon.

Hazardous Polymerization: _____ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Exposure: X Inhalation X Skin X Ingestion

Symptoms Related to the Physical, Chemical and Toxicological Characteristics: Skin or eye mechanical irritation.

Potential Health Effects (Acute, Chronic and Delayed):

Inhalation: Acute exposure to large concentrations of dust may cause irritation. Chronic exposure to large concentrations of dust may cause pneumoconiosis characterized by chest pain, cough, dyspnea, reduced thoracic excursion.

Skin Contact: Skin exposure may result in mechanical irritation.

Eye Contact: No data available; may cause mechanical irritation.

Ingestion: Ingestion of this material is unlikely under normal conditions of use.

Numerical Measures of Toxicity:

Acute Toxicity: Not classified; no data available.

Skin Corrosion/Irritation: Not classified; no data available.

Serious Eye damage/ Eye Irritation: Not classified; no data available.

Respiratory Sensitization: Not classified; no data available.

Skin Sensitization: Not classified; no data available.

Germ Cell Mutagenicity: Not classified; no data available.

Carcinogenicity: Not classified.

Listed as a Carcinogen/Potential Carcinogen _____ Yes X No
Ocean shellfish is not listed by NTP, IARC or OSHA as a carcinogen/potential carcinogen.

Radiological Hazard: SRM 4358
Ionizing radiation is a known carcinogen

Reproductive Toxicity: Not classified; no data available.

Specific Target Organ Toxicity, Single Exposure: Not classified; no data available.

Specific Target Organ Toxicity, Repeated Exposure: Not classified; no data available.

Aspiration Hazard: Not classified; no data available.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: No data available.

Persistence and Degradability: No data available.

Bioaccumulative Potential: No data available.

Mobility in Soil: No data available.

Other Adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of waste in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: Not regulated by DOT or IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Section 302 (40 CFR 355.30): Not regulated.

SARA Title III Section 304 (40 CFR 355.40): Not regulated.

SARA Title III Section 313 (40 CFR 372.65): Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	No.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

State Regulations:
California Proposition 65: Not listed.

U.S. TSCA Inventory: Not listed.

TSCA 12(b), Export Notification: Not listed.

Canadian Regulations:
WHMIS Information: Not provided for this material.

16. OTHER INFORMATION

Issue Date: 26 September 2014

Sources: 29 CFR Occupational Health and Safety Office (OSHA) 1910.1000, *Limits for Air Contaminants*, Table Z-1; available at http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992 (accessed Sep 2014).

Center for Disease Control (CDC) NIOSH Pocket Guide to Chemical Hazards, *Particulates not otherwise regulated*; available at http://www.cdc.gov/niosh/npg/npgd0480.html (accessed Sep 2014).

OSHA 29 CFR, Subpart Z, Ionizing radiation, 1910.1096.

NRC 10 CFR 20, Standards for Protection Against Radiation.

DOT 49 CFR 173, Shippers General Requirements for Shipments and Packages.

Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

Disclaimer: Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The certified values for this material are given in the NIST Certificate.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail srmmsds@nist.gov; or via the Internet at http://www.nist.gov/srm.