TRISO-Coated UCO Fuel Compact Fabrication

Request for Proposals

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1. Background Information

Radiant is a nuclear technology company focused on providing decentralized power solutions for remote operation and disaster relief scenarios. The company's efforts are centered on developing Kaleidos, a 1 MWe high temperature gas microreactor (micro-HTGR) design that prioritizes safety, reliability, and portability.

A major component of the system design is the TRi-structural ISOtropic (TRISO)-coated uranium oxycarbide (UCO) fuel particles that provide both heat to the system and functional containment of fission products produced during operation of the reactor. As the company has recently closed a Series A funding raise with the expressed goal of procuring system components and reducing schedule risk for a demonstration unit to be operated at the National Reactor Innovation Center's (NRIC) DOME facility at Idaho National Laboratory (INL) in 2026, Radiant is seeking proposals from qualified fuel Fabricators capable of manufacturing TRISO particle fuel compacts.

Radiant's Series A funding raise was led by Union Square Ventures (USV). See this statement from Fred Wilson of USV for more information: usv.com/writing/2022/03/radiant

More information on NRIC's NEPA Roadmap for Advanced Reactor Deployment: bit.ly/3bY5Ssm and EBR-II DOME facility: bit.ly/3NOWpko

2. Effort Overview

Radiant is soliciting responses from qualified Fabricators to produce TRISO-coated UCO fuel compacts for testing and use within a micro-HTGR demonstration unit. While nuclear material requires special handling, liability treatment, and has long production timelines, Radiant seeks the simplest possible, free-market purchase arrangement for an initial limited quantity of TRISO UCO fuel compacts with payment at specified milestones. Tasks and material quantities are summarized in Table 1.

Table 1. Proposal Tasks and Quantities

Task	Deliverable Quantity (Approx.)
TRISO UCO Particle Production	123.4 million particles
Natural Uranium Compact Production	866 compacts
HALEU Compact Production	43,300 compacts
Fissile Material Packing, Certification, and Shipping	

3. Contract Structure

After proposals have been reviewed and the award has been announced, a Purchase Agreement contract will be negotiated and executed between Radiant and the Fabricator. Finalization of contract and pre-payment will occur no later than June 30, 2023. The Purchase Agreement will not be exclusive and both parties will remain free to produce or procure fuel with other parties. During the Period of Performance, Radiant and awardee Fabricator will work to finalize specifications, quality plans, and timeline.

3.1 Definition of Terms

To facilitate a common understanding between Radiant and Fabricators, a list of terms and their associated definitions is included.

- Natural Uranium (NU) – Uranium material in any chemical form in which the mass of U-235 is less than or equal to 0.7204% of the total uranium mass.
- High-assay low-enriched uranium (HALEU) – Uranium material in any chemical form in which the mass of U-235 is between 5 and 20% of the total uranium mass.
- Qualification Tests – Tests required to validate the production process for a product specification. Typically, only used for initial runs or when significant specification changes occur.
- Acceptance Tests – Tests required to verify a product meets specifications. Run on all produced lots of product.
- Material Property Tests – Tests to determine thermal-mechanical material properties of the product (thermal conductivity, specific heat, modulus of elasticity, yield strength, etc.). Does not include neutron irradiation testing.
- Period of Performance – Time period between contract execution and product delivery.

3.2. Firm, Fixed Price

Radiant seeks a firm, fixed price contract mechanism with payments disbursed as product delivery milestones are met. Upon contract execution, Radiant will provide a pre-payment amount to awardee Fabricator not to exceed 5% of the total effort cost quoted by Fabricator. A pre-payment reduces financial risk to the Fabricator and payment at milestones ensures that delivery occurs on time, reducing schedule risk to Radiant. A standard change order structure will be utilized to settle price increases or unanticipated costs during fabrication.

3.3. Milestone Schedule

An overview of the effort's schedule and milestones are detailed in Figure 1.

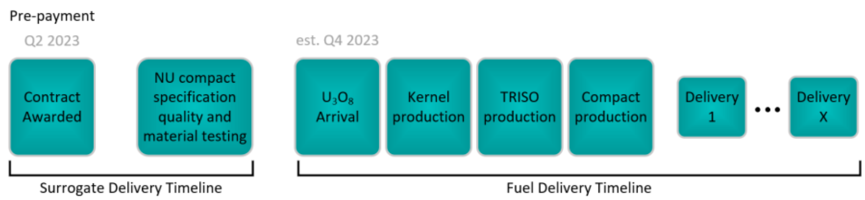

Figure 1. Radiant milestone and payment schedule structure

TRISO-coated fuel compacts conforming to Radiant's fuel specification will first be produced using natural uranium (NU) fuel kernels. NU fuel particles and compacts will undergo specification qualification, acceptance, and material property tests. Test results will be provided to Radiant. Radiant will then provide High-assay low-enriched uranium (HALEU) in the form of either uranium oxide (U_3O_8) or uranium metal to be received by the Fabricator, and HALEU UCO fuel kernel production will begin after NU compacts have been proven to meet the specification within a developed quality plan based on NQA-1 standards. Acceptance and qualification test results for produced HALEU TRISO-coated UCO compacts will then be provided to Radiant. After the initial delivery, a consistent and predictable schedule for subsequent deliveries must be executed.

Fabricator proposals should include a schedule of payments and amounts that correspond to effort milestone deliverable dates. Off-ramps for both parties should be built into a negotiated contract, as material delays significantly affect schedule, such that a mutually agreeable shared risk posture is achieved.

3.4. Radiant Material Responsibility

Radiant will source and provide HALEU material to the awardee Fabricator. The source of HALEU material will be finalized and communicated to Fabricator during Purchase Agreement contract negotiations. The selected Fabricator is expected to work with Radiant and HALEU procurement company to provide delivery address and schedule upon contract award. HALEU material will be delivered to Fabricator in either oxide (U_3O_8) or metallic form.

Radiant will own all compacts (NU and HALEU) produced throughout the fabrication effort. Radiant intends to provide awardee Fabricator a delivery address at DOE or national laboratory facilities for these materials but does not currently have a fuel storage contract with either of these entities. Before executing any UCO TRISO purchase agreement, Radiant would seek to either secure a storage location to provide a delivery address and timeline or provide a date by which Radiant would be required to provide a delivery address to a contracted Fabricator. In the latter case, the delivery address notice date would be before Fabricator takes receipt of any HALEU material to minimize fissile material storage risk to Fabricator and penalties to Radiant in the case of failure to provide delivery location will be specified in the Purchase Agreement.

3.5. Fabricator Material Responsibility

Awardee Fabricator will source materials for TRISO coating and compact production processes. Fabricator will also source NU material for sample compact production. NU material will be characterized by the Fabricator prior to NU kernel production. Fabricator will provide cost for an option to store the full quantity of NU compacts and associated qualification, acceptance, and material property testing for up to 3 years following production.

While it is expected that Fabricators store waste and unrecovered scrap generated from the TRISO fabrication process on-site for some time after production, the material must eventually be disposed of, stored, or (in the case of scrap) recovered. The final contract will specify the parties responsible for disposal, storage, or recovery of material and the length of time after fabricator efforts cease that Fabricator facilities will store unused uranium feedstock, scrap, and waste. If fabricator has particular capabilities in this area, detail them in the proposal.

3.6. Nuclear Fuel Liability/Indemnity

Due to the first-of-a-kind nature of TRISO-coated UCO fuel fabrication, it is expected that the fabricator may not have liability coverage for the production or transport of the material. Nuclear indemnification will either be offered through a DOE contract or secured by Radiant for fuel for the demonstration reactor unit.

In a follow-on contract, it is expected that a reliable fuel supplier producing significant quantities of material should maintain their own liability insurance. Fabricator is encouraged to provide pricing estimates for liability insurance if available for this first quantity of fuel and for later production of long-term quantities.

3.7 Non-delivery Clause

Clear and open discussion from both ends during the contract will be required. Site visits occur in compliance with NQA-1 facility quality standards and to ensure timely completion of the contract remains possible. Delivery timelines being missed will reduce the contract value. If two delivery timelines are missed, Radiant will maintain a right to cancel the contract and to enforce that all payments are returned. Radiant will require a right to make a public statement if the non-delivery cancellation occurs.

4. Proposal Process

This section describes the proposal process including submission format, Radiant Point of Contact, and the submission schedule.

4.1. Submission Format

Proposals to be considered must be submitted in writing in pdf or MS Word format to Radiant no later than 11:59 PM PDT on 11/30/22. Proposals should be 15 pages maximum, using a font size minimum of 11pt in text and 9pt in figures, tables, and their descriptions. Proposals may include a single cover page that will not count against the page limit. All submitted Proposals with "Business Confidential" markings will be protected and treated as proprietary.

4.2. Requests for Additional Information

Fabricators should submit Requests for Additional Information (RFAI) to Radiant to ask for clarification of content within this Request for Proposals document. RFAIs will be handled with an open question period where Fabricators may direct inquiries to the Radiant Point of Contact until 11/18/22. Any questions Radiant deems pertinent to the proposal phase will be answered as quickly as possible.

4.3. Radiant Point of Contact

Both RFAI exchanges and proposal submissions should be directed, in writing, to trisoproposals@radiantnuclear.com throughout the proposal process.

4.4. Schedule

Table 2. Selection schedule dates

Time Period	**Date**
Request for Proposals open date	10/17/22
RFAI closes	11/18/22
Proposals due	11/30/22
Awardee notified	12/31/22
Contract execution, pre-payment due	6/30/23

Request for Proposals open date: Request for Proposals will be posted publicly on a Radiant webpage and known qualified TRISO fuel Fabricators will be notified. Pertinent RFAI inquiries will be answered ASAP.

RFAI closes: No more Requests for Additional Information from potential Fabricators will be considered. RFAI inquiries submitted prior to this date with no response will still be considered.

Proposal due: Completed proposals will be submitted to Point of Contact.

Awardee notified: Radiant will notify awardee Fabricator directly and contract negotiations will immediately follow. Public announcement made within 30 days.

Contract execution, pre-payment due: Purchase Agreement contract will be negotiated and executed. Pre-payment to Fabricator will be made.

Submitting a Proposal in response to this Request does not constitute a binding agreement between Radiant and Fabricator and does not guarantee a response.

5. Proposal Outline

Fabricators Proposals are expected to follow the Proposal Outline in this section.

5.1. Project Timeline and Cost

Deliver a table or diagram detailing a production schedule for Radiant's milestones from Section 3.2. Milestone Schedule. Fabricator is encouraged to add milestones as necessary to communicate costs and risks clearly throughout Period of Performance. Final material shipment is required no earlier than June 2024 and no later than June 2026 for proposal to be considered. Submit cost quotes for each milestone and an itemized budget for the project. Schedule will be a significant contribution to Proposal evaluations and proposals with higher costs but favorable schedule will be viewed positively. Failure to achieve milestones will incur penalties to the payment of that milestone using a pro-rata structure. The contract will be negotiated to allow make up of penalties at further milestones to allow for a healthy partnership combining flexibility and pressure.

5.2. Contract Structure Review and Risks

Reply with a response to all subsections of Section 3 above. Confirm for each subsection that all aspects of the contract terms are acceptable and highlight any identified risks. If terms cannot be met, Fabricators are expected to communicate this during RFAI inquiries and propose alternatives to be considered.

5.3. Management Plan and Performance History

Describe the management methods that will be used and the frequency, format, and means of communication Radiant can expect from Fabricator throughout the Period of Performance. As the intention is a results-oriented, milestone-based contract, no financial reporting will be required.

Fabricators should include descriptions of their TRISO fabrication and test facilities and include dates and details of the most recent fabrication and testing performed. Provide expected process waste and scrap stream numbers for both once-through and scrap recovery efforts. Provide a summary of quality report content that will be made available to Radiant throughout the Period of Performance.

5.4. High-Volume Pricing Estimate

Fabricators must submit price forecasting for a 7-year production quote. Table 2 illustrates Radiant's annual demand for produced TRISO compacts in metric tons U.

Table 3. Radiant annual TRISO fuel demand 2022 – 2032.

Year	2026	2027	2028	2029	2030	2031	2032
Demand [MT U]	0.2	0.4	1.2	1.2	2.4	2.4	3.0

Estimates will be non-binding and will be used to evaluate the commercial viability of a long-term partnership. The contract for long-term supply will be sought at a later date, likely after the first HALEU delivery milestone is achieved.

5.5. Standards and Testing

TRISO-coated fuel is complex, and there are a significant number of specifications a Fabricator must meet to ensure fuel conforms to customer requirements. In addition to the highly specified nature of TRISO fuel is that the specification must be verified by statistical testing of the many particles produced. This section will detail the quality standards and testing the fuel will be produced under and detail testing information Fabricators should include in their proposals.

5.5.1. Quality Assurance

Prior to fabrication efforts, Radiant and awardee Fabricator will agree to a quality assurance (QA) program. The QA program shall be in effect at all points during the fabrication, handling, and shipment of fuel produced for this effort and will conform to the requirements listed in the American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance ASME NQA-1-2008 (with 1a 2009 addenda) *Quality Assurance Requirements for Nuclear Facility Applications*, Part I and Part II, Subpart 2.7 (as applicable). Fabricators should list any parts requiring marking that are present at the compact level.

Even in a reactor the size of Radiant's Kaleidos, multiple millions of fuel particles will be present. To ensure a statistically relevant amount of the material falls within specifications provided, Fabricators should provide a description of their statistical sampling plan and methods as well as detail their administrative procedures to ensure specification compliance. Also include a statement on minimum lot size achievable that test statistics would be expected to scale to a full production lot.

5.5.2. Qualification and Acceptance Testing

Kaleidos fuel specifications are presented in Section 5.6. At least one test must be performed to verify each specification requirement for produced fuel. Some tests will be performed for all lots (acceptance tests) while others may be run infrequently or only to verify an initial specification or change (qualification tests). Fabricators should detail tests to be performed to verify each specification, the frequency (in terms of per lot, less than per lot, or per specification change) of each test, and statistics associated with each test procedure. List which tests will be performed on each lot of produced material and classify each test as 'qualification' or 'acceptance'.

Examples for expected tests to follow: All compacts will be individually weighed, and weight tables delivered in electronic format. Five random HALEU compacts per lot or delivery set will be cut and mounted for visual compliance of matrix material, particle layers and C/O dispersion in kernels. Impurities must be tested for a single lot of fuel kernels, a single lot of coated particles, and the matrix material forming the compact. Describe destructive or nondestructive means of testing for impurities as required by the Kaleidos TRISO specifications. At least 2000 coated particles for NU compacts must be tested for SiC defect for initial failure estimation. Coated particles must be weighed as a whole to ensure compliance with mean mass specification. Mass by weigh scale, and bulk thermal conductivity by laser flash analysis or similar means must be tested for all 2000 compacts. After these tests, 10 compacts will be cut and mounted for visual compliance of particle layers and C/O dispersion in kernels.

5.5.3. Material Property Testing

In addition to the previously outlined testing requirements, material properties for produced fuel will be characterized. Fabricators should provide quotes and comment on their ability to obtain test data for thermal-mechanical properties (e.g. thermal conductivity, specific heat capacity, coefficient of thermal expansion at temperatures from room (300 K) through transient operation (1800 K), modulus of elasticity, and yield strength) of the NU compacts and potential differences expected in these properties for HALEU enriched UCO compacts. Of particular interest are bulk material properties of the fuel compact and thermal-mechanical material properties of the UCO fuel kernel and matrix material.

5.6. Specifications

5.6.1. Fuel Kernel Specifications

UCO microspheres to be coated with TRISO layers shall be produced using both enriched HALEU material and naturally enriched uranium (NU). Radiant's Kaleidos TRISO particle fuel kernel design deviates from the extensively tested Advanced Gas Reactor (AGR) specification in that the target nominal fuel kernel diameter is larger (540 μm versus AGR's 425 μm), though it is not as large as JAERI's HTTR (600 μm). Table 4 presents a summary of physical dimensions for the AGR, HTTR, and Kaleidos fuel specifications.

Table 4. Particle fuel TRISO layer thickness specification comparisons (μm)

	AGR	HTTR	Kaleidos
Kernel Diam.	425	600	540
Buffer	100	60	80
IPyC	40	30	40
SiC	35	30	35
OPyC	40	45	40

Table 5. Kaleidos TRISO particle fuel kernel lot specifications

Kernel Lot Property	Nominal (a)	Critical Region	Critical Fraction
Diameter (μm)	540 ± 10	≤ 490 ≥ 590	≤ 0.01 ≤ 0.01
Aspect ratio	Not Specified	≥ 1.05	≤ 0.01
Envelope density (g/cm^3)	≥ 10.4	Not Specified	
Uranium fraction (gU/gUCO)	≥ 0.885		
Carbon/uranium (atomic ratio)	0.40 ± 0.10		
Oxygen/uranium (atomic ratio)	1.50 ± 0.20		
Individual impurities (ppmw): Cr, Co, Cu, Li, Mn, Mo W, V, Zn	≤ 100 each		
Al, Ca, Cl, Ni, Na	≤ 150 each		
Fe, Si	≤ 250 each		
Process impurities (ppmw): P, S	≤ 1500 each		

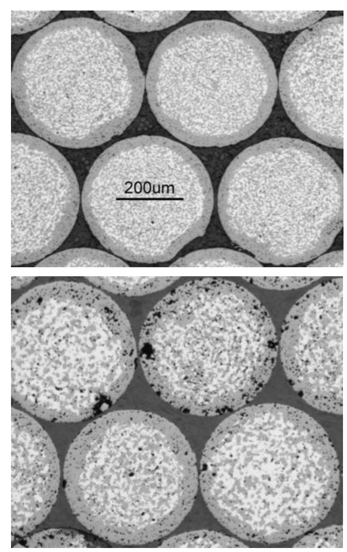

Figure 2. Visual standard of interspersed oxidic (darker) and carbidic (lighter) phases in fuel kernels: (a) finely divided carbidic phase and (b) acceptable phase interspersion. From Figure 1 of SPC-1352 "AGR-5/6/7 Fuel Specification."

Lot Measurement Only	
Microstructure [b]	
(a)	Specified mean values and fraction in critical regions determined at the 95% confidence level. The ± values represent an allowable range for the mean value and are not standard deviations of the mean.
(b)	Samples must show evidence of oxidic and carbidic phase interspersion within the kernels (Figure 2).

Table 5 gives Radiant's UCO kernel lot specifications. The number of HALEU fueled microspheres to produce is approximately 123.4 million corresponding to a mass of 100 kg original HALEU material.

5.6.2. TRISO Layer Specifications

UCO microspheres shall be coated in successive layers of low-density pyrolytic carbon (buffer layer), high-density pyrolytic carbon (inner PyC layer), silicon carbide (SiC layer), and a final layer of high-density pyrolytic carbon (outer PyC layer). Radiant's Kaleidos TRISO particle fuel specification deviates from AGR fuel in that the nominal target buffer layer thickness is thinner (80 μm compared to AGR's 100 μm) though again it falls between the AGR and HTTR values (60 μm for HTTR). Structural layer thicknesses are consistent with AGR, though due to the larger outer radius of the buffer layer, total particle size will be bigger.

Table 6 presents the Kaleidos TRISO coating specifications. The defective IPyC and OPyC coating fraction properties are expected to change with feedback from Fabricators and as Radiant's microreactor design matures, prior to production. Once HALEU production begins, Radiant will not request further changes. The visual standards presented in Figures 3 and 4 are meant to qualitatively demonstrate specifications for SiC grain sizing and IPyC defects leading to uranium dispersion, respectively. Further discussion with the awarded Fabricator is expected to yield more quantitative specifications for these properties. In addition to the specifications in Table 6, a low-strength bond between the buffer and IPyC layers is required.

Table 6. Kaleidos TRISO particle specifications

TRISO Particle Property	**Nominal** [a]	**Critical Region**	**Critical Fraction**
Lot Variable Properties			
Buffer thickness (μm)	80 ± 8	≤ 60	≤ 0.01
Buffer density (g/cm^3)	1.05 ± 0.10	Not specified	
IPyC thickness (μm)	40 ± 4	≤ 30 ≥ 52	≤ 0.01 ≤ 0.01
IPyC density (g/cm^3)	1.90 ± 0.05	≤ 1.80 ≥ 2.00	≤ 0.01 ≤ 0.01
Defective IPyC coating fraction	$\leq 1.0 \times 10^{-4}$	Not Specified	
IPyC diattenuation	≤ 0.0170	≥ 0.0242	≤ 0.01
SiC thickness (μm)	35 ± 3	≤ 28	≤ 0.01
SiC density (g/cm^3)	≥ 3.19	≤ 3.17	≤ 0.01
SiC aspect ratio (faceting)	Not specified	≥ 1.14	≤ 0.01

OPyC thickness (μm)	40 ± 4	≤ 20	≤ 0.01
OPyC density (g/cm^3)	1.90 ± 0.05	≤ 1.80 ≥ 2.00	≤ 0.01 ≤ 0.01
Defective OPyC coating fraction	≤ 2.0 × 10^{-4}	Not Specified	
OPyC diattenuation	≤ 0.0122	≥ 0.0242	≤ 0.01
Lot Measurement Only			
SiC microstructure	Grain size < Figure 3 visual standard [b]		
Uranium Dispersion	Uranium dispersion < Figure 4 visual standard		
(a)	The ± values represent an allowable range for the mean value and are not standard deviations of the mean.		
(b)	Specification will be met if the average SiC grain size is judged smaller than the average grain size shown in the visual standards (Figure 3). Using stratified sampling of batches or pooled coater batch data to demonstrate compliance is recommended.		

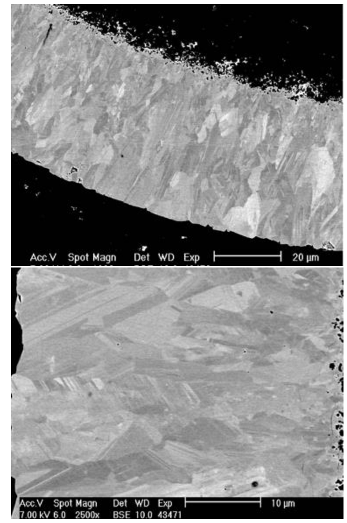

Figure 3. Visual standard of SiC layer with excessively large grain sizes. From Figure 2 of SPC-1352 "AGR-5/6/7 Fuel Specification."

5.6.3. Fuel Compact Specifications

Radiant's Kaleidos microreactor design uses fuel compacts in the form of right circular cylinders. Table 7 provides geometric specifications for the fuel compacts. The diameter and length specifications may be changed depending upon Fabricator's available compact molds to reduce cost and schedule requirements associated with obtaining press molds "close enough" to those that Fabricators already have available for use.

Table 7. Heat-treated Kaleidos TRISO fuel compact geometric specifications

Property	**Nominal** [a]	**Critical Limits**	**Critical Fraction**
Lot Variable Properties			
Diameter (mm)	12.45 (0.49 in.)	≤ 12.37 ≥ 12.62	0 0
Length (mm)	24.64 (0.97 in.)	≤ 24.56 ≥ 25.81	0 0
Particle packing fraction [b] (%volume/compact)	40	Not Specified	
Matrix density (g/cm^3)	≥ 1.62		
(a)	The ± values represent an allowable range for the mean value and are not standard deviations of the mean.		
(b)	Though the nominal packing fraction of 40% is listed, the specification requirements are for a minimum uranium mass loading within each compact. See Table 7 for uranium loading specification.		

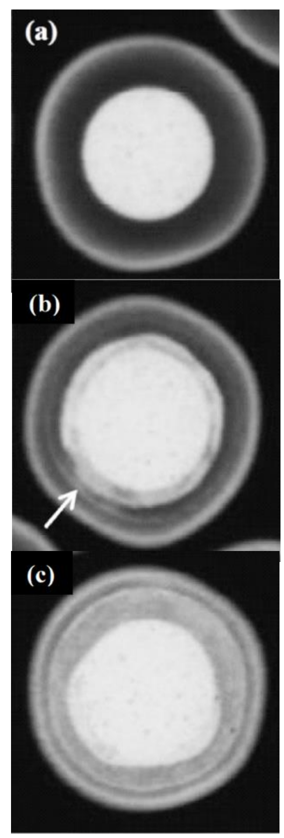

Figure 4. Visual IPyC defect/ uranium dispersion standards for acceptable dispersion (a) and unacceptable dispersion (b and c). From Figure 3 of SPC-1352 "AGR-5/6/7 Fuel Specification."

Table 8 shows nominal percentage of each of the components in the resinated graphite powder overcoat. To avoid being overly prescriptive, the materials are classified according to their general type in the mixture. Exact specification of component feedstock materials is expected after further discussion with the awarded Fabricator.

Table 8. Resinated Graphite Matrix Powder specification

Material	Nominal %
Natural Flake Graphite	64
Synthetic Graphite	16
Phenolic resin	19
Hardening Agent (e.g. Hexamethylenetetramine (HMTA))	1

Compact content and quality specifications are given in Table 9. Dispersed uranium fraction (DUF) and all lot attribute properties are subject to changes in the microreactor design. Fabricators should state the minimum limits their facilities can achieve for these attributes and specify the schedule and cost impacts of tightening or loosening these specifications. Comments from Fabricators regarding the effects of differing packing fractions and/or uranium enrichment variations across production runs on budget and schedule are of interest. In addition to the previously outlined delivery milestone of 2000 NU compacts, the full production run of HALEU fueled compacts will number approximately 43,500.

Table 9. UCO heat-treated compact content and quality specifications

Property	Nominal [a]	Critical Limits	Critical Fraction
Lot Variable Properties			
Mean uranium loading (gU/compact)	2.31 ± 0.15	Not Specified	
Dispersed uranium fraction (DUF) ($g \cdot U_{leached}/g \cdot U_{sample}$)	$\leq 1.0 \times 10^{-5}$		
Iron (µg) Fe outside of SiC per compact	≤ 25	≥ 100	≤ 0.01
Transition metals (µg) Cr, Mn, Co, and Ni outside SiC per compact	≤ 50 each	≥ 200 total	≤ 0.01
Calcium (µg) Ca outside SiC per compact	≤ 50	Not Specified	
Aluminum (µg) Al outside SiC per compact	≤ 50		
Titanium + Vanadium (µg) (Ti + V) outside SiC per compact	≤ 240		
Lot Attribute Properties			
Exposed kernel fraction (EKF) (kernel equiv./particle count)	$\leq 5.0 \times 10^{-5}$	Not Specified	
Defective SiC coating fraction (kernel equiv./particle count)	$\leq 1.0 \times 10^{-4}$		
Defective OPyC coating fraction[b]	≤ 0.01		

(a)	The $\pm$ values represent an allowable range for the mean value and are not standard deviations of the mean.
(b)	For defective OPyC coating fraction, count as defects any particles with exposed SiC due to inadequate OPyC deposition or spalled OPyC layers. This attribute is quantified using particles collected following compact deconsolidation.

5.6.4. NU Fuel Specification

NU microspheres will be fabricated to ensure all aspects of fuel fabrication up to compact production pass qualification and acceptance tests before kernel production with HALEU material begins. As NU will be sourced separately from the HALEU material, NU kernel requirements will not be held to the same overall impurity limits, though introduced carbon/oxygen ratios and process impurities should still be tested.

The requirement for NU microspheres is to produce at least the minimum lot size (2.0 kg U) to deliver for qualification, acceptance, and material property testing. This corresponds to approximately 866 compacts (not considering production yield losses); though more may be produced to dial in production process parameters for the Kaleidos TRISO fuel specification.

5.7. Fissile Material Shipping and Handling

Fabricators must be capable of taking receipt of up to 150 kg U HALEU at an enrichment of 19.75 wt% ^{235}U in either oxide (U_3O_8) or metal form and shipping produced NU and HALEU enriched UCO TRISO compacts. Fabricator proposals should outline a preliminary shipping plan for fabricated compacts that lists the transportation packaging type, material density (anticipated number of compacts and mass ^{235}U per package), compliance with 10 CFR 71, storage capability (especially whether packaging approvals expire during storage), and storage footprint of fabricated compacts. Present the responsibilities each company (Radiant and Fabricator) bears in the shipping process including sourcing and ownership of transport packaging.

Discuss differences between the shipping processes and facility license requirements for NU and HALEU compacts.