A. SECTION C-DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

Section C, <u>DESCRIPTION/SPECIFICATIONS/WORK STATEMENT</u>, is being revised as a result of TPBAR declassification, as follows:

1. Subsection C.6, <u>PHASE IV SCOPE OF WORK</u>, is being revised to remove material control and accountability requirements, and other security requirements as a result of TPBAR declassification, as follows:

C.6 PHASE IV SCOPE OF WORK

The Contractor shall furnish all labor, materials and equipment necessary to fabricate TPBARs in accordance with this Statement of Work. The manufacture and delivery of TPBARs requires that the contractor provide management support to the Tritium Sustainment Program, and support technology development of the TPBAR design, manufacturing process development, and enhancements. The contractor shall perform required inspections, tests, and any special processes or procedures based on Designer of Record (DOR) specifications, drawings and other documents transferred through the interface agreement. The DOE-NNSA will provide the contractor with projected guantities of TPBARs needed to support irradiation schedules at least 15 months prior to TPBAR Delivery. The projection will cover production quantities covering the next three (3) years. Provided below is the most current nominal schedule of TPBAR use through October 2025. The actual number of TPBARs to be manufactured will be provided by the technical contracting officer representative (COR) via letter or other official correspondence.

Fiscal Years	16	17	18	19	20	21	22	23	24	25
TVA Reactors										
Production (End of Year)	3,120	3,824	4,928	4,928	6,432	8,336	9,136	10,640	13,344	14,848
(Cumulative TPBARs)										#20
									#19	
							#18			1,504
Goal = 2,800 grams per cycle						#17			1,504	
				#16			1,504	4		
			#15			1,504				
	#14			1,504						
Watts Bar Unit 1			1,104							
Actual TPBARS	704									
Planned TPBARS										
										1,504
								1,200)	
Second Reactor - Watts Bar Unit 2							800			
Planned TPBARS					400					

(a) TPBAR FABRICATION AND ASSEMBLY

- (1) Provide a facility certified to handle hardware to fabricate and assemble TPBARs.
- (2) Provide for storing components and interim storage of assembled TPBARs until shipment. Provide for storage of components and necessary material inventory. Examples include bare cladding tubes, full length getters, and SS 316 ingots. Storage will be in accordance with current requirements identified by the DOR and concurred by the COR.
- (3) Provide all labor and material required to procure or fabricate all required materials, components, and equipment to assemble the TPBARs, in accordance with the DOR drawings and specifications, approved and provided by the COR.
- (4) Prior to the start of a fabrication campaign, the Contractor shall verify with the DOR and the COR that the current versions of design drawings and specifications are being used. Contractor and sub-contractor procedures and MAQPs, including the associated MOP's and QCI's, shall be submitted to the PNNL for subject matter review.
- (5) Perform inspections, tests, and develop special processes or procedures required to ensure that the TPBARs are assembled in accordance with the requirements defined in the current drawings and specifications provided by the DOR and approved by the COR.
- (6) Manufacture basic lead use assembly (LUA) rods per design agency drawings and specifications as a part of the TPBAR build requirement. Extra costs (over/above the standard cost) associated with manufacturing LUAs will be covered under a separate Basic Ordering Agreement between DOE-NNSA and PNNL.
- (7) Manufacture the specified number of TPBARs identified by the COR via letter or other official correspondence. The

actual quantities of TPBARs required by the DOE-NNSA, to coincide with reactor irradiation schedules, will be based on DOE-NNSA's established tritium requirements to support national security requirements plus sufficient spares to cover possible damage or failures in production or during incorporation into fuel assemblies and shipment to TVA.

- (8) Provide a Product Certification to TVA, the irradiation utility, the DOR and the utility's fuel fabricator at the time of TPBAR delivery. This certification will list the TPBARs by unique identification numbers and certify that: (1) they were built in accordance with the approved Quality Assurance Program and the approved Manufacturing and Quality Plan and (2) they meet the requirements of applicable engineering drawings, specifications and acceptance criteria. A reference to each previously approved nonconformance dispositioned "repair" or "use-as-is" will be included as part of the Product Certification. Copies of all such certifications shall be sent to the DOE-NNSA COR at the same time. The format and sample content of the certifications are identified in Part I, Section F.8 (see example in Part III, Section J, Attachment 3).
- Receive and store TPBAR components from component fabrication sub- contractors and PNNL/DOE-NNSA (i.e., liners, pellets, and <u>FLGs</u>).
- (10) Manufacture of development components to support evolution of TPBAR design.
- (11) Provide for ultimate disposal of waste products, including coordination with PNNL, as appropriate, from the fabrication processes that the contractor is responsible for.
- (12) Arrange for appropriate off-site storage for inventory items not able to be stored at the TPBAR facility (.e.g., bare cladding tubes). Storage will be in accordance with current requirements identified by the DOR and concurred by the COR.

(b) PACKAGING AND SHIPMENT

(1) The Contractor shall coordinate with the Fuel Vendor (i.e., Westinghouse), the delivery of the TPBARs to TVA.

- (2) The Contractor shall provide shipment services for hardware when required. The numbers of shipments and places of shipment will depend on program requirements.
- (3) The Contractor shall ship TPBARs per agreed upon schedules provided by the COR. In order to accomplish this requirement, the Contractor shall provide the following services:
 - (-) WesDyne will deliver TPBARs to the Fuel Vendor (i.e., Westinghouse) in time for final assembly to meet delivery of fuel as agreed upon between the fuel vendor and TVA.

(c) PROJECT MANAGEMENT

- (1) Technical Support
 - (a) The Contractor shall participate as a member of the Tritium Program Production Group.
 Participation includes attending meetings, biweekly telephone conferences, action item resolution, and representing TPBAR fabrication concerns to the group. Travel may be required.
 - (b) The Contractor shall participate in Quarterly Management Meetings together with DOE-NNSA and other program participants, and shall present program status reports of progress, plans, issues, and risks. Travel may be required.
 - (c) The Contractor shall participate in TPBAR risk management activities including attending yearly risk management meetings, evaluating assigned risks, performing action item resolution, and reviewing risk management documents.
 - (d) The Contractor shall participate in Tritium Sustainment Subprogram quality assurance and configuration management processes as required.
 - (e) The Contractor shall have the QA program audited by both the Nuclear utility and the DOR, and be maintained as an Approved Supplier to both organizations, in accordance with the QA

requirements of 10CFR50 Appendix B and Interface agreements. The Contractor shall verify suppliers meet the same quality requirements and are maintained on an Approved Supplier's List in accordance with WesDyne's TVA-approved Quality Assurance Program. Changes or improvements as a result of the audits that might result in additional cost will be approved by the COR.

- (f) The Contractor shall provide support to Tritium Sustainment Subprogram problem solving and process improvement activities as required.
- (g) The Contractor shall:
 - Support the utility reactor owner, the DOR and the nuclear fuel fabricator in resolving NRC licensing issues associated with the use of the TPBARs.
 - (ii) Support DOE-NNSA design reviews for changes to the TPBAR or LUAs, and for independent technical reviews.
 - (iii) Submit all use-as –is and repair nonconformance reports to the DOR and Utility (as required) for review and approval as outlined in the Interface agreements.
- (2) Reports, Data and Other Deliverables

The Contractor shall plan, schedule, coordinate, direct, and control all project-related activities and deliverables. The Contractor shall provide the following deliverables in accordance with this Statement of Work and reports as required by the Reporting Requirements Checklist.

- (a) TPBARs per specified quantities and dates.
- (b) The Contractor shall submit reports in accordance with the Reporting Requirements Checklist. The reports shall be in the appropriate format for the COR's use.

- i. Schedule of expected monthly invoicing for the next FY, due NLT September 1st
- ii. Track actuals against the schedule of expected monthly invoicing and report variances greater than 10%.
- iii. Provide a monthly Earned Value Management Cost Performance Report in accordance with the Reporting Requirement Checklist.
- iv. Submit an update of component sourcing, inventory, storage status, proposed long-term build schedule, and associated costs after each fabrication campaign.
- v. Maintain a procurement planning and contract administration function to ensure reliable and timely sourcing of TPBAR components that reflect lead times of all parties involved in TPBAR production, including long range planning that may go beyond the current contract period of performance, to support DOE-NNSA's ten-year budgeting process. The Contractor shall provide to DOE-NNSA an opportunity to technically review subcontractor SOWs prior to sending to the subcontractor, and cost proposals during the proposal process.
- vi. The Contractor shall work with the Design Authority to determine cost effective measures to take when modifying or dispositioning design options (design changes or nonconformances). Approval shall be obtained from the DOE-NNSA to implement cost changes or modifications.

- vii. Cost Proposal for Phase IV TPBARs: On a schedule consistent with a Technical Assistance request from DOE-NNSA, the Contractor will prepare a cost proposal for performing scope associated with Phase IV (including additional option periods) **TPBAR** fabrication and assembly responsibilities. The format and scope of the proposal will be contained in the request. DOE-NNSA will review the proposal and, within two weeks, will either accept the Contractor's proposal or return it with comments. The Contractor will have two weeks (longer if agreed to by both parties) to resolve DOE-NNSA's comments and submit a revised proposal for DOE-NNSA approval.
- viii. At the direction of the DOE-NNSA, the Contractor shall provide PNNL and TVA access to quality and manufacturing records and the applicable areas of facilities and facilities of suppliers where TPBAR fabrication related work is performed or scheduled to be performed. PNNL shall have access to conduct a survey or witness specific fabrication and inspection activities to determine their compliance with TPBAR requirements documents. Results or recommendations from these surveys or reviews will be provided to the contractor by the DOE-NNSA.
- (3) Facility Operating and Maintenance

If DOE-NNSA determines that there will be no TPBAR fabrication activities during a given period, then WesDyne will maintain the facility and place it in a ready state for that period. WesDyne shall also maintain its production and storage capabilities during this down period to ensure that it can mobilize its facility to meet future production requirements. (4) Travel

Travel shall be conducted as necessary to accomplish the work required within this PWS. Travel in support of project management activities normally consists of participating in Tritium Sustainment Quarterly Meetings, TPBAR design review meetings, and Risk Management meetings on an annual basis, vendor oversight, Quality Audits, Design Review Boards, and TPPG meetings. Any undefined travel shall be coordinated with the COR and CO prior to incurring any expenses for, or conducting additional travel. Travel, when required, shall be performed in accordance with current General Services Administration published Federal Travel Regulation.

 Subsection C.7, <u>DRAWINGS, SPECIFICATIONS, AND DOCUMENTS</u> <u>FOR INFORMATION</u>, is being revised to remove requirements as a result of TPBAR declassification, and to incorporate updated specifications and drawings, as follows:

C.7 DRAWINGS, SPECIFICATIONS, AND DOCUMENTS FOR INFORMATION

The Contractor shall comply with all Federal, State and DOE-NNSA requirements in the manufacture and assembly of TPBARS. The following documents are applicable to this SOW. In the event of a conflict between documents referenced herein, the Contractor shall, upon discovering such conflict, immediately notify the Contracting Officer in writing. The Contractor shall use the most current documents available at the time of production, as validated by the design authority and notify the Contracting Officer in writing, if changes will incur increased cost.

- a. a. 10 CFR 50, Appendix B, Quality Assurance (QA) Criteria for Nuclear Power Plants and Fuel Reprocessing Plants
- b. ASME-NQA-1-1994 Edition, Basic and supplementary requirements
- c. 10 CFR Part 21, Reporting of Defects and Noncompliance

- d. Drawings: PNNL-TTP-1-976, Rev. 28, (U) TPBAR Design Drawings,
- e. <u>Specifications</u>

TTQP-1-072, Rev. 6	Production Specification for 316 Stainless Steel Seamless Cladding Tubes
TTQP-1-075, Rev. 4	Production Specification for LWR Tritium Target Rod Stainless Steel Bar Stock for Cladding
TTQP-1-076, Rev. 5	Production Specification for Enriched, Annular LiAIO ₂ Pellets
	(Covers components on the shelf)
TTQP-1-077, Rev. 6	Production Specification for LWR Tritium Target Rod Bare Zircaloy Tube
TTQP-1-079, Rev. 4	Production Specification for LWR Tritium Target Rod, Top and Bottom End Plugs
TTQP-1-080-00, Rev. 9	Production Specification for LWR Tritium Target Rod Top and Bottom End Plug Welding
TTQP-1-081, Rev. 12	TPBAR Component Characteristics and Related Importance Factors
TTQP-1-083, Rev. 5	Production Specification for LWR Tritium Target Rod Stainless Steel Bar Stock for End Plugs
TTQP-1-089, Rev. 4	Production Specification for LWR Tritium Target Rod Spring Clip
TTQP-1-134, Rev. 3	Specification for Assembling TPBARs onto a Holdown Base Plate
TTP-1-076-01, Rev. 0	Specification for Enriched, Annular LiAIO ₂ Pellets (to be used for procurement of new components)
TTP-1-170-00, Rev. 2	Specification for LWR TPBAR Zircaloy Strip
TTP-1-184, Rev. 1	Specification for LWR TPBAR Zircaloy Bar Stock
TTP-1-185, Rev. 1	Specification for LWR TPBAR Machined Cruciform Spacers

PNNL-TTQP-1-692, Rev. 14	Specification for LWR Tritium Target Rod Inside Diameter Aluminide Barrier (U)
PNNL-TTQP-1-920- 00, Rev. 3	Specification for Production LWR Full-Length Getter Tubes (U) Includes Addendum 1, Rev. 3(Covers components on the shelf)
PNNL-TTP-920-01, Rev. 1	(U) Specification for Production LWR Full Length Getter Tubes Includes Addendum 1 Rev. 1 (to be used for procurement of new components)
PNNL-TTP-1-1073- 00, Rev. 2	(U) Specification for LWR TPBAR Getter Disks Includes Addendum 1, Rev. 2

PNNL-TTP-1-1078,	(U) TPBAR Final Assembly
Rev. 7	Specification
PNNL-TTP-1-1078- 01, Rev. 0	(U) TPBAR Final Assembly Specification (Currently in process. Will supersede PNNL-TTP-1-1078 Rev. 7 when completed.)
PNNL-TTP-1-3086,	Chemistry Requirements for LiAlO ₂
Rev. 0	Pellets

Additional Drawings and Specifications

Below is an additional list of drawings and specifications. An "X" indicates a revision is in process and we anticipate it will be implemented by the time the contract option is awarded.

Document Number	Rev.	Title	Comment
H-3-307322, Sheet 1	4	Full-Length Getter Tube Stock	
H-3-307323, Sheet 1	7	(U) Full-Length Getter Plated Getter Tube	
H-3-307846, Sheet 1	10	Production Cladding Tube	
H-3-307847, Sheet 1	11	(U) Production Coated Cladding Tube	
H-3-307853, Sheet 1	8	Production Standard Length Pellet Stack	
H-3-307857, Sheet 1	9	Production Standard Inner Liner Tube	
H-3-307862, Sheet 1	11	Production Spring Clip	
H-3-310571, Sheet 1	11	Top End Plug	
H-3-310571, Sheet 2	11	Top End Plug	
H-3-310572, Sheet 1	3	(U) Trimmed Coated Cladding Tube With End Prep	x
H-3-310572, Sheet 2	3	(U) Trimmed Coated Cladding Tube With End Prep	x
H-3-310573, Sheet 1	2	(U) Coated Cladding Bottom End Plug Assembly	x
H-3-310574, Sheet 1	3	(U) Coated Cladding Bottom End Plug Assembly With End Prep	x
H-3-310584, Sheet 1	3	(U) Getter Disk	
H-3-310585, Sheet 1	3	Getter Disk Stock	Х
H-3-310586, Sheet 1	3	Bottom End Plug	
H-3-310586, Sheet 2	3	Bottom End Plug (WesDyne Proprietary Information)	
H-3-310732, Sheet 1	21	TPBAR Drawing List	Х
H-3-310733, Sheet 1	8	(U) TPBAR General Notes	Х
H-3-310733, Sheet 2	8	TPBAR Mark 9.2 Materials List	Х
H-3-310733, Sheet 3	8	(U) TPBAR	Х
H-3-310733, Sheet 4	8	(U) TPBAR Details	Х

H-3-310733, Sheet 5	8	(U) TPBAR Internals & General Assembly	Х
H-3-310734, Sheet 1	4	TPBAR Reactor Interface	Х
H-3-310734, Sheet 2	4	(U) TPBAR Extraction Interface	Х
H-3-310735, Sheet 1	4	(U) Finished Full Length Getter Tube	Х
H-3-310739, Sheet 1	3	Pellet Stack Groups	Х
H-3-310750, Sheet 1	8	Variable Pellet Stack	Х
H-3-310751, Sheet 1	6	Standard Pellet Stack	
H-3-310753, Sheet 1	2	Variable Inner Liner Tube	Х
H-3-310754, Sheet 1	3	Top End Plug Chrome Plating	Х
H-3-310755, Sheet 1	3	Top End Plug Stock	Х
H-3-310755, Sheet 2	3	Top End Plug Stock (WesDyne Proprietary Information)	x
H-3-310825, Sheet 1	1	Lower Cruciform Machined	
H-3-310828, Sheet 1	4	Upper Cruciform Machined	
H-3-317492, Sheet 1	0	Inner Liner Tube	
H-3-317493, Sheet 1	1	Pellets	Х
H-3-317786, Sheet 1	1	Pellet Stack Groups	Х

f. Documents For Information

These documents are primarily intended for information. Among these documents are procedures that were used by DOE-NNSA for TPBAR fabrication. These procedures serve only as examples, rather than requirements. Use of these procedures would not relieve the Contractor of responsibility for complying with the specifications and drawings.

Document Identifier Description

	2000
TTQP-1-015, Rev. 21	Description of the Tritium
	Producing Burnable Absorber Rod
	for the Commercial Light Water
	Reactor
TTQP-1-113, Rev. 5	Recommended Statistical
	Guidance for TPBAR Lot
	Acceptance Sampling
PNNL-TTQP-1-689,	Functional Requirements
Rev. 10	Document for the Tritium-
	Producing Burnable Absorber Rod
	(TPBAR) (U)
TTQP-2-043, Rev. 8	Pellet Information Reporting Tool
	User Guide
TTP-2-254, Rev. 0	Lithium Aluminate Sample
	Preparation Using Microwave

	Accelerated Acid Dissolution
TTP-2-255, Rev. 1	Determination of Carbon in Lithium
	Aluminate
TTP-2-256, Rev. 0	LiAIO2 Solution Preparation for
	High-Precision ICP-OES Analysis
TTP-2-257, Rev. 0	Calibration Standards Preparation
	for High-Precision Analyses of Li
	and AI by ICP-OES
TTP-2-258, Rev. 0	Analysis of LiAIO2 Solutions by
	High-Precision ICP-OES
TTP-2-259, Rev. 0	Preparation of Lithium Aluminate
	by Potassium Hydroxide Fusion
	and Acid Distillation
TTP-2-260, Rev. 0	Ion Chromatographic
	Determination of Halides in Lithium
	Aluminate
TTP-2-262, Rev. 0	Preparation of Lithium Aluminate
	by Potassium Hydroxide Fusion
	Followed by Water Leach
TTP-2-263, Rev. 0	Ion Chromatographic
	Determination of Iodide in Lithium
	Aluminate
TTP-2-264, Rev. 0	Preparation of the Lithium
	Aluminate Control Material (LACM)
TTP-2-267, Rev. 0	Determination of Cation Impurities
	in Lithium Aluminate Solution by
	ICP-OES
TTP-2-407, Rev. 1	Preparation of Sample and
	Standard Dilutions
11P-2-408, Rev. 1	Measurement of 6LI//LI Isotopic
	Katio by High Kesolution
	MULTICOLLECTOR ICP-MIS

- 3. Subsection C.11, <u>SECURITY REQUIREMENTS</u>, is being removed in its entirety. In accordance with TNP-62, Security Requirements for TPBARs are unclassified and is therefore removed.
 - C.11 RESERVED
- 4. Subsection C.12, <u>EXPORT CONTROL</u>, is being incorporated as a standalone requirement as a result of declassification (downgrade in the facility to non-possessing) of the TPBAR and its elements which deletes FAR 52.204-2 SECURITY REQUIREMENTS in its entirety.

C.12 EXPORT CONTROL

The Contractor shall continue to comply with the requirements of the Department of Commerce (DOC) Export Administration Regulation (EAR) to ensure that tritium targets and associated technology are controlled and protected against unauthorized release to foreign persons or entities. End of Section C Changes for Mod 060