SUPPLEMENTARY TECHNICAL REQUIREMENT HAZARDOUS MATERIAL MINIMIZATION IN MECHANICAL AND ELECTROMECHANICAL COMPONENTS AND MAINTENANCE EQUIPMENT

1.0 SCOPE

This STR specifies hazardous material minimization requirements for the items to be delivered on this purchase order. The performance, function, reliability, maintainability, or life cycle cost requirements of the item shall not be compromised as a result of applying this STR.

2.0 DEFINITIONS

2.1 Commercial Portion

Commercial portions are those portions of some mechanical components or maintenance equipment that are available off-the-shelf for general use.

2.2 Components

An item is categorized as a component if: (a) the item is an assembly of parts, (b) the item is not a repair part, and (c) the item is separably installable as a functional part of the propulsion plant (e.g., steam generators, valves, pumps, etc).

2.3 Design Approval Activity

The activity responsible for approving the design of the component or maintenance equipment for which this STR is invoked. Where some aspects of the design are approved by one activity and other aspects are delegated to a lower ranking activity, the higher-ranking activity is the Design Approval Activity for purposes of this STR.

2.4 Hazardous Materials

For the purposes of complying with this STR, hazardous materials are the elements and compounds listed in Table I, with the following exceptions:

- Trace amounts of listed material present solely as an impurity (e.g., lead in stainless steel or rubber) are not considered hazardous.
- Except for brass or bronze with greater than one percent lead, metal alloys containing listed material are not considered hazardous.

2.5 Hazardous Waste

Hazardous waste is the designation given to an item if it contains a sufficient quantity of a hazardous material such that the item when disposed would classify as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901 et. sec.) and/or regulations implementing RCRA (40 CFR 261 and other such federal implementing regulations).

2.6 Maintenance Equipment

An item is categorized as maintenance equipment if: (a) the item is an assembly of parts, (b) the item is not a repair part, and (c) the item is used to transport, install, maintain, calibrate or remove propulsion plant components, or the item is used to handle or transport spent fuel (e.g., reactor servicing, steam generating inspection, etc).

2.7 Part

Any separable and distinct mechanical or electronic/electrical part of the component or maintenance equipment or any lubricant, adhesive, sealant or preservative (e.g., paint) applied to the component or maintenance equipment.

2.8 RCRA Toxicity Characteristic Leaching Procedure (TCLP)

The analytical method used to determine whether or not a waste is characteristically hazardous for toxicity under the provisions of RCRA. The

TCLP test is designed to determine the leachability of analytes present in liquid, solid and multiphase wastes into groundwater if the waste were buried (see 40 CFR 261.24 and Test Method 1311 in EPA Publication SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods).

2.9 Readily Available Information

Information which is: (1) required by federal, state, or local laws and regulations to be supplied by the vendor to their customers, or (2) previously obtained by the vendor as a result of another customer's request, or (3) received by the vendor during normal conduct of business with their sub-tier supplier base or known by virtue of their routine interface with commercial industry, or (4) routinely provided to the vendor by their sub-tier suppliers, or (5) available as a result of tests performed by the vendor for other reasons.

3.0 REQUIREMENTS FOR MECHANICAL COMPONENTS AND MAINTENANCE EQUIPMENT

3.1 Hazardous materials as defined in 2.4 shall not be used in or on components or maintenance equipment unless one of the following conditions is met:

3.1.1 The hazardous material is used in an approved application listed in Table I.

3.1.2 The amount of hazardous material used would not result in the component or maintenance equipment (or part if the part may be separately disposed during service life) being designated as a hazardous waste. This shall be determined calculationally using the RCRA TCLP limits for hazardous materials specified in 40 CFR 261.24 as exemplified by the Section 5.0 sample calculation. The revision of 40 CFR 261.24 in effect on the date of bid solicitation shall be used. Asbestos, PCBs, boron trifluoride, and ODSs (as defined in 40 CFR 82, Subpart A, Appendix A, except for those listed in 40 CFR 261 Subpart C) do not have comparable limits. If the vendor uses this 3.1.2 provision, the limits used shall be identified with the bid. The following additional requirements also apply:

- The calculation used to justify that the component or maintenance equipment will not be designated a hazardous waste must be included in the equipment design justification.

- The design justification must be submitted for approval to the Design Approval Activity prior to committing the design to use of this material.

3.2 In the event that Table I hazardous materials are used in the item design, including those in approved applications, each drawing shall denote the presence of any Table I hazardous material using the designator ”HAZ” in a block as follows:

3.2.1 On the lowest tier drawing which details the item:

- In those cases where multiple parts are detailed on the drawing, the designator “HAZ” in a block, shall be placed adjacent to the part number in the parts list for each part containing hazardous material.

- In those cases where a single part is detailed on a drawing and no parts list is present, the designator “HAZ” in a block and associated notes shall be featured on the drawing.

3.2.2 On <u>all</u> higher tier subassembly and assembly drawings which contain the item:

- The designator “HAZ” in a block shall be placed adjacent to the item number in the parts list for the part containing the hazardous material.

3.2.3 A note shall be added to the lowest tier drawing for the item(s) containing hazardous material which identifies the hazardous material being used and gives the reason that use of the hazardous material is acceptable.

3.2.4 All drawings shall contain a note (examples provided in Figure 1) stating that a hazardous material review of the drawing has been performed.

4.0 REQUIREMENTS FOR ELECTROMECHANICAL COMPONENTS AND MAINTENANCE EQUIPMENT AND MECHANCIAL COMPONENTS AND MAINTENANCE EQUIPMENT WHICH UTILIZE COMMERCIAL PORTIONS

4.1 The requirements in paragraph 3.0 apply to the mechanical portions of the component or maintenance equipment.

4.2 The following requirements apply to the electronic/electrical and commercial portions of the component or maintenance equipment:

4.2.1 Asterisked hazardous materials listed in Table I shall not be used in an item unless there is no suitable substitute which could be used due to compromise of performance, function, reliability, maintainability, or life cycle cost of the item. The vendor shall identify the location and amount of asterisked Table I hazardous materials to be used via letter or report. An evaluation of alternatives considered must also be provided. The vendor must provide justification to the Design Approval Activity for use of an asterisked hazardous material and obtain Design Approval Activity approval for its use.

4.2.2 The vendor shall identify to the procuring activity, via letter or report, whether any Table I non-asterisked hazardous materials are used and the applications of non-asterisked hazardous materials, if any. The content of this letter or report shall be based on readily available information. Neither procuring activity approval nor identification of specific locations/amounts of non-asterisked hazardous materials is required.

4.3 The vendor shall recommend to the Design Approval Activity which assemblies/parts should receive a hazardous material review as a mechanical assembly/part per paragraph 4.1 and which assemblies/parts should receive a hazardous material review as an electronic/electrical assembly/part per paragraph 4.2. The dividing line between the mechanical and electronic/electrical portions of the component or maintenance equipment shall be where the item can be

readily disassembled if possible. However, given their straightforward design and mechanical nature, electric pump motors shall be treated as mechanical components. The review shall not begin until approval of the review plan is obtained from the Design Approval Activity.

5.0 HAZARDOUS WASTE CHARACTERIZATION SAMPLE CALCULATION

The component (or maintenance equipment) to be characterized weighs fifty pounds. Based on a review of the alloy composition of specified materials, the component contains the following Brass/Bronze parts:

Part A) 0.5 lbs of 3% lead Brass

Part B) 0.33 lbs of 15% lead Brass

Part C) 0.68 lbs of 8% lead Brass

* Part D) 1.0 lbs of 0.5% lead Brass

* All parts containing the hazardous constituent must be included in the calculation, including those parts which, if taken individually, would not be considered a hazardous material as defined in Section 2.4 of STR-700.

Assuming no other sources of lead are present in the component, determine concentration of lead in the component. Calculate the total lead in the component.

Part A =	0.50 lbs X 0.030 =	0.0150 lbs
Part B =	0.33 lbs X 0.150 =	0.0495 lbs
Part C =	0.68 lbs X 0.080 =	0.0544 lbs
Part D =	1.00 lbs X 0.005 =	0.0050 lbs
		0.1239 lbs

Divide the calculated total by 2×10^{-5} times the total weight of the component. 2×10^{-5} is a RCRA TCLP extraction fluid factor constant which converts weight fraction to concentration of hazardous constituent in leachate (mg/l). This conversion factor

conservatively assumes that all of the hazardous constituent in the component would leach if tested.

Lead concentration $= (0.1239 \text{ lbs}) / (50 \text{ lbs} \times (2 \times 10^{-5}))$
$= 124 \text{ mg/l}$

This value must be compared with the RCRA concentration limit listed in 40 CFR 261.24 to determine if the component would be designated as a hazardous waste when disposed. For this sample calculation, the limit is 5 mg/l (based on 2003 copy of 40 CFR 261.24). The calculated lead concentration is greater than the 40 CFR limit. Therefore, the component would be a hazardous waste if disposed (refer back to Section 3.1.2).

The RCRA TCLP extraction fluid factor constant is applicable for any of the materials in Table I for which the RCRA TCLP test is applicable.

Table I. Hazardous Material

Hazardous Material	Approved Applications
Asbestos (friable and non-friable)	Commutator inverter clutch assemblies
Barium	Pump hybrid bearing grease
Brass and Bronze greater than 1 percent lead	Items not expected to become radioactively contaminated or activated, based on process knowledge, as specified by procuring activity
Boron Trifluoride	Neutron detectors
Cadmium Metal	
Chromium Metal and Compounds	Plating
Lead Metal and Compounds	Bulkhead and detector shielding; solder
Mercury Metal and Compounds (1)	
Ozone Depleting Substances (ODSs) Class I (as defined in 40 CFR 82, Subpart A, Appendix A, except for those listed in 40 CFR 261 Subpart C)	
Polychlorinated Biphenyls (PCBs) (1)	
Selenium Compounds	
Silver Metal and Compounds	Plating; solder; braze metal

NOTES:

1. Minimized in Electronic/Electrical and Commercial Components and Maintenance Equipment. Design Approval Activity approval is required for use of these materials.

With the exception of brass and bronze with greater than one percent lead, metal alloys containing listed materials are not considered hazardous. Trace amounts of listed material present solely as an impurity are not considered hazardous.

This figure provides examples of notes to be placed on the following drawings after completion of review for hazardous materials:

a. Each drawing for mechanical components or maintenance equipment
b. Each drawing of the mechanical portions of electromechanical components or maintenance equipment.

NOTE FORMAT WHEN HAZARDOUS MATERIAL IS SPECIFIED ON A DRAWING

A hazardous material review has been performed per STR-700 Revision 2 for recycling/disposal purposes. Hazardous material has been identified.

EXAMPLE WHEN HAZARDOUS MATERIAL IS SPECIFIED ON A DRAWING

Assembly Drawing (222B222):

	Part No.	Qty.	Description	Drawing No.	Notes
	1	1	Upper Block	222B222-1	
	2	1	Lower Block	222B222-2	
HAZ	3	6	Bolt	111A111-1	1
	4	1	Lock Ring	222B222-4	

Notes: 1. A hazardous material review has been performed per STR-700 Revision 2 for recycling/disposal purposes. Hazardous material has been identified.

Detail Drawing (111A111):

HAZ Bolt 111A111-1 See Notes 1 - 2

Notes: 1. A hazardous material review has been performed per STR-700 Revision 2 for recycling/disposal purposes. Hazardous material has been identified.
2. Hazardous material identified; Chromium metal, used for plating

NOTE FORMAT WHEN HAZARDOUS MATERIAL IS NOT SPECIFIED ON A DRAWING

A hazardous material review has been performed per STR-700 Revision 2 for recycling/disposal purposes. No STR-700 Revision 2 hazardous materials are present in the items specified on this drawing.

Figure 1. Drawing Notes

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