Using Proposed MIL-STD-882 Change 1 For Hazardous Materials Management

Hazardous Materials Management Plan Description of Task 107

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NDIA Systems Engineering Conference,
San Diego, CA
October 28, 2009

Table of contents

Background

- International, federal, state, and local regulation of hazardous materials has become increasingly stringent over time.
- New and emerging regulatory requirements and the global economy are creating additional chemical management requirements.
- Prior to acquisition reform, DoD used military specifications and standards to dictate the design and build of systems, including materials to be used.
- This practice often resulted in industry requiring separate production lines for military and commercial products.
- 2002 Single Process Initiative (SPI) at a defense contractor established a common Hazardous Materials Management Program (HMMP) across multiple DoD contracts.
- Set a precedent that DoD and industry can adapt to provide financial incentives to contractors to reduce hazardous chemical use.

Current Status

- DoD requires each acquisition program to manage hazardous materials over the system life cycle as one component of the program's overall environment, safety, and occupational health (ESOH) risk management effort.

- The adequacy of the implementation of the DoD acquisition hazardous material policy and guidance tends to be program-dependent.
  - Larger programs are more likely to have robust hazardous materials management activities.
  - Smaller programs may not have the resources (funding and expertise) to implement effective hazardous materials management efforts.

- There are few specific DoD or industry requirements to eliminate hazardous material usage.
  - Exceptions are the DoD mandate to not use Ozone Depleting Substances and hexavalent chromium.
  - However, programs must include an HMMP effort as part of the overall ESOH risk management requirement.

- DoD requires use of MIL-STD-882D for assessing and managing ESOH risks, including those from hazardous materials, through systems engineering.

Table of contents

New Approach for HMMP in Systems Acquisition

- The Proposed MIL-STD-882D Change 1* includes a HMMP Task 107 which incorporates key elements of the original SPI HMMP.
  - This standardization would provide a flexible framework to target materials that are subject to evolving regulatory restrictions.
  - The proposed HMMP Task 107 could be applied to any contract that includes requirements for developmental or sustaining engineering.
  - Task 107 would be in lieu of NAS 411 and should be more cost effective as it provides for prioritized and focused management efforts.

- The proposed standardized HMMP would enable DoD and industry to team to reduce risks and costs driven by the use of hazardous material in system production and manufacturing, operation, maintenance, demilitarization, and disposal.
  - Making the proposed HMMP a mandatory part of contract documents through Task 107 will compensate contractors for specific hazardous materials reduction activities, while providing DoD with insight into potential developmental cost increases and sustainment cost decreases.
  - Using the contractual imposition of Task 107 to implement a standardized HMMP will also facilitate the prime contractor's ability to flow the HMMP requirements down to second and third tier suppliers.

*MIL-STD-882D Change 1 is currently in DoD technical comment adjudication

Table of contents

Task 107 HMMP - *Purpose*

- Requires the DoD Program Office and the contractor to collaboratively identify and categorize the list of hazardous materials that they want to eliminate or manage during system development or sustainment.
- Finalization of the initial list would occur as part of the first actions once DoD has selected a contractor to award a contract to and would be part of the activities to finalize the contract cost by definitizing the cost of the HMMP effort based on the agreed to list of hazardous materials.
- Either the contractor or the DoD Program Office could propose chemicals for inclusion on the list of managed hazardous materials.
- The HMMP will use the categorized list to guide decisions about the materials contained within the system, required for operation or support, or generated during sustainment, disposal, or demilitarization activities. The change would not require contractors to include hazardous materials that are unique to their production and manufacturing processes.

Task 107 HMMP - *Description*

- The HMMP defines DoD PM and contractor roles, responsibilities, and procedures needed to accomplish HAZMAT management and tracking contractual requirements included in the general and special provisions of the contract.

- The HMMP will include, at a minimum, the following content:
  - the PM and contractor processes to properly identify, control, analyze, and track HAZMAT to protect human health and the environment and to support end user needs;
  - HAZMAT targeted for elimination and reduction;
  - the process for approving prohibited HAZMAT usage where it cannot be eliminated; and
  - the list of HAZMAT contained within the system and required for the operation or support of the system.

Task 107 HMMP – *Categorizing Identified HAZMAT*

- Working together, the DoD program office and the contractor will categorize the hazardous materials that they agree to manage as prohibited, restricted, or tracked.
  - ***Prohibited:*** materials for which the contractor is required to obtain DoD approval before they can be included in systems, subsystems, and support equipment, or planned for operations and support (If approved, managed as restricted-focus on elimination).
  - ***Restricted:*** materials the contractor will target for elimination or minimization.
  - ***Tracked:*** do not require specific contractor action other than inclusion in the hazard tracking system and the list of hazardous materials. (Does not require risk assessment or identification of mitigation measures, e.g,. use of JP-8.)

- The contractor will be required to track all three categories of hazardous materials, and deliver a list of hazardous materials contained within the system and which are required for operation or support or disposal.

Uses risk management decision making to focus management attention and engineering activities on materials of concern to contractor and government.

Task 107 HMMP – *Modification of HAZMAT List and Categorization*

- The program will focus its HAZMAT management efforts on ***restricted*** materials and ***prohibited*** materials that have been approved for specific use on the system or during operations and support.
- Dialogue between the DoD program office and the contractor will continue after the initial agreement on the listing of hazardous materials.
- Due to changing concerns or a shifting regulatory environment, either the DoD Program Office or the contractor may want to add materials to the list of managed HAZMAT or change the categorization of selected materials.
  - The Chemical & Materials Risk Management Directorate at OSD is a resource for identifying materials of regulatory concern.
- The HMMP will include procedures for adjusting contract documents and cost if list modifications increase the cost of executing the HMMP during the life of a given contract.

Task 107 HMMP – *HAZMAT Data Tracking*

- The HMMP will describe how the contractor will integrate data required to manage HAZMAT with the data included in the hazard tracking system. The minimum additional data elements required for HAZMAT management and tracking include —
  1. The locations and quantities of HAZMAT within the system
  2. Processes/activities where HAZMAT are used or generated during operations, support, and disposal of the system
  3. Reasonably anticipated materials used or generated during:
     - the life cycle of the system (e.g. installation, test and evaluation, normal use, maintenance or repair, and disposal)
     - emergency situations (e.g., exhaust, fibers from composite materials released during accidents)
  4. Special HAZMAT control, training, handling measures, and personal protective equipment needed, including provision of required material safety data sheets

Task 107 HMMP – *Implementation Considerations*

- DoD will have to structure contracts to support execution of the HMMP, e.g., DoD Program Offices will have to budget appropriately for the implementation of the HMMP once a contract has been awarded and the list of hazardous materials be managed is finalized.

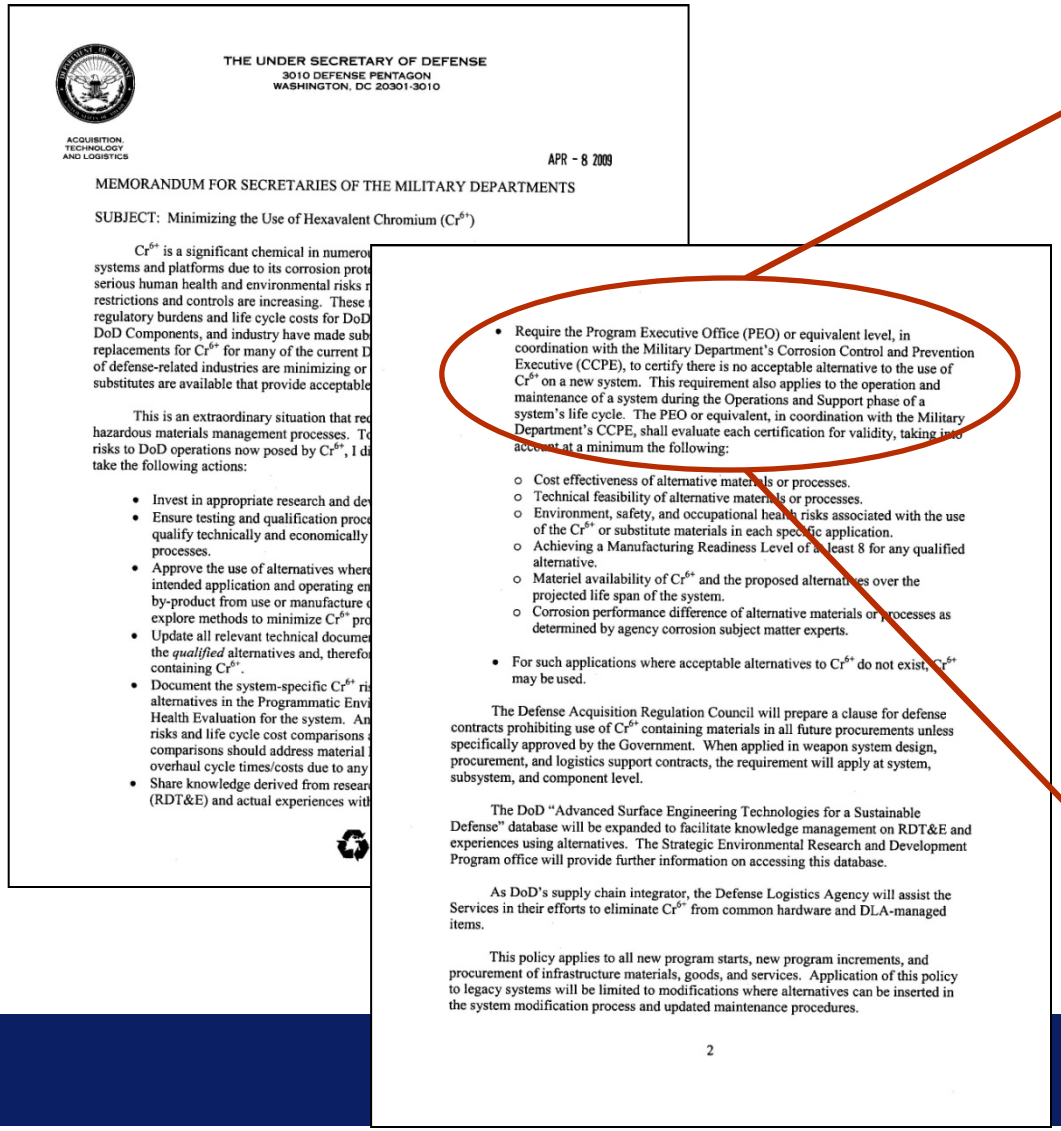
- This places a cost risk on the DoD Program Office since DoD and the contractor will not definitize the final cost of the HMMP effort until after contract award and the Program Office and contractor agree on the list of hazardous materials included in each of the three categories identified above. This structure will place emphasis on hazardous material management from the beginning of the development of a contract requiring developmental or sustaining engineering activities. This recommendation also provides synergy with ongoing efforts within DoD to drive the inclusion of ESOH considerations earlier in the process.

- Ideally, a DoD Program Office would list and categorize hazardous materials it wants managed under the HMMP in solicitations for bids, which will help to place all contractors on a level playing field in preparing their proposals. This will also incentivize a contractor to include its proposed list of hazardous materials as part of its proposal. These two steps would have the effect of expediting the finalization of the contract once the DoD Program Office has selected the contractor.

Table of contents

Prohibited: Hexavalent Chromium (Cr^{+6})

Policy Memo: Minimizing the Use of Hexavalent Chromium



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ACQUISITION, TECHNOLOGY AND LOGISTICS

APR - 8 2009

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS

SUBJECT: Minimizing the Use of Hexavalent Chromium (Cr^{6+})

Cr^{6+} is a significant chemical in numero systems and platforms due to its corrosion prot serious human health and environmental risks r restrictions and controls are increasing. These regulatory burdens and life cycle costs for DoD DoD Components, and industry have made sub replacements for Cr^{6+} for many of the current D of defense-related industries are minimizing or substitutes are available that provide acceptable

This is an extraordinary situation that re hazardous materials management processes. T risks to DoD operations now posed by Cr^{6+}, I di take the following actions:

- Invest in appropriate research and de
- Ensure testing and qualification proc qualify technically and economically processes.
- Approve the use of alternatives where intended application and operating en by-product from use or manufacture explore methods to minimize Cr^{6+} pro
- Update all relevant technical docume the *qualified* alternatives and, therefo containing Cr^{6+}.
- Document the system-specific Cr^{6+} ri alternatives in the Programmatic Envi Health Evaluation for the system. An risks and life cycle cost comparisons comparisons should address material overhaul cycle times/costs due to any
- Share knowledge derived from resear (RDT&E) and actual experiences with

- Require the Program Executive Office (PEO) or equivalent level, in coordination with the Military Department's Corrosion Control and Prevention Executive (CCPE), to certify there is no acceptable alternative to the use of Cr^{6+} on a new system. This requirement also applies to the operation and maintenance of a system during the Operations and Support phase of a system's life cycle. The PEO or equivalent, in coordination with the Military Department's CCPE, shall evaluate each certification for validity, taking into account at a minimum the following:
  - Cost effectiveness of alternative materials or processes.
  - Technical feasibility of alternative materials or processes.
  - Environment, safety, and occupational health risks associated with the use of the Cr^{6+} or substitute materials in each specific application.
  - Achieving a Manufacturing Readiness Level of at least 8 for any qualified alternative.
  - Materiel availability of Cr^{6+} and the proposed alternatives over the projected life span of the system.
  - Corrosion performance difference of alternative materials or processes as determined by agency corrosion subject matter experts.
- For such applications where acceptable alternatives to Cr^{6+} do not exist, Cr^{6+} may be used.

The Defense Acquisition Regulation Council will prepare a clause for defense contracts prohibiting use of Cr^{6+} containing materials in all future procurements unless specifically approved by the Government. When applied in weapon system design, procurement, and logistics support contracts, the requirement will apply at system, subsystem, and component level.

The DoD "Advanced Surface Engineering Technologies for a Sustainable Defense" database will be expanded to facilitate knowledge management on RDT&E and experiences using alternatives. The Strategic Environmental Research and Development Program office will provide further information on accessing this database.

As DoD's supply chain integrator, the Defense Logistics Agency will assist the Services in their efforts to eliminate Cr^{6+} from common hardware and DLA-managed items.

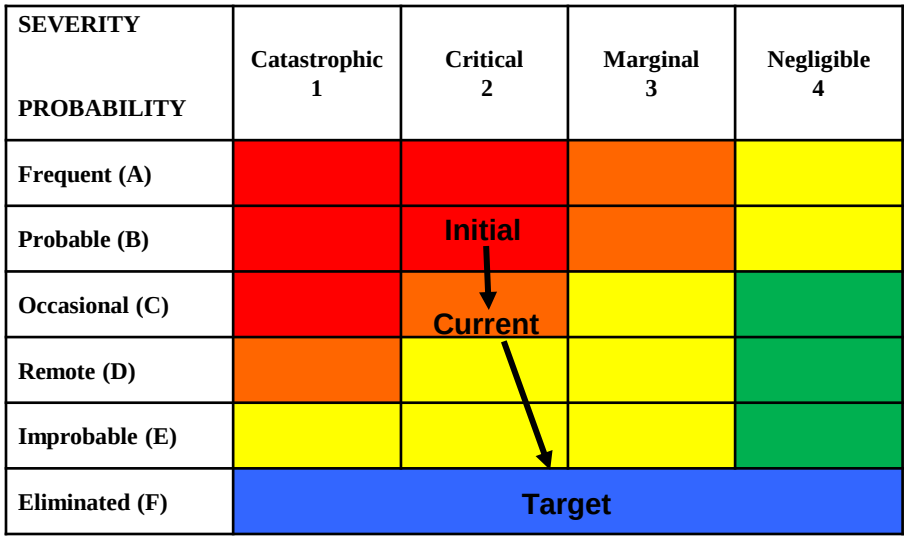
This policy applies to all new program starts, new program increments, and procurement of infrastructure materials, goods, and services. Application of this policy to legacy systems will be limited to modifications where alternatives can be inserted in the system modification process and updated maintenance procedures.

2

"…the Program Executive Office (PEO) or equivalent level, in coordination with the Military Department's Corrosion Control and Prevention Executive (CCPE), to certify there is no acceptable alternative to the use of Cr6+ on a new system."

Prohibited: Hexavalent Chromium (Cr^{+6})

- Cr^{+6} is recognized as a human carcinogen via inhalation. Workers in many different occupations are exposed to hexavalent chromium.
- Cr^{+6} is used primarily in DoD as anti-corrosion and conversion coatings as well as a variety of niche uses.
- Normally, the PM would need to approve use of a **"Prohibited"** material, but Cr^{+6} is a special case due to DoD's increased management requirement
- If PEO-level approves use (per memo), manage CR^{+6} as if it were ***"Restricted"*** with the goal to find a suitable alternative and eliminate use of CR^{+6}

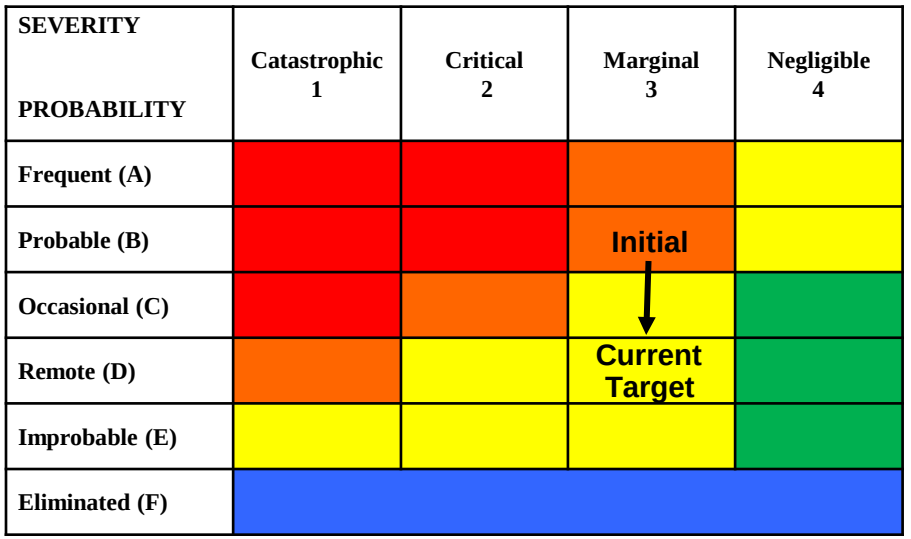


MIL-STD-882D Rev 1 Risk Assessment

Hazard ID	Description	Initial RAC & Category	Mitigation	Current RAC & Category	Mitigation Status / Date	Target RAC & Category
1	Inhalation of Cr6+ while stripping coating systems and re-painting the aircraft during maintenance. Exposure likely to occur frequently in a 12 month period. May cause permanent or partial disability, acute or chronic illness.	2B High	1. Perform painting activity in a space with appropriate ventilation and control technology 2. Institute procedures mandating the use of PPE during painting. 3. Qualify alternative coating with no Cr^{+6}	2C Serious	1. Complete – 10/08 2. Open – verify mitigation test by 02/09 3. Open – new paint test will be completed by 11/09	F Eliminated

Restricted: *Advanced Composites with Boron Fibers*

- Elemental boron and the borates are not considered to be toxic. However, in fibrous form they are an acute skin and eye irritant. Allergic reaction to boron fibers may cause chronic dermatitis.
- Boron fiber is a high performance synthetic fiber used for structural applications. It is found in aircraft, space, and industrial applications. In adhesive tape form it provides high compression strength and stiffness with reduced weight.
- **"Restricted"** materials - contractor must attempt to eliminate the usage or mitigate the risks.



MIL-STD-882D Rev 1 Assessment

Hazard ID	Description	Initial RAC & Category	Mitigation	Current RAC & Category	Mitigation Status / Date	Target RAC & Category
1	**Penetration of the skin or eyes by fibers during maintenance activities.**	3B Serious	**1) Advise careful handling and use of approved PPE when working with materials containing boron fibers. Ensure maintenance and handling and storage procedures include appropriate precautions.**	3 D Medium	1) Closed 9JUL09. All maintenance and handling and storage materials contain appropriate warnings and safety precautions. PPE is provided to all maintainers.	3 D Medium

Table of contents

Conclusion

- Proposed MIL-STD-882D Change 1 Task 107, HMMP, can be used to insure HAZMAT management is an integral part of the SE ESOH hazard management effort
  - Provides a risk-based approach to targeting materials that are subject to evolving regulatory restrictions or which present ESOH hazards.
  - Used in lieu of NAS 411 for more cost effective and efficient management.

- Enables DoD and industry to reduce risks and costs driven by the use of hazardous material in system production, composition, operation, maintenance, demilitarization, and disposal.

- Requires **collaboration** between the DoD Program Office and the contractor to identify and categorize the list of hazardous materials that they want to eliminate or manage during system development or sustainment.
  - The HMMP will use a categorized list (***prohibited***, ***restricted***, or ***tracked***) to guide decisions about the materials contained within the system, required for operation or support, or generated during disposal or demilitarization activities.
  - Placing HMMP Task in contract documents will compensate contractors for specific hazardous materials reduction activities, while providing DoD with insight into potential developmental cost increases and sustainment cost decreases.

Questions?

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Backup Slides

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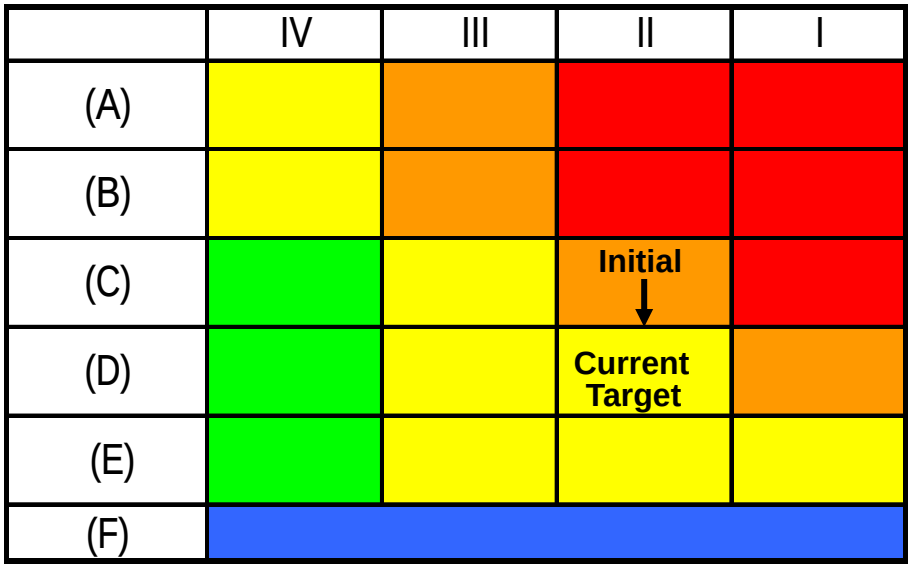
HM Tracking Example

HAZMAT	Hexavalent Chromium
Location	Struts on landing gear
Quantity	10 grams
Procedures using HAZMAT	Machining struts on landing gear during mtce repairs produces chrome particulate which could be inhaled
Special controls/training	Designated area with specific ventilation rate/PPE/all mtce personnel trained on Cr6+ hazards
Waste generated by activity?	Respirator cartridges, shavings generated during mtce activities, and cleaning chemicals will be disposed of according to specific procedures.

Restricted: Acetone

- The most common hazard associated with acetone is its extreme flammability. Acetone may pose a significant risk of oxygen depletion in aquatic systems due to the microbial activity consuming it.
- Acetone is a good organic solvent that is a component of some paints and varnishes, as well as for most plastics and synthetic fibers. It is ideal for thinning fiberglass resin, cleaning fiberglass tools and dissolving two-part epoxies and superglue before hardening. A heavy-duty degreaser, it is useful in the preparation of metal prior to painting; it also thins polyester resins, vinyl and adhesives.

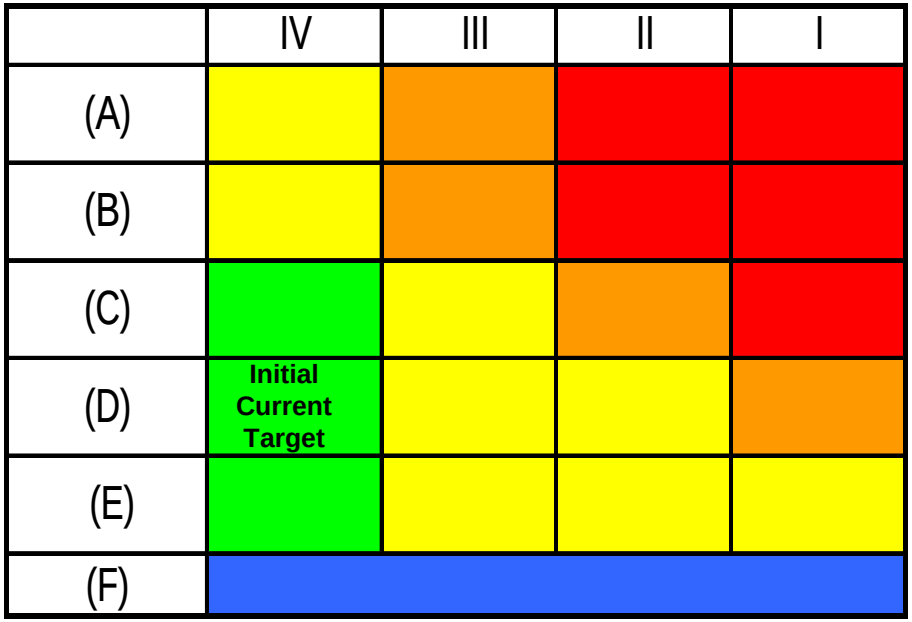


MIL-STD-882D Rev 1 Assessment

Hazard ID	Description	Initial RAC & Category	Mitigation	Current RAC & Category	Mitigation Status / Date	Target RAC & Category
1	Acetone spills and catches fire causing serious injury and destruction of property. Spill flows into natural water supply and causes reversible environmental damage.	IIC Serious	1. Specify the use of spill pan as containment protection when pouring acetone. 2. Require appropriate fire extinguishing agent in proximity of acetone storage and usage areas.	IID Medium	1. Complete – 04/09 2. Complete – 04/09	IID Medium

Tracked: (Jet Propellant Fuel) JP-5 Fuel

- Fire hazard, but less than auto gasoline. The main component of JP-5 is kerosene. Inhalation of JP-5 can cause headache, lightheadedness, loss of appetite, poor coordination, and difficulty concentrating
- Propellants are substances that move other objects or give thrust. JP-5 is a jet propellant used by the military as an aircraft fuel. JP-5 is one of the jet fuels used by the U.S. Navy.



MIL-STD-882D Rev 1 Assessment

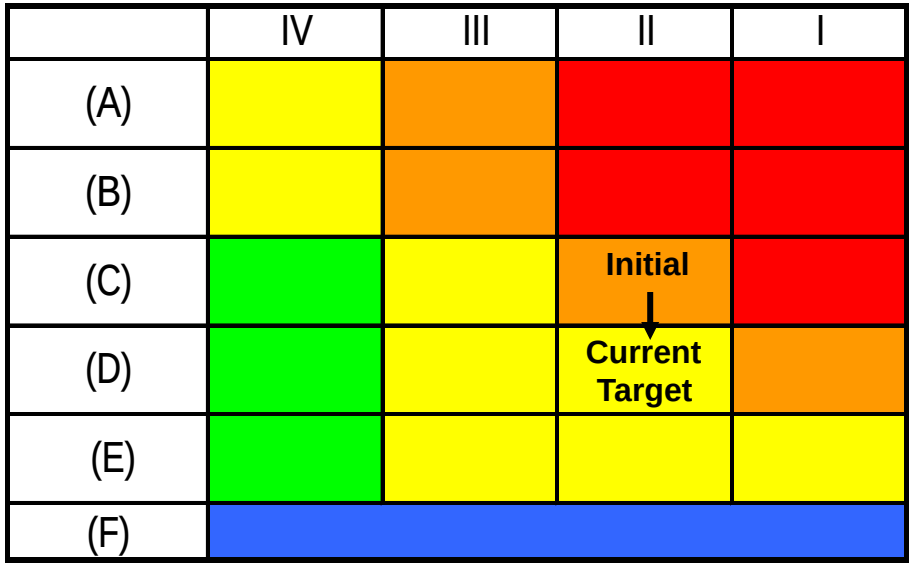
Hazard ID	Description	Initial RAC & Category	Mitigation	Current RAC & Category	Mitigation Status / Date	Target RAC & Category
1	JP-5 fuel spills onto ground while topping off fuel tank of aircraft which could lead to a fire or inhalation of JP-5 vapors	IVD Low	No program office or contractor mitigation actions planned beyond the typical control measures for this material.	IVD Low	Complete	IVD Low

Restricted: *Beryllium (Be)*

- Beryllium is a know human carcinogen and respirable Be is associated with chronic and acute beryllium disease. Ingestion and contact with solid forms pose no occupational illness risk. Main concern with Be is inhalation.

- Beryllium is a naturally occurring element that is one third lighter than aluminum and six times stiffer than steel. Because of its many desirable qualities, Be metal and Be containing alloys are used for a wide-variety of purposes such as structural members on satellites and aircraft, aircraft brake parts, large bushings and bearings, equipment supports, fasteners.

- **"Restricted"** materials - contractor must attempt to eliminate the usage or mitigate the risks



MIL-STD-882D Rev 1 Assessment

Hazard ID	Description	Initial RAC & Category	Mitigation	Current RAC & Category	Mitigation Status / Date	Target RAC & Category
1	**Inhalation of Be particulate while abrasive blasting of Be containing rudder during corrosion control maintenance activities.**	IIC Serious	**1) Set safe distances from work area, require approved PPE for maintenance personnel within the work are, keep work clean and collect all blast residue for proper, safe disposal.** **2) Provide warnings and safety precautions in all maintenance manuals, as appropriate.**	IID Medium	1) Tests scheduled for 14JAN09 to take Be sampling during abrasive blasting operations. This information will be used to determine appropriate PPE and safe distances.	IID Medium