U.S. ARMY PUBLIC HEALTH CENTER

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MANAGEMENT OF WASTE DENTAL AMALGAM

1. BACKGROUND. Dental amalgam is used in restorative work for filling teeth as the result of tooth decay. This amalgam is an alloy that contains silver, tin, copper, other metallic elements, and mercury, which typically makes up about 50% of the amalgam. As a result, waste dental amalgam often exhibits characteristics of hazardous waste (HW) under the Resource Conservation and Recovery Act (RCRA). Sources of waste amalgam include, but are not limited to—noncontact and contact scrap amalgam; amalgam fillings that have been removed; amalgam prepared for new fillings; used amalgam capsules; extracted teeth with amalgam fillings; and used chair-side traps, filters, and amalgam separators. Mercury is a bio-accumulator that builds up in the environment and our food. Preventing mercury releases to the environment is the common goal in dental waste management.

2. TESTS. The U.S. Army Public Health Center (APHC) conducted a waste sampling study of mixed amalgam waste collected during dental procedures (contact and noncontact). The samples were analyzed for mercury and silver content using the Toxicity Characteristic Leaching Procedure (TCLP). APHC conducted TCLP testing on a number of different amalgam samples under different scenarios to include wet (soaked in x-ray fixer) and dry samples. Silver was not identified as a regulatory concern in any of these samples. Mercury results were variable with both hazardous and nonhazardous results. Each sample was comprised of some unused, noncontact amalgam and used, contact amalgam removed from degraded fillings. The sample result variability can be attributed to different manufacturer brands and ages of amalgam in the samples. Sample results also indicated that soaking the amalgam in a disinfectant solution or x-ray fixer can leach mercury in to the liquid solution, creating two hazardous waste streams (liquid and the amalgam). A separate waste characterization study was conducted to evaluate extracted teeth fillings. This is a separate waste stream as discussed in paragraph 7.

3. DISPOSAL. Amalgam waste should not be disposed of in the regular trash, infectious waste containers (red bags), or sharps containers. Some regular garbage and medical waste is incinerated and the mercury could be released into the environment through the incineration process. Amalgam waste should never be rinsed down the drain to the sanitary sewer system or storm drain. Scrap metal recycling or hazardous waste disposal are the two options that exist for dental amalgam waste. Amalgam waste can be safely and legally recycled. A retort process can remove the mercury from the amalgam waste and recapture it, allowing it to be reused in new products. During the recycling process, the other metals in the alloy, such as silver and copper, may also be recycled. If recycling is not an option, dry dental amalgam waste must be turned in to the Defense Logistics Agency (DLA) Disposition Services as a hazardous waste.

4. WASTE MANAGEMENT IN THE CLINIC. Collection and labeling procedures for scrap amalgam in the clinic will be determined by the disposal option selected. Some procedures such as chair-side trap maintenance will not be impacted by the disposal method utilized. At routine intervals, the chair-side traps are cleaned and the basket filters containing the amalgam must be emptied. The amalgam waste found in the traps and any noncontact amalgam waste remaining from the procedures should be collected dry in closed containers. Dry is defined as not soaking in any solution while accumulating in the clinic. If recycling the waste, the containers must be appropriately marked to indicate the waste is destined for recycling. If waste is being collected for hazardous waste disposal, the area(s) where the waste containers are maintained must be managed according to the hazardous waste regulations for satellite accumulation. The containers must be closed except when adding waste and must be labeled to indicate the contents are waste amalgam. The words “hazardous waste” may be required depending on local and State regulations. If there are several operatory chairs in one room, collect the amalgam waste from all chairs in a central location within the room/operatory and manage as hazardous waste. The centralized collection location should be managed as a Satellite Accumulation Area (SAA). The Preventive Medicine Environmental Science and Engineering Officer (ESEO) and/or installation environmental office should be consulted with regard to the placement and management of the SAA(s) and the turn-in of the amalgam.

NOTE: The Dental clinic operatory chair collection sites are permissible points of generation and movement; consolidation into the centralized SAA is permissible as long as the amalgam waste remains “at or near” the point of generation and “under control of the operators of the waste generating process.” EPA Memorandum dated Mar 7, 2004, SUBJECT: Frequently Asked Questions about Satellite Accumulation Areas, Question #11.

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5. RECYCLING. Several States now require dental amalgam to be recycled specifically for the mercury content. Check with your installation environmental office to see if your state requires mercury recycling. To meet the regulatory requirements, the clinic must be able to show that the waste is actually recycled. This is a generator requirement. To start a recycling program for amalgam waste, select a reputable company that complies with all applicable Federal and State laws. Please consider the following factors: Is the company legitimately recycling the mercury (i.e., is it reclaiming the mercury and selling it back to industry), or is it sending it to another facility for destruction? Will the company provide you with proof that your mercury waste was recycled? You should also consult with your installation environmental office with regard as to how your mercury waste should be sent to the recycling company (i.e., no special requirements or on a hazardous waste manifest). APHC has vetted two mercury retort facilities to retort mercury waste and sell the reclaimed mercury back to the industry. For more information on retort facilities, please contact APHC.

6. CHAIR-SIDE AMALGAM SEPERATORS. In response to EPA guidelines for dental facilities to reduce discharges of mercury to the environment, the Dental Command has installed amalgam separators (attached) at each patient chair side in all dental clinics. The separators may replace chair-side traps and disposable filter baskets or be added in conjunction with them. The separator filter and contents may contain liquid and or sludge as well as solid amalgam material and require offsite processing to recycle the contents. The U.S. Army Medical Command has been unable to implement a recycling option with the vendor. Therefore, these filters require hazardous waste management and collection in established SAAs. Liquids and/or solids spilled during disconnection and replacement of the filters must also be managed as hazardous waste.

7. EXTRACTED TEETH. Extracted teeth with amalgam fillings are a separate waste stream with a different waste characterization than scrap dental amalgam. Representative waste samples include the tooth mass and the filling; thus creating a different sample composition from a sample composed only of amalgam. Numerous medical tests have also proven amalgam fillings do not leach mercury into humans while in their mouths, which expose the fillings to constant contact with corrosive saliva. The APHC has conducted a multi-year, hazardous waste characterization study of extracted teeth with amalgam fillings. All samples tested to date have been nonhazardous, indicating the filling alloy is stable and the mercury does not leach out above acceptable regulatory levels. Extracted teeth also differ from scrap amalgam because some States classify them as pathological medical waste and require regulated medical waste disposal. If disposed of as regulated medical waste, ensure the waste goes for a treatment/disposal process other than incineration. Check with the contracting officer representative of the RMW disposal contract to identify the disposal method. This function is usually handled through the Environmental Services Branch in Logistics. If hazardous waste disposal is required for all amalgam wastes by your State, the DLA Disposition Services regulations allow for extracted teeth to be added to the scrap amalgam waste stream. However, the DLA Disposition Services has stipulated that the teeth must be “certified” noninfectious (contact your DLA Disposition Services representative for specific hazardous waste turn-in paper work guidance).

8. BEST MANAGEMENT PRACTICES FOR AMALGAM WASTE.

- Use precautions such as gloves, glasses, and masks when handling amalgam waste.
- Stock a variety of amalgam capsule sizes to minimize excess waste amalgam.
- Empty amalgam capsules and empty disposable filter trap baskets are "RCRA empty". They should not be considered as hazardous waste (unless directed by a State regulation—currently New York is the only State with such a requirement). Dispose of empty amalgam capsules as solid waste or non-RCRA waste.
- Noncontact amalgam should be collected and stored in an air-tight container and processed for proper disposal to DLA Disposition Services and/or per local policy.
- Run a nonchlorine disinfectant through the lines of the evacuation system before collecting the contact amalgam from the chair-side traps or changing chair-side amalgam separators.
- Never use bleach or chlorine disinfectants to clean the lines of the evacuation system, as they have the potential to **dissolve** the mercury from the **amalgam** particles and release the mercury ions into the sewer.
- Chair-side traps that have had contact with amalgam should never be rinsed over sinks or drains.
- Contact amalgam may require disinfection and drying prior to disposal or recycling. Your recycling vendor or DLA Disposition Services can provide further guidance.
- Dried contact amalgam waste should be combined with noncontact amalgam waste in an air-tight container and processed for proper disposal to DLA Disposition Services and/or per local policy.
- Always check your State regulations for further guidance, as some States have mandatory dental amalgam program requirements that may differ from the guidance APHC has provided. Contact your installation environmental office for guidance.