



Debris Treatment Plan  
For  
Chemical Waste Management of the  
Northwest, Inc.

Arlington Facility • ORD 089 452 353  
17629 Cedar Springs Lane  
Arlington, Oregon

Standalone Document No. 11

This document is issued by the  
Oregon Department of Environmental Quality

October 2014

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## **1 INTRODUCTION**

The United States Environmental Protection Agency (EPA) has adopted new technologies for the treatment of debris contaminated with hazardous materials. Two of these procedures (macroencapsulation and microencapsulation) can be done using existing stabilization facilities at the Chemical Waste Management of the Northwest, Inc. (CWMNW) Arlington Facility.

In general, there are no contaminant restrictions, either organic or inorganic, to the use of either macroencapsulation or microencapsulation. However, debris which is contaminated with organics, which have specified treatment standards, will be only treated using macroencapsulation. Tables 1-1 and 1-2 list the matrices that are acceptable for macroencapsulation and microencapsulation, respectively. Figure 1-1 Facility Layout Map (contained in the Part B Permit) shows the location of the stabilization unit area. The process flow diagram presented on Figure 1-2 illustrates the movement of debris through the Arlington Facility.

**TABLE 1-1**

**MACROENCAPSULATION ACCEPTANCE CRITERIA**

CONTAMINATES ACCEPTED  ORGANICS AND INORGANICS	MATRICES ACCEPTED  (Maximum 5.0 foot sections*; maximum weight 2000 pounds/piece of debris)	WASTE CODES ACCEPTED
Solvents, Pesticides, Herbicides, heavy metals, etc.	Wood, metal, grating, plastic, double bagged asbestos, pipe, motors, pumps, concrete, PPE, rags, glass, etc.  Debris to be macroencapsulated is generally of complex geometric shapes.  Contamination may be on the surface and/or throughout the debris matrix.	See Part A (Attachment 3) of the Permit Renewal Application for the list of codes that are not acceptable

\* Sizes greater than 5.0 feet will be considered on a case by case basis.  
 PPE = Personal protective equipment.

**TABLE 1-2**

**MICROENCAPSULATION ACCEPTANCE CRITERIA**

CONTAMINATES ACCEPTED  INORGANICS AND NEWLY LISTED ORGANICS ONLY	MATRICES ACCEPTED  (Must be greater than 60 mm and less than 5 feet*; maximum weight 2000 pounds/piece of debris)	WASTE CODES ACCEPTED
Heavy metals  Pesticides, Herbicides, Solvents, etc. from newly listed or characteristic sources for which treatment standards have not been specified	Wood, metal sheeting, metal grating, brick, rebar, rocks, concrete, etc.  Debris must be of simple geometric shape. All surfaces of the debris must contact the appropriate reagents.  Contamination is limited to the surface of the debris only.	D004, 5, 6, 7, 8, 9, 10, 11;  F006, F007, F008, F009, F011, F012, F019  Newly listed organic codes w/o treatment standards specified

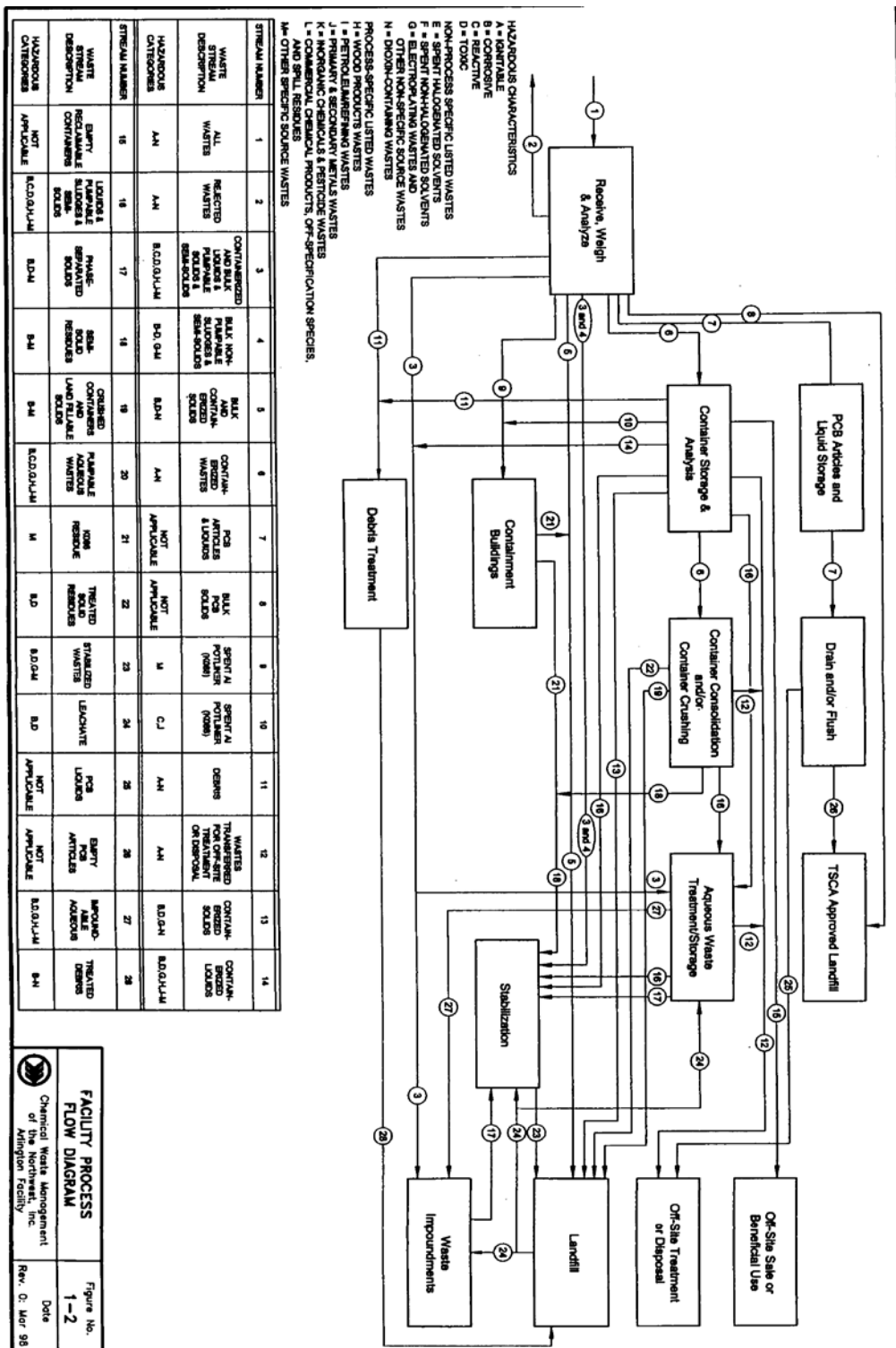


Figure 1-2 Facility Process Flow Diagram

## **2      MACROENCAPSULATION**

Macroencapsulation is a treatment technology for hazardous waste debris that involves encasing the waste within a physical barrier to substantially reduce the potential of contaminants leaching from the waste.

Debris is placed into a macroencapsulation device and an acceptable material is placed around the debris to fill any void spaces. The device is then sealed by placement of a lid which is welded or otherwise secured to the device. This device is then carefully placed into the landfill where wastes are compacted around it.

Calculations which demonstrate the structural integrity and suitability of the macroencapsulation devices are shown in Appendix A.

### **2.1      Debris Waste Acceptance and Macroencapsulation**

CWMNW may accept loads of debris in bulk, drums, or in partially filled prefabricated macroencapsulation devices that have previously been loaded into a roll-off box. Debris loads received in bulk will be unloaded into the existing stabilization unit and may be size reduced if needed. The debris will then be placed into the macroencapsulation devices as outlined in Section 2.3.

The devices used in this process are manufactured by the National Seal Company under the tradename Macro\*Secure. Appendix B details the suitability of high density polyethylene (HDPE) resins for hazardous debris macroencapsulation. They are vacuum formed from a HDPE to form a high strength device which lines an approximately 20 cubic yard roll-off container. This operating plan describes the procedures used to macroencapsulate debris and ensure the integrity of the macroencapsulation device when it is placed within the landfill.

### **2.2      Macroencapsulation Device Transportation and Handling Procedures**

#### **2.2.1      Quality Assurance and Quality Control**

New macroencapsulation devices will be shipped to the CWMNW Arlington Facility by truck. Each device will be visually inspected for shipping damage and manufacturing defects. Any device with damage which will impair its performance will be returned to the manufacturer.

The manufacturer=s quality control documentation for each device will be reviewed to ensure that the device meets the manufacturer=s specifications. The manufacturer=s quality control certifications for each device will be kept on file at the facility. The manufacturer=s quality control plan for the macroencapsulation devices is attached in Appendix C. A sample copy of the quality control certification is also included in Appendix C.

#### **2.2.2      Macroencapsulation Container Handling Procedures**

No device will be allowed to be dragged along the ground. Empty devices will be transported using care not to abrade or puncture the device.

When a device is to be used, it will be loaded in to an approximately 20 cubic yard steel roll-off box by CWMNW personnel. The device will be loaded manually or with assistance from heavy equipment and guided into place in the roll-off box by hand. Loading will be done with care to prevent damage to the device.

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The roll-off box loaded with the empty device will be transported by truck to the stabilization unit area, a permitted RCRA container storage unit, or off-site for loading of debris waste at the point of generation.

### **2.3 Container Loading Procedures**

During placement of wastes within the device, the device will be placed inside a steel roll-off box. The debris wastes will be loaded with a backhoe bucket or a grappling attachment for individual large waste pieces. Smaller debris may be loaded into the devices by hand. Impact loads from large or heavy wastes will be minimized by loading smaller lighter wastes into the box first to cushion the impact of heavy, irregularly shaped objects. A layer of filler material approximately six inches in depth will be placed in the bottom of the device when large, heavy irregular-shaped waste particles (e.g., steel plates or beams, rock or concrete particles greater than 24 inches in diameter). The filler material will be used to prevent direct impact of sharp or heavy objects with the bottom of the device. Heavy wastes will be loaded into the box with a backhoe from a small drop height (less than two feet) to minimize impact forces.

Once the debris wastes are loaded into the device (the device is to be filled at least 90% full of debris), a filler material will be added to the device to fill the remaining void spaces within the debris. The filler material used will be one or more of the following materials:

- Stabilization reagents such as kiln dust, Portland Cement, bed ash, etc.;
- Stabilized wastes meeting Land Disposal Restriction (LDR) requirements (such stabilized wastes must be at ambient temperatures before placement into a macroencapsulation container);
- Clean, non-cohesive soil materials such as sand, sandy silt, etc., with a maximum particle size of two inches; and/or
- Lean Portland Cement or similar materials.

The filler materials will be flowable enough to fill the void spaces within the waste debris and will provide structural support for the device lid once the device is placed within the landfill. The filler materials will also cover and isolate the debris from seaming personnel and provide a buffer for the device lid to prevent puncture of the lid from sharp debris within the device after landfill placement. Filler materials will be placed to within not less than two inches of the upper flange around the outside perimeter of the device. The filler material will be mounded toward the center of the device to, at, or above the elevation of the outside flange of the device. Once added, the top surface of the filler material may be smoothed or leveled manually with a rake or similar tool.

Any waste which protrudes above the filler material will be removed or repositioned before the filler material is placed in the device.

At the end of the normal working hours, any debris that has not been transferred to a macroencapsulation device may be left in the stabilization unit provided the stabilization unit has been covered with a temporary cover (tarp, etc.). The stabilization unit will not be covered during normal working hours. The macroencapsulation device will be managed as stated in Section 2.8.

## **2.4 Container Lid Sealing Procedures**

### **2.4.1 General Description - Welding**

After the filler material has been placed over the top of the debris wastes, the device lid sealing process will begin. The lid consists of a 100 mil thick HDPE geomembrane manufactured from the same type of HDPE resin as the macroencapsulation device. The manufacturer's technical specifications for the device lids are enclosed in Appendix C. The lids are cut by the manufacturer to the approximate size of the container top flange. The manufacturer's quality control certifications for each device lid will be kept on file at the facility.

After the filler material has been placed over the top of the debris wastes, the device lid sealing process will begin. The lid consists of a 100-mil thick HDPE geomembrane manufactured from the same type of HDPE resin as the macroencapsulation device. The manufacturer's technical specifications for the device lids are enclosed in Appendix C. The lids are cut by the manufacturer to the approximate size of the container top flange. The manufacturer's quality control certifications for each device lid will be kept on file at the facility.

The lids will be extrusion welded to the top flange of the device using hot HDPE extrudate composed of the same type of resin as the device and device lid.

#### **2.4.1.1 Lid Welding Procedures**

The welding procedures to be used for securing each lid to the macroencapsulation device are described in the welding instructions document entitled "Welding Instruction for Macro\*Secure Project", attached in Appendix C. Before welding the device lid to the container, the following procedures will be completed:

- The device lid will be trimmed by hand to contact the outside flange of the box approximately halfway between the inside and outside edges of the flange's width. Trimming will take place with the lid in close contact with the top of the filler material surface in the box. Sand bags or other weighting devices may be used to allow the lid to conform to the filler material surface.
- The device top flange will be cleaned if necessary to remove dust and dirt from the flange area to be welded.

#### **2.4.1.2 Welding Quality Assurance and Quality Control**

The welding procedures are described in the "Welding Instruction for Macro\*Secure Project" attached in Appendix C.

Once welding is completed for each container, each weld will be tested as described below:

#### **2.4.1.3 Seam Testing**

CWMNW will have all the extrusion welded lid seams and field extrusion weld seam repairs tested using a nondestructive electric wire (Asparking $\cong$ ) test.

#### **2.4.1.4 Container Sealing Locations**

Macroencapsulation containers may be sealed inside an enclosed building (e.g. truck wash, and/or the maintenance building). Macroencapsulation containers may be kept in the truck wash,

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maintenance building, or transportation building for up to a week when sealing and testing procedures are being performed.

#### **2.4.2 General Description - Batten\*Secure**

After the filler material has been placed over the top of the debris wastes, the device lid sealing process will begin. The lid consists of a 100-mil thick HDPE geomembrane manufactured from the same type of HDPE resin as the macroencapsulation device. The manufacturer's technical specifications for the device lids are enclosed in Appendix C. The lids are cut by the manufacturer to the approximate size of the container top flange. The manufacturer's quality control certifications for each device lid will be kept on file at the facility.

##### **2.4.2.1 Lid Sealing Procedures**

The sealing procedures to be used for securing each lid to the macroencapsulation device are described in the sealing instructions document entitled "Batten\*Secure Instructions for Macro\*Secure Containers", attached in Appendix C. Before sealing the device lid to the container, the following procedures will be completed:

- Inspect the perimeter top plate surface. The surface should be free of dust, dirt or debris of any kind. Wipe this surface clean with a wet towel or alcohol based cleaner and allow to dry.
- Any materials not removable with the initial cleaning should be chiseled off or ground down flush to the surface. Repeat the cleaning process along the outer edge of the cover.

##### **2.4.2.2 Batten\*Secure Quality Assurance and Quality Control**

The sealing procedures are described in the "Batten\*Secure Instructions for Macro\*Secure Containers" attached in Appendix C. Any modifications to these procedures must be made with the appropriate Department approval.

##### **2.4.2.3 Container Sealing Locations**

Macroencapsulation containers may be sealed inside an enclosed building (e.g. truck wash, and/or the maintenance building). Macroencapsulation containers may be kept in the truck wash, maintenance building, or transportation building for up to a week when sealing and testing procedures are being performed.

#### **2.5 Container Unloading Procedures**

Container unloading procedures have been designed to minimize damage to the devices during unloading from the roll-off box at the working face of the landfill.

The area of the landfill in which the device is to be unloaded will be a firm level area free from large debris which may puncture the bottom of the device. The area will typically be the top of the previous waste lift that has been covered with daily or intermediate soil cover. The area designated for unloading will be identified to the roll-off truck driver by landfill personnel.

Extreme care will be used during unloading to prevent rupturing of the devices due to abrupt movements. The device will be unloaded by placing the back end of the roll-off on the ground in the area of the landfill designated for unloading. The roll-off truck will then drive forward to

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minimize the angle of the roll-off box with the ground. The tail gate will then be opened on the roll-off box and the box tilted to an angle such that the macroencapsulation device begins to move out of the roll-off. The roll-off truck will then drive forward slowly, moving the roll-box out from under the device. The device is gradually and gently unloaded from the roll-off in this manner.

## **2.6 Container Inspection and Repair Procedures**

After the devices have been off-loaded into the designated position within the landfill, they will be inspected by trained CWMNW personnel to check for any severe damage, perforations, or any holes in the top and sides. Any defects observed which compromise the integrity of the device will be identified and marked so it may be repaired in accordance with the device repair procedures.

The device will be repaired with a combination of 100-mil HDPE patches and extrusion welding as outlined in the "Welding Instruction for Macro\*Secure Project", attached in Appendix C.

## **2.7 Landfill Placement Procedures**

Once the device has been unloaded into the landfill, inspected for damage, and repaired if necessary, backfill will be placed around the device. Backfilling around the device will take place as filling progresses and may not be done immediately after the device is placed. Select waste material or clean cover will be placed as backfill material within two feet of the top the device. The select waste or cover material will also be compacted around the sides of the device as filling progresses. Select wastes may consist of stabilized wastes, soil-like wastes, or other materials granular in nature and free of materials that may puncture the device.

The select waste placement around the in-place device will be done with the facility's heavy equipment to achieve a relatively well compacted condition around the box sides. To maintain the integrity of the device, at least two feet of uncompacted soil or select waste will be placed over the top of the box before equipment is allowed to drive over the box.

## **2.8 Container Staging**

The macroencapsulation devices will normally be staged immediately adjacent to one or more of the stabilization bins. The devices will be staged in this manner during normal working hours and will be covered with a temporary cover (tarp, etc.) when debris or waste is not being loaded into the devices.

At the end of normal working hours, the sealed macroencapsulation devices will either be taken to the landfill for disposal or placed into one of the permitted storage units.

## **2.9 Acceptance of Containers**

CWMNW may accept macroencapsulation containers filled with emplaced off-site hazardous waste debris. Macroencapsulation containers filled off-site may not be accepted at the Arlington Facility if the top lid is welded closed or otherwise affixed in a manner that would prove difficult for inspection of the container's content.

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Pre-acceptance procedures for the macroencapsulation containers must note punctures and holes on the sides, and inspect for material releases from the bottom of the container by inspection of the floor of the roll off box on which the container had been placed.

### **3 MICROENCAPSULATION**

Microencapsulation is similar to the current stabilization operations already performed at CWMNW. Microencapsulation is defined as the addition of stabilization reagents(s) to the contaminated debris such that the leachability of the hazardous contaminants is reduced, with the subsequent disposal in a hazardous waste landfill. The only performance or operating standard that must be met is leachability of the hazardous contaminants must be reduced. Microencapsulation will typically be limited to inorganic (heavy metal) contamination. Organic contamination will be allowed for newly listed waste with no treatment standards specified by the EPA. See Appendix D for additional information on debris microencapsulation.

Typically only the surface of the debris is contaminated. During microencapsulation operations, the contaminants on the surface of the debris are chemically treated using stabilization reagents. Standard recipes/formulations which will be used to perform microencapsulation will be similar to those utilized in existing stabilization operations. The reagents do not need to adhere to the surface of the debris because the contaminants on the surface have been chemically treated to reduce toxicity. The concern of exposing new contaminated surface during the loading or unloading the debris after treatment is minor due to the contamination being limited to the surface of the debris. Debris that is contaminated throughout will be macroencapsulated.

CWMNW will accept debris in bulk or in drums. The debris will be unloaded into an existing stabilization unit, adding reagent(s) appropriate to the inorganic contaminants present, adding water as necessary, mixing waste and reagents in the stabilization unit, and removing the treated contents for direct placement in the landfill.

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#### **4 SIZE REDUCTION DURING IMMOBILIZATION PROCEDURES**

CWMNW will perform mechanical size reduction incidental to macroencapsulation and microencapsulation handling procedures. All procedures described herein will be followed during size reduction activities, including procedures and standards identified in Appendices A, B and C. Size reduction will be utilized, as follows, to facilitate the implementation of these treatment technologies.

- A tracked excavator will be fitted with a hydraulic bucket clamp attachment which will allow CWMNW to perform size reduction of debris received.
- Mechanical size reduction will allow for efficient loading of macro secure containers by reducing air space. Mechanical size reduction will be done inside the stabilization tanks. Containment provided by the stabilization tanks will prevent releases to the surrounding area and will provide a safe work area.

**APPENDIX A – ENGINEERING CALCULATIONS FOR  
MACROENCAPSULATION CONTAINERS**

[Insert – PDF Debris Treatment Plan Appendix A]

**APPENDIX B – SUITABILITY OF HDPE RESINS FOR HAZARDOUS DEBRIS  
MACROENCAPSULATION**

[Insert – PDF Debris Treatment Plan Appendix B]

**APPENDIX C – MACROENCAPSULATION CONTAINER SPECIFICATIONS  
AND QUALITY CONTROL PLAN**

[Insert – PDF Debris Treatment Plan Appendix C]



**APPENDIX D – MICROENCAPSULATION SPECIFICATIONS**

[Insert – PDF Debris Treatment Plan D]