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ADDENDUM C
PROCESS INFORMATION

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ADDENDUM C
PROCESS INFORMATION

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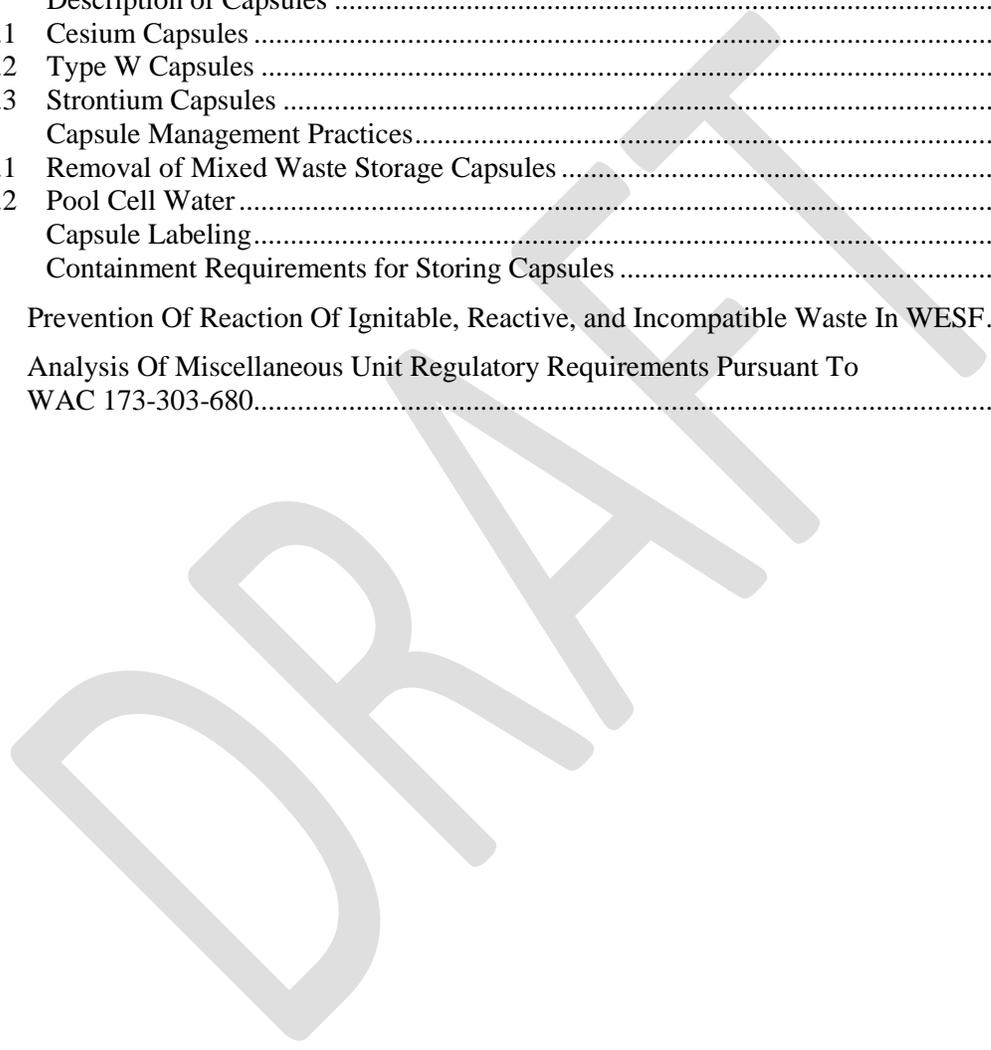
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1 **C. PROCESS INFORMATION**

2 This addendum discusses the processes used to store waste at WESF. Two waste streams are managed at
3 WESF, which consists of the cesium chloride and strontium fluoride salts that are stored within capsules.
4 The two areas that could store capsules are the pool cells and hot cells.

5 WESF will be permitted as a miscellaneous storage unit under WAC 173-303-680. The design of the
6 stainless steel capsules precludes the mixed waste from contact with the pool cell water and monitoring
7 equipment is installed to detect leakage of the mixed waste from the storage capsules. There is no
8 potential for incidental rainwater to enter into the pool cells or hot cells. The hot cells currently have an
9 active managed fire suppression system. Unintended water is not allowed within the pool cell and hot cell
10 operating areas, including fire suppression water.

11 WESF pool cells and hot cells have been designed and built to isolate and maintain confinement of the
12 mixed waste during normal storage conditions and in the event of a natural or man-made accident over
13 the design life of WESF.

14 **C.1 Storage Unit Description**

15 This section discusses WESF processes that will be involved in the storage operations. All of the mixed
16 waste in storage at WESF originated at WESF. WESF does not receive mixed waste from an onsite
17 and/or offsite facility.

18 The pool cell area consists of 12 pools lined with stainless steel. Only Pool Cells 1 through 8, and 12 can
19 be used for capsule storage. The mixed waste capsules are currently stored in Pool Cells 1, 3 through 7,
20 and 12. The pool cells are filled with water to a depth of approximately 4 meters (13 feet) to provide
21 cooling and shielding for the capsules. The hot cell area consists of seven hot cells labeled A through G.
22 The hot cells are constructed of reinforced concrete for shielding and have viewing windows. Activities
23 within the hot cells are performed remotely using manipulators. Only Hot Cells F and G are active for
24 mixed waste capsule storage. Capsules are not normally stored in Hot Cells F or G; but could be placed
25 in either cell for storage or evaluation.

26 **C.1.1 Description of Capsules**

27 The two waste streams consisting of cesium chloride and strontium fluoride are stored in three types of
28 capsules at WESF: mixed waste capsules of cesium salts, Type W overpack mixed waste capsules, and
29 mixed waste capsules of strontium salts. The cesium salts are stored in both the mixed waste cesium
30 capsules and Type W overpack capsules. There are a total of 1,936 cesium and strontium capsules in
31 storage; 1,335 cesium capsules and 601 strontium capsules.

32 **C.1.1.1 Cesium Capsules**

33 The standard mixed waste cesium capsule consists of a double capsule configuration with one capsule
34 placed inside another as shown in Figure C.1. Both the cesium inner and outer capsules and end caps are
35 made of 316L stainless steel. The inner capsule dimensions are 5.7 centimeters (2.25 inches) in diameter
36 by 50.1 centimeters (19.725 inches) long. The outer capsule is 6.7 centimeters (2.625 inches) in diameter
37 by 52.8 centimeters (20.725 inches) long. There are 1,312 standard mixed waste cesium capsules in
38 storage.

39 **C.1.1.2 Type W Capsules**

40 The Type W overpack mixed waste cesium capsule (Figure C.2) is a 316L stainless steel capsule used to
41 contain standard mixed waste cesium capsules that had swollen as a result of thermal cycling, cesium
42 chloride that had been reconfigured into pencils or pellets for use as irradiators, or the contents of
43 capsules that had been cut up for examination purposes. The Type W overpack capsule is 8.3 centimeters
44 (3.25 inches) in diameter by 55.4 centimeters (21.8 inches) long. There are 23 Type W capsules in
45 storage.

1 **C.1.1.3 Strontium Capsules**

2 Two types of material are used to encapsulate the strontium fluoride. Like the standard cesium capsule,
3 the strontium capsule consists of a capsule within a capsule as shown in Figure C.3. The inner capsule is
4 Hastelloy C-276™. The outer capsule for the majority of strontium capsules is 316L stainless steel and
5 the remaining capsules have a Hastelloy C-276™ outer capsule. The inner capsule is 5.7 centimeters
6 (2.25 inches) in diameter by 48.4 centimeters (19.05 inches) long. The outer capsule is 6.7 centimeters
7 (2.625 inches) in diameter by 55.4 centimeters (21.8 inches) long. There are 601 standard mixed waste
8 strontium capsules in storage.

9 **C.1.2 Capsule Management Practices**

10 Pool Cells 1 and 3 through 7 are the primary pool cells used for capsule storage and each of these pools
11 contains one small (13-by-13 grid) and two large (18-by-21 grid) capsule storage racks. Capsules are
12 placed vertically in the storage racks and are stored in approximately 4 meters (13 feet) of water for
13 shielding and cooling.

14 One or more capsules may be moved from the pool cells to the hot cells for inspection or storage. Using
15 long handled tongs, the capsule can be moved under water from its storage pool location into Pool Cell 12
16 through a transfer port located approximately 1 meter (3 feet) above the pool cell floor. The capsule can
17 then be temporarily stored on the floor or in a rack in Pool Cell 12 or be immediately moved to the hot
18 cells. Capsules are transferred individually to and from Hot Cell G through a transfer chute. The capsule
19 transfer chute is equipped with a trolley device for lowering and raising the capsule. Once in Hot Cell G,
20 the capsules can be transferred into Hot Cell F using manipulators.

21 **C.1.2.1 Removal of Mixed Waste Storage Capsules**

22 Removal of mixed waste capsules stored within WESF will not be conducted routinely. It is planned that
23 the mixed waste capsules will remain in WESF for storage until a final disposition option becomes
24 available.

25 **C.1.2.2 Pool Cell Water**

26 Deionized water from the WESF deionized water system is added to the pool cells periodically to
27 maintain water level due to evaporation.

28 **C.1.3 Capsule Labeling**

29 The WESF capsules will not be labeled with traditional hazardous waste labels, but will meet the intent of
30 [WAC 173-303-320](#) with an alternative to standard labeling requirements as described in Permit
31 Addendum E. Signs are posted at the personnel entrances to the areas storing mixed waste, identifying
32 any potential hazards in the area to satisfy [WAC 173-303-320](#) and [WAC 173-303-630](#).

33 **C.1.4 Containment Requirements for Storing Capsules**

34 The design of the pool cell and hot cell areas that are directly involved with the handling and storage of
35 mixed waste are built to keep exposures to these as low as reasonably achievable (ALARA). The pool
36 cell and hot cell areas are built to isolate and maintain confinement of the mixed waste during normal
37 storage conditions and in the event of a natural or man-made accident.

38 WESF does not store any capsules with free liquids, waste that exhibit ignitability or reactivity, or waste
39 designated F020 through F023, F026, or F027 (Section J).

40 **C.2 Prevention Of Reaction Of Ignitable, Reactive, and Incompatible Waste In WESF**

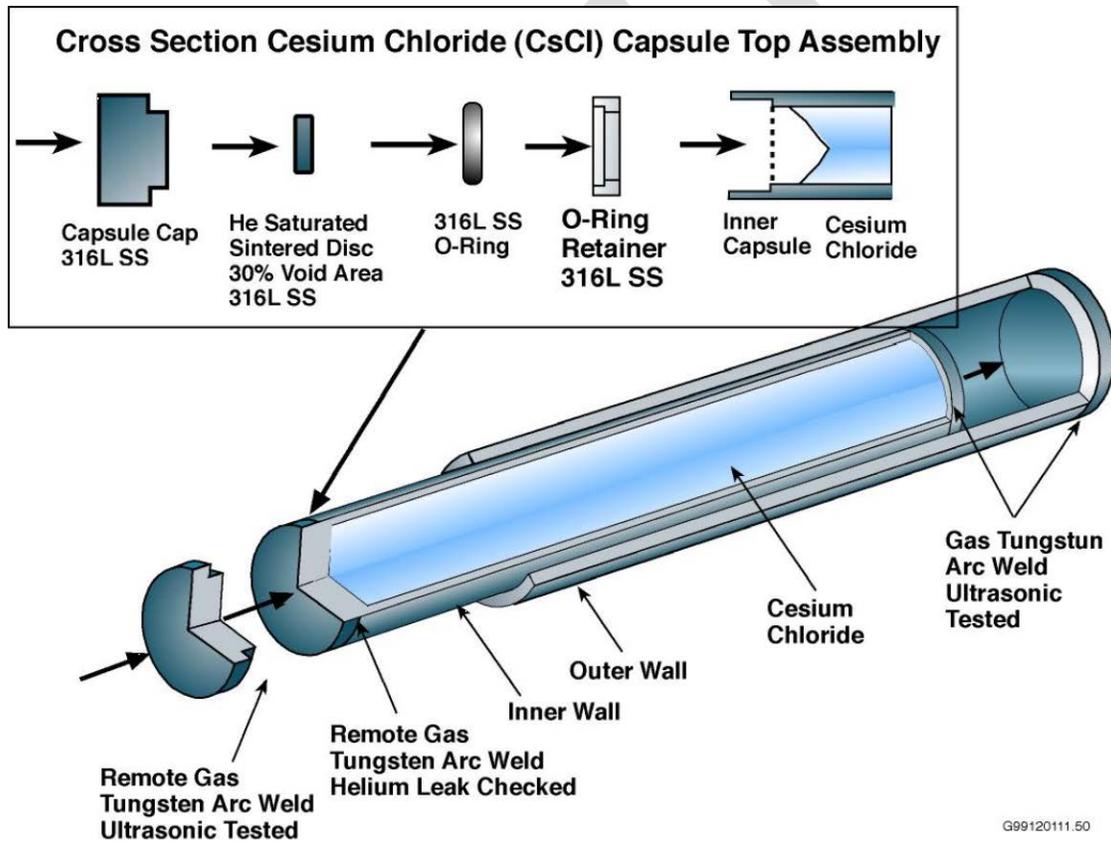
41 WESF does not store ignitable, reactive, or waste incompatible with the mixed waste. The WESF
42 capsules do not contain or generate materials that are explosive, pyrophoric, or chemically reactive. The
43 capsule materials preclude chemical, electrochemical, or other reactions (such as internal corrosion). The
44 WESF capsules will not exhibit the characteristics of ignitability or reactivity as defined in
45 [WAC 173-303-040](#) and [WAC 173-303-090\(5\)](#).

**C.3 Analysis Of Miscellaneous Unit Regulatory Requirements Pursuant To
WAC 173-303-680**

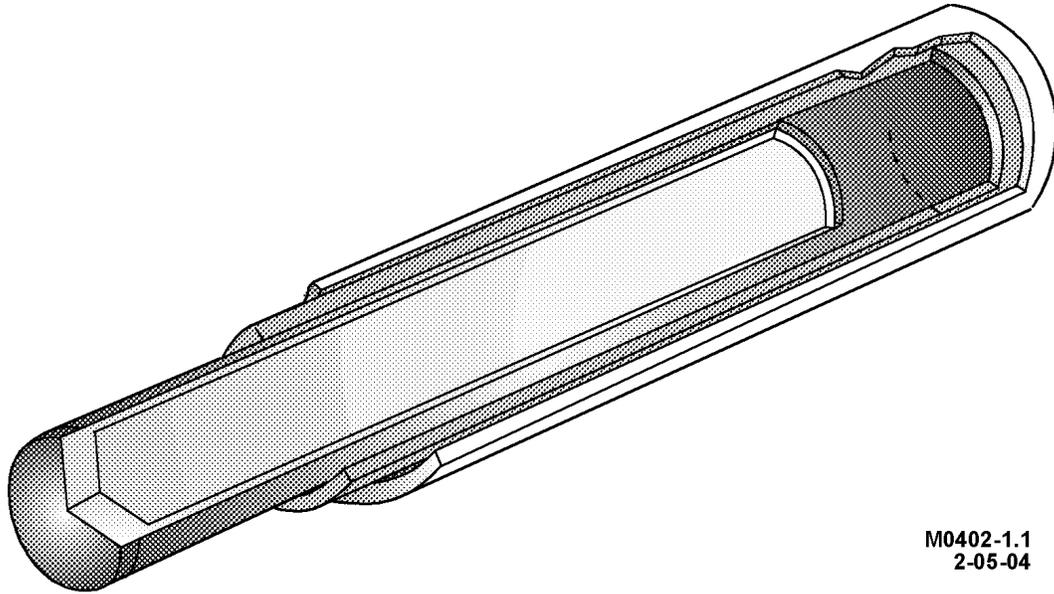
[WAC 173-303-680](#) requires "a miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of the human health and the environment. Permits for miscellaneous units are to contain such terms and provisions as necessary to protect the human health and the environment...." Waste management process descriptions provided above describe all essential elements of waste management practices necessary to support the required demonstrations, including requirements of [WAC 173-303-680](#)(3).

[WAC 173-303-680](#)(2)(a) through (c) requires consideration of the potential release or migration of waste or waste constituents to groundwater, surface water, and air. Since mixed waste managed at WESF are in sealed capsules with little or any potential for release outside of the outer capsule, explicit consideration of these WAC sections are not necessary. WESF is not seeking to be permitted as a disposal unit, so consideration of postclosure care requirements of [WAC 173-303-680](#)(4) is not necessary.

Figure C.1. Cesium Capsule



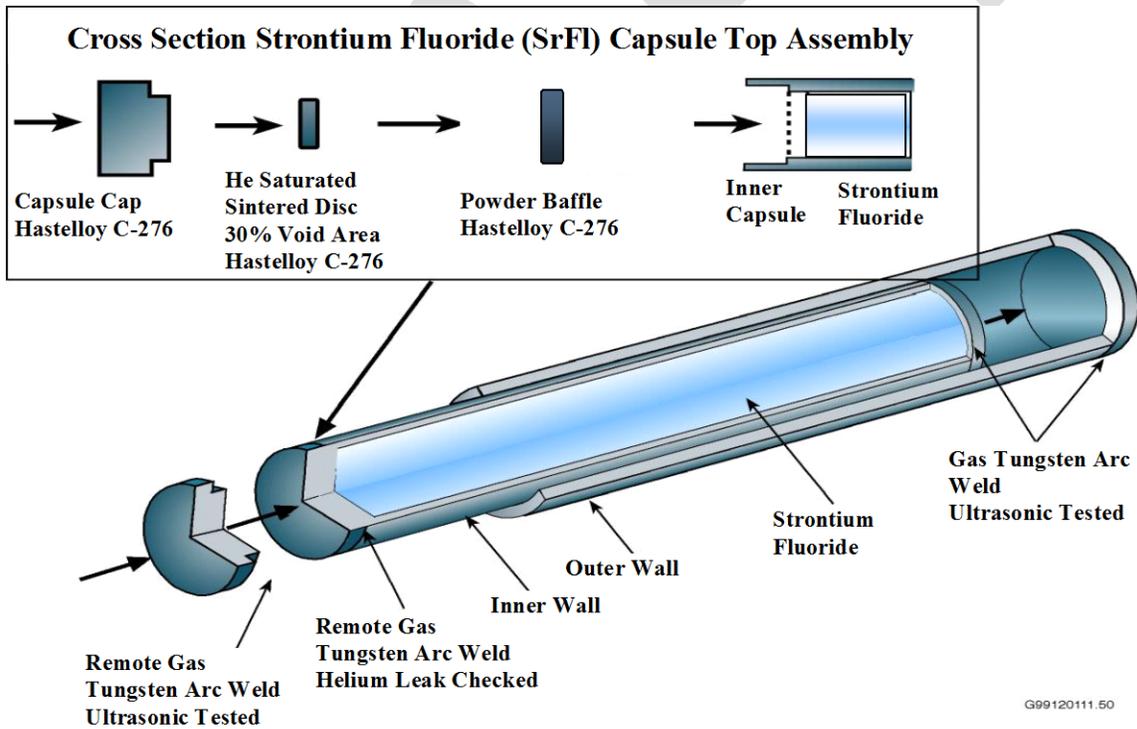
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Figure C.2. Type W Overpack Capsule (Typical)



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Figure C.3. Strontium Capsule

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