

HWMA/RCRA PART B PERMIT
FOR THE
IDAHO NATIONAL LABORATORY

BOOK 1 OF 1

PER-140 – MATERIALS AND FUELS COMPLEX
SECONDARY SODIUM SYSTEM (MFC-766)

ATTACHMENT 8

SECTION I – CLOSURE PLAN

MODIFICATION DATE: April 14, 2014

CONTENTS

I.	CLOSURE PLANS [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.14(b)(13) and 264.111 through 264.115].....	1
I-1	Closure Plan Overview	1
I-2	Closure Performance Standard [IDAPA 58.01.05.008; 40 CFR 264.111 and 264.178 and 264.197]	2
I-3	Partial Closure Activities [IDAPA 58.01.05.008; 40 CFR 264.112(b)(3)]	4
I-4	Maximum Waste Inventory [IDAPA 58.01.05.008; 40 CFR 264.112(b)(3)].....	5
I-5	Disposal or Decontamination of Equipment, Structures, and Soils [IDAPA 58.01.05.008; 40 CFR 264.112(b)(4) and 264.114].....	5
I-6	Closure of Tanks [IDAPA 58.01.05.008; 40 CFR 264.197].....	5
I-7	Ancillary Closure Activities [IDAPA 58.01.05.008; 40 CFR 264.112(b)(5)].....	8
I-8	Schedule for Closure and Notification of Closure [IDAPA 58.01.05.008; 40 CFR 264.112(b)(6) and (d)].....	8
I-9	Certification of Closure [IDAPA 58.01.05.008; 40 CFR 264.115].....	10

EXHIBITS

Exhibit I-1.	SSS Closure Approach Flow Chart.....	2
Exhibit I-2.	Closure Performance Standards for SSS Closure Activities	4
Exhibit I-3.	HWMA SSS Ancillary Piping and Equipment Unit Schedule for Closure.....	9

1 **I. CLOSURE PLANS [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR**
2 **270.14(b)(13) and 264.111 through 264.115]**

3 In accordance with the requirements of IDAPA 58.01.05.009 and 58.01.05.0128; 40 CFR
4 264.111 through 264.115 and 270.14(b)(13), this section of the INL HWMA/RCRA SSS
5 (MFC-766) Permit describes the closure plan that will be implemented at the SSS HWMA
6 Unit. The closure plan ensures the HWMA unit is closed in a manner that will protect
7 human health and the environment.

8 The information provided in this section is organized by subsection as follows:

- 9 • Subsection I-1, Closure Performance Standards
- 10 • Subsection I-2, Closure Plan
- 11 • Subsection I-3, Partial Closure Activities
- 12 • Subsection I-4, Maximum Waste Inventory
- 13 • Subsection I-5, Disposal or Decontamination of Equipment
- 14 • Subsection I-6, Closure of Tanks and Tank Systems
- 15 • Subsection I-7, Ancillary Closure Activities
- 16 • Subsection I-8, Schedule for Closure
- 17 • Subsection I-9, Certification of Closure

18 **I-1 Closure Plan Overview**

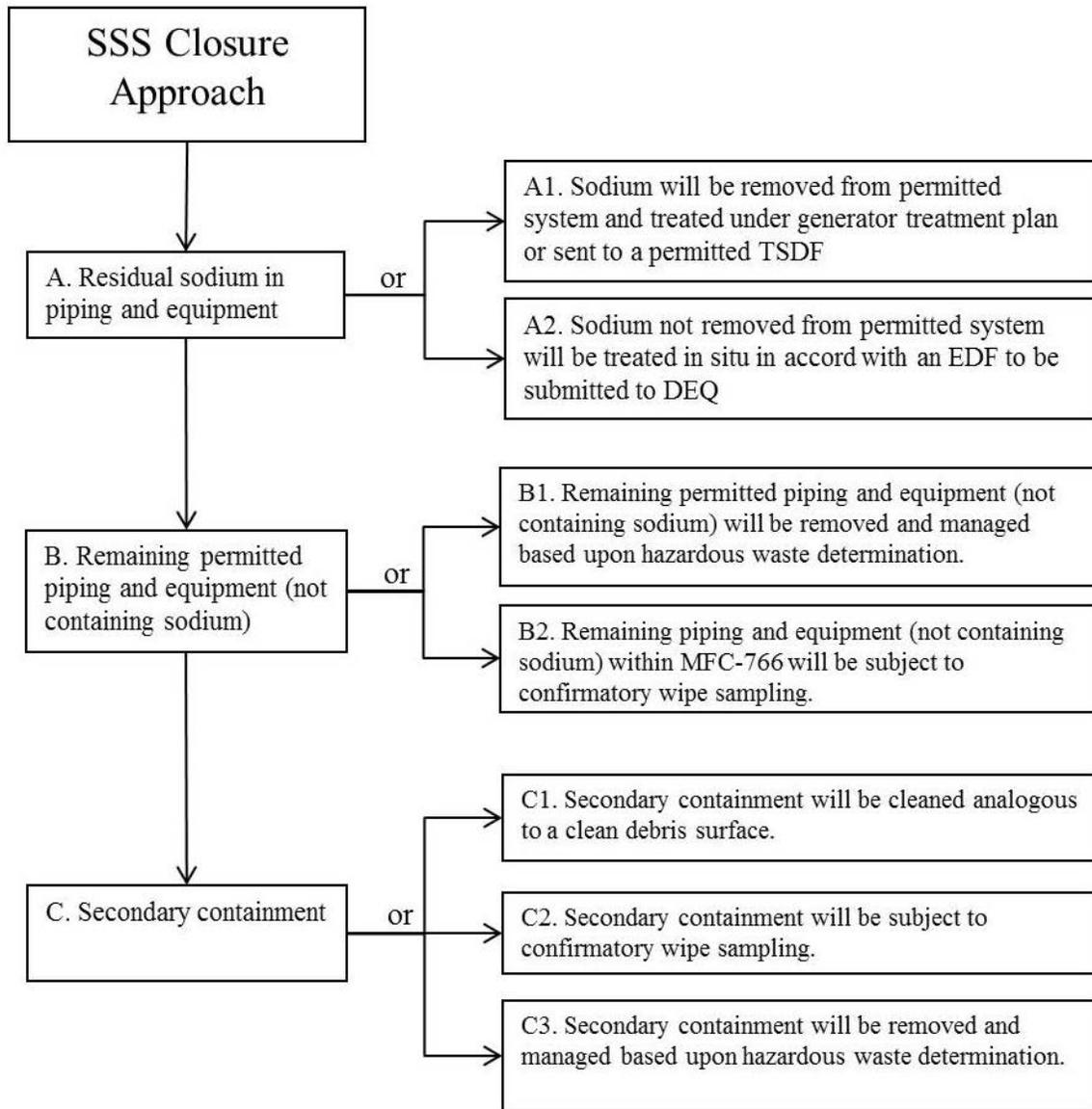
19 This closure plan presents the approach for achieving clean closure of the MFC-766 SSS
20 HWMA/RCRA unit. The HWMA/RCRA unit includes piping and equipment (some of
21 which contains residual sodium) and the secondary containment. The closure approach
22 includes:

- 23 • Removal of most of the piping and equipment (that contains sodium) for later
24 treatment under a generator treatment plan or shipment to a permitted TSDF.
- 25 • Piping and equipment containing sodium that is not removed will be treated in place
26 (in-situ) as described in an Engineering Design File (EDF) to be submitted to DEQ.
- 27 • Remaining permitted piping and equipment that managed hazardous waste will be
28 removed and managed based upon hazardous waste determinations or will remain
29 and be subjected to confirmatory wipe sampling.
- 30 • Secondary containment will be cleaned analogous to a clean debris surface, subjected
31 to confirmatory wipe sampling, or removed and managed based upon a hazardous
32 waste determination.

33 The closure methods are depicted in Exhibit I-1 and further described in Subsection I-6.
34 Closure will be certified by the owner and operator and a qualified professional engineer
35 (PE) and closure certification will be sent to the Idaho Department of Environmental
36 Quality (DEQ).

Exhibit I-1. SSS Closure Approach Flow Chart

Exhibit I-1. SSS Closure Approach Flow Chart



1 I-2 Closure Performance Standard [IDAPA 58.01.05.008; 40 CFR 264.111,
2 264.178 and 264.197],

3 Final closure of the HWMA unit, as described in this closure plan, will be performed in a
4 manner that achieves the closure performance standards defined at IDAPA 58.01.05.008;
5 40 CFR 264.111, 264.178 and 264.197.

6 The closure performance standards require the owner and operator to close the facility in a
7 manner that

- 1 a) minimizes the need for further maintenance (IDAPA 58.01.05.008 [40 CFR
2 264.111(a)]),
3 b) controls, minimizes, or eliminates to the extent necessary to protect human health and
4 the environment, post-closure escape of hazardous waste, hazardous constituents,
5 leachate, contaminated runoff, or hazardous waste decomposition products to the
6 ground or surface waters or to the atmosphere (IDAPA 58.01.05.008
7 [40 CFR 264.111(b)]), and
8 c) complies with the closure requirements of this subpart (IDAPA 58.01.05.008
9 [40 CFR 264.111(c)]) including, but not limited to, the requirements of
10 • IDAPA 58.01.05.008 (40 CFR 264.197) for closure of tank systems: Remove
11 or decontaminate all waste residues, contaminated containment system
12 components (liners, etc.), contaminated soils, and structures and equipment
13 contaminated with waste, and manage them as hazardous waste.

14 Sections I-6 describes the methods that will be used to meet the closure performance
15 standards for the MFC-766 SSS Ancillary Piping and Equipment. The closure
16 performance standards for each closure method are depicted in Exhibit I-2.

17 The sampling and analytical methodology for confirmatory wipe sampling (if used) will
18 be described in a sampling procedure (SPR) submitted to the DEQ for review and
19 approval.

20 The HWMA unit was designed and operated in a manner that minimized the potential for
21 contamination of the facility structures and surrounding property. The facility designs,
22 coupled with frequent inspections and corrective maintenance, provided safe operations
23 that minimize the need for cleanup and decontamination at closure. HW inventories were
24 previously removed from the facility to the extent practicable and transferred to a
25 permitted TSDF prior to initiation of closure. Only residual sodium remains in the piping
26 and equipment. That residual sodium is addressed in this closure plan. Any spills, leaks, or
27 other discharges that may have occurred during tank storage, processing or transfers
28 would have been handled immediately during the normal operational life of the HWMA
29 unit and documented on the HWMA unit Inspection Log or HWMA unit operating record
30 [as applicable], which is maintained as part of the HWMA unit operating records.
31 Therefore, inspection and operating logs will be reviewed prior to initiating closure to
32 verify that no HW or HW residues remain at the HWMA unit from previous spills or
33 releases.

34 To ensure personnel safety during the performance of closure activities:

- 35 • Closure activities will be supervised and performed by qualified ICP personnel in
36 accordance with comprehensive safety procedures.
37 • Personnel performing closure activities will be trained to adhere to applicable
38 procedures and equipped with proper personal protective equipment (PPE).
39 • Personnel and equipment will be decontaminated to established ICP radiological
40 control levels prior to leaving any contaminated work area.

Exhibit I-2 Closure Performance Standards for SSS Closure Activities

SSS Piping and Equipment Closure Method	Closure Performance Standard		
A. Removal of piping and equipment containing sodium that will not be treated in situ	<ol style="list-style-type: none"> 1. Removed piping and equipment will be subject to hazardous waste determinations. 2. Removed sodium will be subject to generator treatment or shipped to a permitted TSDF. 		
B. In situ treatment of sodium remaining in SSS MFC-766 piping and equipment	<ol style="list-style-type: none"> 1. Treatment in situ in accordance with an EDF submitted to DEQ that describes the treatment approach and performance standards 		
C. Removal of piping, equipment, and secondary containment that does not contain sodium	<ol style="list-style-type: none"> 1. Hazardous waste determination followed by appropriate waste management based upon hazardous waste determinations 		
D. Decontaminate remaining secondary containment	<ol style="list-style-type: none"> 1. Decontaminate analogous to a clean debris surface⁽¹⁾ 2. Document history of spills 3. Visual examination for the presence of hazardous waste residues on the secondary containment 		
E. Confirmatory surface wipe sampling⁽²⁾ of piping, equipment, and secondary containment that remains in SSS	COC	Action Level (AL) ($\mu\text{g}/100\text{ cm}^2$) ⁽³⁾	Evaluation Method
	Cadmium	6.32	Total Metals Analysis
	Chromium	0.948 (Cr^{+6}) 59,400 (Cr^{+3})	
	Lead	4.3	
	Mercury	512	
	Silver	576	

- (1) A clean debris surface is defined in IDAPA 58.01.05.011 [40 CFR § 268.45, Table 1, Footnote 3], and is to be the standard to be used after one of the physical or chemical extraction technologies described in Table 1 is performed. The submitted SPR may propose another decontamination treatment and standard analogous to the clean debris standard.
- (2) Confirmatory surface wipe sampling may be used to demonstrate the absence of COCs for any piping or components that will remain.
- (3) Sample results that are not non-detect will be compared to the ALs. COCs that exceed the ALs will be compared to background levels for similar materials to determine if they are statistically different from background. The specific methodology for establishing background levels will be described in the SPR.

1 **I-3 Partial Closure Activities [IDAPA 58.01.05.008; 40 CFR 264.112(b)(3)]**

2 A partial closure certification may be submitted after treatment of residual sodium but
3 before completion of clean closure.

1 **I-4 Maximum Waste Inventory [IDAPA 58.01.05.008; 40 CFR 264.112(b)(3)]**

2 The maximum inventory of HW in tank system storage at any time during the operational
3 life of the SSS HWMA unit is provided in this INL HWMA/RCRA SSS Permit,
4 Attachment 1 – Part A Permit information.

5 **I-5 Disposal or Decontamination of Equipment, Structures, and Soils [IDAPA**
6 **58.01.05.008; 40 CFR 264.112(b)(4) and 264.114]**

7 During closure of the HWMA unit, all equipment, structures and soils
8 contaminated/suspected contaminated with HW (including HW waste generated as a result
9 of closure activities) will be disposed of/decontaminated in accordance with all applicable
10 regulations.

11 The Caustic Storage Tank (4,000 gallon stainless steel tank) and the Caustic Cooling Tank
12 (1,000 gallon nickel tank) were permitted tanks removed from MFC-799 during closure of
13 that facility. During MFC-799 operations they were used to store caustic liquids. These
14 tanks were confirmed empty and may be used in the generator treatment of the sodium
15 removed from MFC-766. The disposition of these two tanks will be addressed in the
16 closure certification for this closure.

17 **I-6 Closure of Tanks [IDAPA58.01.05.008; 40 CFR 264.197]**

18 The closure approach for the SSS is to first address removing and treating the residual
19 sodium and then address clean closure requirements as described in the following
20 subsections. The closure methods are depicted in Exhibit I-1. Closure will be certified by
21 the owner and operator and a qualified professional engineer (PE) and closure certification
22 will be sent to the Idaho Department of Environmental Quality (DEQ).

23 Operating records and inspection records will be reviewed to determine if HW spills
24 occurred in the facility. Closure activities will include visual inspection to identify visible
25 HW residue on floors, secondary containment, and other surfaces. Areas with residual
26 contamination will either be removed or the HW residues will be removed from the
27 affected area.

28 **I-6(a) Piping and Equipment Containing Residual Sodium**

29 The closure approach for the SSS ancillary piping and equipment containing residual
30 sodium is based upon treatment in place (in situ) or removal. Residual sodium in the larger
31 piping and equipment may be treated in situ. Sodium containing piping that is not treated
32 in situ will be removed for treatment under a Generator Treatment Plan or shipment to a
33 permitted TSDF.

1 ***I-6(a)(1) In Situ Treatment of Piping and Equipment with Residual Sodium***

2 In November 2011, while treating the passivated sodium in the SSS ancillary piping
3 and equipment as part of closure activities, a pressure excursion occurred. Following
4 recovery activities, the SSS ancillary piping and equipment in the east side of the
5 MFC-766 were placed in a safe configuration. In anticipation of restarting that
6 treatment approach, an engineering design file (EDF-9831) describing a modified
7 sodium treatment process was submitted to DEQ. However as a result of further
8 evaluations, it has been determined that piping containing sodium can safely be
9 removed and treated under generator treatment requirements similar to the closure for
10 the MFC-799 tanks. However, the heat exchangers will remain within MFC-766 and
11 will require in-situ treatment. A treatment approach different from that described in
12 EDF-9831 has been selected for in-situ treatment of sodium remaining in the heat
13 exchangers.

14 The in situ treatment approach will be described in an EDF which will be submitted
15 to DEQ for concurrence. The treatment EDF will describe the results of studies that
16 support the design, operating parameters, system limits, required monitoring, and
17 establish closure performance standards that will be used to determine completion of
18 sodium treatment. In addition, drawings or sketches showing construction
19 specifications for the final design will be submitted along with the professional
20 engineer (PE) certification for the in situ treatment system. The modified treatment
21 process will be controlled by monitoring parameters such as volume of water added,
22 hydrogen concentration, temperature, pH, and pressure. The in situ treatment of the
23 SSS ancillary piping and equipment will commence after concurrence by DEQ on the
24 treatment EDF and submittal of the PE certification and support information stated
25 above. Waste generated by the treatment process will be characterized and managed
26 in accordance with a hazardous waste determination.

27 ***I-6(a)(2) Removal of Piping and Equipment with Residual Sodium***

28 SSS piping and equipment containing sodium that is not to be treated in situ will be
29 removed for generator treatment or for shipment to a TSDF. As sodium containing
30 piping and equipment are removed, that sodium containing piping and equipment
31 may be size reduced to facilitate storage and eventual treatment. In addition, sodium
32 may be removed from sodium containing piping and equipment to further facilitate
33 storage and eventual treatment. Containers used for storing sodium will be inerted
34 with inert gas to minimize reactions that could lead to over-pressurization. Closure-
35 generated waste will be stored in the vicinity of the facility being closed in a closure-
36 generated waste storage area until the waste can be treated under the generator
37 treatment requirements of IDAPA 58.01.05.006 (40 CFR 262) or until the waste is
38 shipped to a permitted treatment, storage, or disposal facility. For the purposes of this
39 closure plan, vicinity is defined as the area controlled by CWI in the northwest corner

1 of MFC. Waste will be appropriately managed based on a hazardous waste
2 determination. All generator requirements of IDAPA 58.01.05.006 (40 CFR 262) will
3 be met except that the 90-day administrative timeframe stipulated in IDAPA
4 58.01.05.006 [40 CFR 262.34(a)(1), “Generator Standards: Accumulation Time”]
5 will not apply to closure-generated waste. Closure-generated waste can be stored by
6 the generator for up to 365 days in order to facilitate completion of closure related
7 activities. All hazardous waste will be removed from these storage areas within 365
8 days for treatment under a generator treatment plan or sent to a permitted TSDF.

9 Containers of closure-generated waste containing sodium may be placed in permitted
10 storage units at the INL until the generator treatment system is ready to process that
11 waste. Containers of closure-generated waste containing sodium can be removed
12 from permitted storage areas and placed in the closure-generated waste storage area
13 for treatment under the generator treatment requirements of IDAPA 58.01.05.006 [40
14 CFR 262]. Hazardous waste removed from permitted storage areas to closure-
15 generated waste storage areas for generator treatment will be treated within 90 days
16 of removal. Information regarding waste management during closure activities will
17 be provided in the quarterly closure reports and to the PE for closure certification.

18 **I-6(b) Removal of Piping and Equipment Not Containing Sodium and Secondary**
19 **Containment**

20 Permitted piping and equipment not containing sodium as well as secondary containment
21 may be removed from the SSS. This removal may occur as part of building demolition.
22 Waste removed will be subjected to hazardous waste determinations that will determine
23 the needs for further management.

24 **I-6(c) Confirmatory Wipe Sampling of Remaining Piping and Equipment Not**
25 **Containing Sodium**

26 Permitted piping and equipment not containing sodium that will remain within the SSS
27 after closure will be subject to confirmatory wipe sampling in accordance with an
28 approved SPR. Wipe sampling procedures will be described in the SPR and will be
29 comparable to ASTM wipe sampling standards E1728-03, D6966-08 and E1792-03.
30 Wipes will be analyzed using total metals analysis for the five metals identified as COCs
31 (chromium, cadmium, mercury, lead, and silver). If the 95% upper confidence levels of
32 the mean concentrations for all COCs are below the ALs listed in Exhibit I-2, then waste
33 and waste residues have successfully been removed and the closure performance standard
34 has been met. If the 95% upper confidence level of the mean concentration of any COC is
35 greater than the AL, a comparison will be made to the background level for the COC for
36 similar materials to determine if the concentration is statistically different from
37 background. If the 95% upper confidence levels of the mean concentrations of COCs
38 greater than the AL are less than background, then waste and waste residues have
39 successfully been removed and the closure performance standard has been met. The
40 methodology for establishing background will be described in the SPR submitted to DEQ
41 for concurrence. For COCs with concentrations that exceed both the ALs and background

1 levels, decontamination and further wipe sampling will be performed until those levels are
2 achieved. At any time during the closure of the SSS, piping and equipment may be
3 removed and managed in accordance with a hazardous waste determination in lieu of
4 decontamination and further testing. The PE certifying closure will be provided
5 photographs or videos from the testing efforts.

6 **I-6(d) Decontaminate Secondary Containment Analogous to Clean Debris Surface**

7 The secondary containment can be decontaminated analogous to a clean debris surface.
8 For purposes of meeting a clean debris surface, a document describing the
9 decontamination approach (i.e., water washing using spraying, mopping, etc.) and a
10 statistical basis for evaluation for a clean debris surface will be submitted to DEQ prior to
11 the initiation of decontamination activities. This does not preclude normal
12 decontamination efforts implemented for work area control and safety concerns from
13 being implemented prior to submittal of the document. A record of decontamination and
14 evaluation efforts for the purpose of meeting a clean debris surface will be maintained and,
15 along with photographs, will be submitted to the PE certifying closure.

16 Alternatively, the secondary containment may be removed in accord with I-6(b) above or
17 subjected to confirmatory surface wipe sampling in accord with I-6(c) above.

18 **I-7 Ancillary Closure Activities [IDAPA 58.01.05.008; 40 CFR 264.112(b)(5)]**

19 Ancillary closure activities, for example groundwater monitoring, will not be required.

20 **I-8 Schedule for Closure and Notification of Closure [IDAPA 58.01.05.008; 40**
21 **CFR 264.112(b)(6) and (d)]**

22 The closure processes for the SSS HWMA unit is anticipated to take more than 180 days
23 to complete following the removal of final volume of HW.

24 The remaining closure schedule for the SSS ancillary piping and equipment includes
25 submittal of an in-situ treatment EDF. In addition, the schedule includes a milestone for
26 the submittal of the support documents necessary to implement either wipe sampling or
27 decontamination to a clean debris surface if these closure options are implemented. The
28 closure schedule for the SSS equipment will begin upon DEQ approval of the permit
29 modification for this revised closure plan. The closure of the MFC-766 SSS will be
30 completed no later than December 31, 2017. The closure schedule for the HWMA unit is
31 as follows in Exhibit I-3:
32

Exhibit I-3 HWMA SSS Ancillary Piping and Equipment Unit Schedule for Closure			
	Activity	Days to Completion ¹	Completion Date
1	DEQ approval of revised closure plan	Day 0	
2	Submittal of in situ sodium treatment EDF that includes closure performance standards.		September 30, 2014
3	Submittal of an SPR for wipe sampling of remaining piping and equipment not containing sodium or a determination that wipe sampling will not be conducted.		December 21, 2015
4	Submittal of PE certification and other support information for in situ treatment of remaining SSS components.		December 21, 2016
5	Submittal of document describing secondary containment decontamination approach and statistical evaluation analogous to a clean debris surface or a determination that decontamination will not be conducted.		December 21, 2016
6	Begin in situ treatment of the remaining SSS components.		March 31, 2017
7	Complete closure.		December 31, 2017
8	Submit closure certification to DEQ ² .	60 days after completion of closure ³	

1. Days to Completion for closure will be determined based on the date DEQ approves the permit modification request.
2. A separate partial certification of closure may be submitted after residual sodium activities are complete.
3. If clean closure is completed earlier than December 31, 2017, the closure certification will be submitted to DEQ 60 days after completion of closure.

1 **I-8(a) Extensions for Closure Time [IDAPA 58.01.05.008; 40 CFR 264.113(a)**
2 **and (b)]**

3 Planned closure of the HWMA SSS unit is expected to exceed 180 days. An extension to
4 closure is being requested at this time to protect human health and the environment and to
5 adequately perform closure activities.

1 **I-9 Certification of Closure [IDAPA 58.01.05.008; 40 CFR 264.115]**

2 At the conclusion of the closure process, the facility owner and operator and the qualified
3 professional engineer will certify that closure has been successfully completed in
4 accordance with this closure plan and the closure performance standard has been achieved.
5 These certifications will be submitted within 60 days of the closure to the:

6 Director, State of Idaho, Department of Environmental Quality
7 1410 North Hilton, Third Floor
8 Boise, ID 83706-1255