

RCRA PART B PERMIT
FOR THE
IDAHO NATIONAL LABORATORY

Volume 22
Idaho Nuclear Technology and Engineering Center
Calcined Solids Storage Facility

Attachment 8 - Section I
Closure and Post Closure Requirements

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I. CLOSURE AND POSTCLOSURE REQUIREMENTS

1 This closure plan specifies Idaho Nuclear Technology and Engineering Center (INTEC)
2 performance standards and procedures for the waste management units addressed in this permit. The
3 activities and closure performance standards described in this plan apply only to Hazardous Waste
4 Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA)-regulated wastes. Prior to
5 initiation of closure, all hazardous waste will be removed from the units and disposed of according to
6 applicable laws and regulation.

7 The closure performance standards for decontaminating equipment and components correspond
8 to applicable regulatory guidelines. Closure activities will address contaminated process equipment and
9 building components to be salvaged as scrap metal or other recyclable material; contaminated process
10 equipment and building components to be reused for non-waste management purposes; contaminated
11 process equipment and building components to be disposed of as hazardous waste debris; and
12 residues/wastes resulting from decontamination activities.

I-1. CLOSURE AND POSTCLOSURE REQUIREMENTS [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 270.14(b)(13), 264.111, and 264.112(a)(1) and (2)]

13 This closure plan describes the procedures to be used to remove remaining waste residues and to
14 decontaminate process equipment and building components to achieve closure performance standards
15 specified in the Idaho Administrative Procedures Act (IDAPA) 58.01.05.008 [40 Code of Federal
16 Regulation (CFR) 264.111]. The units addressed in this permit will be operated and closed to prevent
17 releases to the environment. Postclosure escape of hazardous waste constituents to the ground, surface
18 water, or atmosphere will be nonexistent. Therefore, continued maintenance activities after closure is
19 completed will not be required. This closure plan satisfies the requirements of IDAPA 58.01.05.008 (40
20 CFR 264.111 through 264.115 and applicable parts in 40 CFR 264.197).

I-1a. Closure Performance Standards (IDAPA 58.01.05.008; 40 CFR 264.111)

1 The closure process is designed to:

- 2 • Minimize the need for further maintenance
- 3 • Control, minimize or eliminate to the extent necessary to protect human health and the
4 environment, postclosure escape of hazardous waste, hazardous constituents, leachate,
5 contaminated run-off, or hazardous waste decomposition products to the ground or surface waters
6 or to the atmosphere
- 7 • Complies with the closure requirements of applicable portions of 40 CFR 264.

8 The closure performance standards for the units are in accordance with applicable portions of
9 IDAPA 58.01.05.006 through 58.01.05.012 (40 CFR 262 through 270). HWMA/RCRA closure activities
10 are considered precursor efforts to the ultimate facility deactivation and decommissioning (D&D).
11 Technical approaches to this ultimate facility D&D will have practical bearing on the appropriate
12 approach to HWMA/RCRA-regulated closure. At this time, the Department of Energy Idaho Operations
13 Office (DOE-ID) approach to facility D&D for the Calcined Solids Storage Facility (CSSF) has not been
14 determined. Therefore, this plan presents assumptions based on past and current HWMA/RCRA-
15 regulated closure and D&D activities at the INTEC. This integration of HWMA/RCRA closure activities
16 with subsequent D&D activities is reflected in Number 3 below as it relates to contaminated process
17 equipment and building components that would remain in place and undergo subsequent facility D&D.
18 Performance standards, probable scenarios affecting process equipment, building components, and
19 decontamination residuals are indicated below:

- 20 1. Contaminated process equipment and building components salvaged as scrap metal/materials will be
21 decontaminated as described in Section I-1d. Process equipment and building materials will be
22 decontaminated in a manner and degree as specified by the recycle scrap metal/material vendor in
23 conformance with their recyclable material acceptance criteria. To attain the closure performance
24 standard, the subject process equipment and building components may be subjected to
25 decontamination techniques such as sweeping, brushing, scraping, wiping, or rinsing. The selected
26 means of decontamination will be material-specific and dependent on the effectiveness in attaining
27 the contracted recyclable materials vendor acceptance criteria, minimization of the potential spread of
28 contamination, and minimization of decontamination wastes. All decontamination media and other

1 residuals generated from this closure activity will be managed as identified in Section I-1d of this
2 permit.

3 2. The performance standard for reusable process equipment and building components will be a degree
4 of decontamination consistent with the intended "postclosure" use of the process equipment or
5 building components as determined by INL-accepted industrial hygiene and health physics protocols
6 and guidelines. The need to decontaminate room, vault or equipment surfaces will be determined
7 initially by reviewing the operating record for evidence that hazardous waste or hazardous
8 constituents came into contact with the structure or equipment in question. In addition to the
9 operational record review, visual observation will be completed by using visual aids such as mirrors,
10 remote cameras, etc.

11 3. Other than internal surfaces of tank systems and ancillary equipment, the performance standard for
12 contaminated process equipment and building components that would remain in place and undergo
13 subsequent facility D&D will be a level of chemical or physical decontamination required to render
14 the equipment or structural surfaces "clean," analogous to that specified and identified under
15 IDAPA 58.01.05.011 (40 CFR 268.45). The degree of decontamination will be based on how
16 extensively the equipment or structure was used in waste treatment operations, and the likelihood that
17 it came into direct contact with the hazardous waste. An assessment of the facility operating record
18 and spill records will be conducted to determine the extent of potential waste contamination.
19 Equipment and structures that have documented releases, waste-related stains, or known contact with
20 waste materials will be decontaminated, using an appropriate decontamination solution/method and/or
21 be decontaminated using a method analogous to an alternative treatment technology identified in
22 IDAPA 58.01.05.011 (40 CFR 268.45).

23 In the event that this primary performance standard is not achievable upon the initial decontamination
24 campaign, the appropriateness of the decontamination media will be verified and a second
25 decontamination effort will be undertaken, potentially with different and/or more aggressive chemical
26 agents or physical removal methods. If upon completion of the second decontamination campaign,
27 apparent waste-related stains remain greater than 5% of the equipment or structural surface area, an
28 equipment/building surface sampling regimen will be considered. Design and implementation of this
29 sampling regimen and corresponding data quality objectives and performance standard will be
30 presented to the Idaho Department of Environmental Quality (DEQ) as an amendment to the closure
31 plan. Depending on the timeframes involved, development, DEQ approval and implementation of
32 this sampling regimen would likely require an extension of the timeframe to complete closure

1 pursuant to IDAPA 58.01.05.008, 40 CFR 264.113(a) and 264.113(b). It is anticipated that results
2 from such a sampling effort would be utilized to assess the worker, nonresidential scenario risk posed
3 by residual hazardous constituent contamination, such that the concentrations of contaminants
4 remaining in the units would not pose a risk to human health and the environment.

5 4. The performance standard for contaminated process equipment and building components to be
6 managed as hazardous debris will be the alternative treatment standards for hazardous waste debris in
7 IDAPA 58.01.05.011 (40 CFR 268.45), or the equipment/components will be managed as hazardous
8 waste, per IDAPA 58.01.05.006 through .012 (40 CFR 262 through 270). Contaminated process
9 equipment and building components will be managed as hazardous waste debris, either at an INL or
10 off-Site treatment, storage, or disposal (TSD) unit. This may entail decontamination until the
11 standard for attaining a "clean debris surface" is achieved, as verified by visual inspection of the
12 contaminated surface. Clean debris surface means that the surface, when viewed without
13 magnification, shall be free of visible contaminated soil and hazardous waste except that residual
14 staining from soil and waste, consisting of light shadows, slight streaks, or minor discoloration. Soil
15 and waste in cracks, crevices, and pits may be present, provided that such staining and waste and soil
16 in cracks, crevices, and pits shall be limited to no more than 5% of surface area. Table I-1
17 summarizes potential physical and chemical extractive treatment technologies to be employed and the
18 corresponding type of process equipment or building components. Following decontamination and/or
19 equipment removal, the area will be swept clean of debris. Materials will be removed and
20 containerized. All collected decontamination media and collected dirt and debris will be sampled,
21 analyzed, and managed accordingly. An alternative to the described closure activities that may be
22 exercised at the time of closure is dismantling, packaging, manifesting as hazardous waste, and
23 transport of contaminated equipment to be disposed of to an interim status/permitted TSD unit.

24 5. Decontamination media, rinsates, residues, and used Personal Protective Equipment (PPE) generated
25 from the decontamination of recyclable scrap metal/material, reusable equipment, and hazardous
26 waste debris will be characterized per the Waste Analysis Plan (WAP) of this permit. As detailed in
27 Section C, characterization will be determined by acceptable process knowledge or sampling and
28 analysis. Management of mixed waste streams will, as necessary, be addressed in the INL Site
29 Treatment Plan and may include incineration, stabilization, or other acceptable means of treatment, as
30 necessary. All characterization activities performed in conjunction with this closure action will be in
31 accordance with the current WAP for this permit.

Table I-1. Potential Unit Closure Debris Treatment Technologies.

Component or Subsystem	Extractive or Immobilization Treatment Technology ¹
Ancillary equipment and surfaces	High-pressure steam and water sprays, ² abrasive blasting, CO ₂ blasting
Structural components (metal wall panels, floor surfaces, structural beams, ceiling materials, etc.)	CO ₂ blasting, abrasive blasting, high-pressure steam and water washing, spraying, ² spalling
Miscellaneous metal ducting	CO ₂ blasting, abrasive blasting, high-pressure steam and water washing, spraying ²
Tank Storage Units and Affected Sumps	
Tanks	Not classified as debris, see Section I-1d(2)
Affected ancillary equipment and surfaces, secondary containment devices, including sump surfaces	High-pressure steam and water sprays, ² abrasive blasting, CO ₂ blasting

1. From IDAPA 58.01.05.011 (40 CFR 268.45, Table 1).
2. Would require an Equivalent Technology Approval per IDAPA 58.01.05.011 [40 CFR 268.42(b)].

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

1 The Bin Sets occupy 7 separate vaults. Each Bin Set will be closed separately. This would
2 constitute a partial closure for this permit. Therefore, partial closure activities would be preceded by
3 notification of the DEQ and undertaking an amendment to the closure plan pursuant to IDAPA
4 58.01.05.008, 40 CFR 264.113(a) and 264.113(b).

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

5 This Part B permit includes the Part A hazardous waste permit for units in this permit. The Part
6 A permit application indicates the maximum potential waste inventory for units. In addition, the
7 operating record for each unit will identify the occurrence of waste spills, if any, over the operating life,
8 and the measures taken to mitigate the spill.

I-1d. Inventory Removal and Disposal or Decontamination of Equipment, Structures, and Soils (IDAPA 58.01.05.008; 40 CFR 264.111, 264.112, and 264.114)

9 Selection of specific process equipment and building components, and the degree of
10 decontamination efforts, will be based on whether the equipment and structures have come into direct
11 contact with waste, whether or not there is visual evidence of waste-related staining or streaking, the
12 nature of constituents or contaminants present, and whether the equipment and structures will be managed
13 for recycle, reuse, or disposal as hazardous debris. Due to the design and integrity of the bins at closure,

1 releases to the environment are unlikely. As a result, disposal of contaminated soils pursuant to this
2 permit is not anticipated. Section I-1a., Closure Performance Standards (IDAPA 58.01.05.008; 40 CFR
3 264.111), addresses the protocols for achieving the closure performance standards or management
4 processes for the following groupings of process equipment, contaminated structures and residues:

- 5 • Contaminated process equipment and building components to be salvaged as scrap
6 metal/materials
- 7 • Contaminated reusable process equipment and building components
- 8 • Contaminated process equipment and building components that would remain in place and
9 undergo subsequent facility deactivation and decommissioning
- 10 • Contaminated process equipment and building components to be managed as hazardous debris
- 11 • Decontamination media, rinsate, residues, and used PPE.

12 The selected means of decontamination will depend on effectiveness in attaining the closure
13 performance standard, minimization of the potential spread of contamination, and minimizing the
14 generation of decontamination waste. Room or area surfaces contaminated during decontamination of
15 equipment will be closed in the same fashion. If used, fluids from equipment decontamination using an
16 ancillary pumping system will be collected in containers and stored within the work area. Spill booms,
17 spill control pillows, swabs, or other absorbent material(s) may also be used to contain the residual fluids
18 and facilitate removal.

19 **Process Equipment and Building Components – Selection of**
20 **Potential Debris Treatment Technologies Employed**
21

22 As indicated in Section I-1a, Closure Performance Standard, dismantled contaminated process
23 equipment and building components to be disposed of as solid waste will be managed in accordance with
24 the treatment standards for hazardous debris in IDAPA 58.01.05.011 [40 CFR 268.45(a)]. In general,
25 hazardous debris must be treated for each "contaminant subject to treatment," as defined in
26 IDAPA 58.01.05.011 [40 CFR 268.45(a)], using the technology or technologies specified in
27 IDAPA 58.01.05.011 (40 CFR 268.45, Table 1). The proposed debris treatment and waste storage
28 activities will involve prohibited listed wastes and metal-bearing characteristic wastes. Given this fact,
29 debris treatment conducted as part of facility closure will necessarily consider prohibited listed wastes and
30 TCLP constituents subject to treatment, and the corresponding treatment standards indicated under
31 IDAPA 58.01.05.011 (40 CFR 268.45). While not all-inclusive, Table I-1 indicates the process
32 equipment, building component or subsystem, and the probable corresponding physical and chemical

1 extractive debris treatment technology description. Any contaminant restrictions relative to application of
2 technologies other than the best demonstrated available technology would be presented to the Idaho DEQ
3 Director for approval, prior to implementation.

4 **Alternate Treatment Technology Selection Process**

5
6 Prior to implementation of a given alternative treatment technology specified in Table I-1 or
7 otherwise, a comprehensive engineering evaluation will be made of the given form of debris (such as
8 metal versus plastic), the known hazardous constituents, radiological considerations, industrial hygiene
9 concerns, and any other factors that may affect technology selection. If, based on this evaluation, a
10 suitable alternative treatment technology is not clearly indicated, a treatability study of one or more
11 technologies may be undertaken on that class of debris waste. Based on the initial engineering evaluation
12 or the successful identification of a technology via treatability studies, an alternative treatment technology
13 will be selected for implementation. In all cases, the performance standard for any technology
14 implemented (specified on Table I-1) will be the clean debris surface standard under
15 IDAPA 58.01.05.011 (40 CFR 268.45).

16 **Vault Surfaces**

17 Contaminated vault surfaces as indicated by an assessment will be cleaned of dirt and other
18 residuals, as necessary. Materials will be removed and containerized, followed by decontamination to
19 attain an appearance analogous to the "clean debris surface."

20 **Transfer Areas and General non-Waste Handling Equipment**

21 Equipment and structures that have no documented releases, visible signs of release, or known
22 contact with waste will be decontaminated using customary radiological decontamination practices or
23 standard housekeeping procedures. At a minimum, equipment and structures will be wiped down or
24 mopped with a suitable decontamination medium. Portions of the floor with no known contact with
25 hazardous waste will be mopped or wiped down. Residues generated by this general cleaning or
26 decontamination will undergo a hazardous waste determination in accordance with the current WAP for
27 this permit. Environmental Protection Agency (EPA) SW-846 or equivalent methodologies will be used,
28 matching contaminant of concern with appropriate sample type, quantity, and analysis.

1 **Hazardous Residue Management**

2 Process equipment and building components that undergo decontamination on-Site will be
3 decontaminated in appropriate areas within the INTEC as necessary, or at other approved INL facilities
4 available at the time of closure. If used, fluid resulting from decontamination activities will be contained
5 within the work area and collected in containers using an ancillary pumping or other system as needed.
6 Spill booms, spill control pillows, swabs, or other absorbent materials may be used to contain the residual
7 fluids and facilitate removal. Following decontamination and/or equipment removal, the area will be
8 swept clean of dirt and residuals. Materials will be collected and containerized. Recovered
9 decontamination media and collected dirt and residuals will be characterized in accordance with
10 Section C of this permit and managed according to the results of the analysis. When sampling and
11 analysis is required, EPA SW-846 or equivalent methodologies will be used, matching contaminant of
12 concern with appropriate sample type, quantity, and analyses. An alternative to the described closure
13 activities that may be exercised at the time of closure is dismantling, packaging, and transport of
14 contaminated equipment to be disposed of at an on-Site or off-Site RCRA interim status or permitted
15 facility for required treatment and subsequent disposal.

16 All of the indicated waste, residue, and decontamination materials and/or rinsates will be
17 containerized and sampled as described and stored in INL HWMA/RCRA-compliant facilities as
18 "Unknown-Pending Sampling and Analysis," until analytical results indicating the hazardous
19 classification, if any, of the waste is received. In addition, all disposable PPE, other disposable
20 equipment, and all other wastes generated during closure activities will be containerized and characterized
21 in accordance with the current WAP. When sampling and analysis is required, EPA SW-846 or
22 equivalent methodologies will be used, matching contaminant of concern with appropriate sample type,
23 quantity, and analysis. Before being moved from any areas undergoing decontamination, reusable PPE
24 will be decontaminated by removing residual materials from booties, gloves, anti-C's, and spraying,
25 washing, and scrubbing all outside protective clothing surfaces. Treatment and disposal of these waste
26 streams will be addressed in the INL Site Treatment Plan and may include incineration, stabilization, or
27 other acceptable methods of treatment, as necessary.

28 **I-1d(2) Closure of Tank Systems [IDAPA 58.01.05.008; 40 CFR 264.197]**

29 Tanks addressed by this closure plan located in CSSFs 1–7. The tank systems will be considered
30 "clean closed" when the following methods are completed to meet the closure performance standards:

- 31 • Wastes are removed from the tanks, pipelines, ancillary equipment, and surfaces of the system.

- 1 • If removed from the facility and managed as (1) salvageable scrap metal/materials, or (2) reused
2 as process equipment, the performance standard is that specified in Section I-1a above.
- 3 • If left physically intact, in place and not managed as hazardous waste debris, the tanks, piping,
4 ancillary equipment, and building interiors associated with these tank systems are decontaminated
5 in a manner to achieve the performance standard. Probable decontamination solutions may
6 include one or more acidic or alkaline decontamination solutions, or appropriate combinations of
7 the two.

8 In verifying the effectiveness of decontamination activities, the Management and Operation
9 (M&O) contractor will make use of the following measurements and determinations:

- 10 (1) **Levels of removable hazardous chemical constituents on swipe samples taken from**
11 **decontaminated surfaces.** Swipes will be moistened with mildly acidic (pH 3 to 5) solution,
12 appropriate for removing waste constituents adhering to the tank system surfaces. Closure of the
13 tank systems will be considered successful when concentration of hazardous constituents smear
14 samples do not exceed two times the method detection limit (as defined in the appropriate
15 procedure of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846,
16 current edition).
- 17 (2) **Levels of hazardous chemical constituents and hazardous characteristics in spent**
18 **decontamination solutions.** Closure of the tank systems will be considered successful when the
19 concentration of hazardous constituents in spent decontamination solutions do not exceed the
20 risk-based action levels. Spent decontamination solutions may be sampled downstream at a
21 suitable storage tank.
- 22 (3) **Radiological surveys of tank exterior walls.** Radiological surveys will be taken of tank exterior
23 walls to verify removal of the solid waste fraction, if any.
- 24 (4) **Boroscope or other visual determination methods.** Boroscope or other visual determination
25 methods will be used for verifying removal of the solid waste fraction, if any.

I-1e. Other Closure Activities [IDAPA 58.01.05.008; 40 CFR 264.112(b)(5)]

26 No other activities such as groundwater monitoring, leachate collection, or run-on/run-off control
27 are appropriate or planned for these units.

I-1f. Schedule for Closure [IDAPA 58.01.05.008; 40 CFR 264.112(b)(6)]

1 The Director of the DEQ will be notified in writing at least 45 days prior to the date that closure
2 operations are planned to begin. The projected schedule for closure of these units is generalized as
3 follows:

Activity	Day Completed
Initiate closure activities	Day 0
Complete equipment decontamination	Day 100
Complete surface decontamination	Day 140
Decontaminate tools, complete waste assessments, remove wastes	Day 160
Complete all closure activities	Day 180
Submit closure certification to the State of Idaho	60 days after completion of closure

4 **I-1g. Extension for Closure Time [IDAPA 58.01.05.008;
40 CFR 264.113(a) and 264.113(b)]**

5 Closure of these units is scheduled for completion within the prescribed 180-day period. No
6 variance is requested at this time. If it is later determined that an extension for the closure time is
7 necessary a permit modification request will be submitted to the Director of DEQ per
8 IDAPA 58.01.05.012 (40 CFR 270.42).

**I-1h. Certification of Closure [IDAPA 58.01.05.012 and 58.01.05.008;
40 CFR 270.11(d) and 264.115]**

9 An independent, registered professional engineer (PE), the M&O contractor, and/or DOE-ID will
10 provide to the DEQ within 60 days of the completion of closure, a certification of closure for each unit in
11 accordance with IDAPA 58.01.05.008 (40 CFR 264.115). The certification will state that each unit was
12 clean closed in accordance with the approved closure plan. Final closure activities will be considered
13 complete upon submittal of supporting documentation to the PE's certification and the certification of
14 closure, and then written acceptance issued by the DEQ. These units will not be closed as a land disposal
15 facility; therefore, a "Notice in Deed" and survey plat are not required.

I-2. Postclosure Plan [IDAPA 58.01.05.012; 40 CFR 264.197(b) and 270.14(b)(13)]

1 Since all hazardous or mixed wastes will be removed prior to closure and any residual hazardous
2 chemical contamination will be removed during closure, a postclosure plan is not required. Also, there
3 have been no releases to the environment that would require a contingent landfill closure plan.

I-3. Postclosure Notices [IDAPA 58.01.05.012; 40 CFR 270.14(b)(14)]

4 Since all hazardous and mixed wastes will be removed prior to closure and any residual
5 hazardous chemical contamination will be removed during closure, postclosure notices are not required.

I-9. State Mechanisms

I-9a. Use of State Required Financial Mechanisms [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.14(b)(18) and 264.149]

I-9b. State Assumption of Responsibility [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.14(b)(18) and 264.150]

6 The INL is owned by the U.S. Department of Energy; therefore, the facility is exempt from
7 providing a closure cost estimate, financial assurance mechanism, meeting liability requirements, or
8 compliance with state mechanisms under IDAPA 58.01.05.012 and 40 CFR 270.14(b)(18) and 264.149
9 and 264.150.