IDAHO
DEPARTMENT OF ENVIRONMENTAL QUALITY

HWMA STORAGE and TREATMENT PERMIT for the

IDAHO NUCLEAR TECHNOLOGY & ENGINEERING CENTER

and the

ACCELERATED RETRIEVAL PROJECT

on the

IDAHO NATIONAL LABORATORY

EPA ID NO. ID4890008952

Effective Date: April 27, 2009
Revision Date: December 7, 2013
Book 3 of 3

Permittee: **Department of Energy (DOE) and DOE-Designated Contractors, Idaho National Laboratory**
Partial Permit Number: EPA ID# ID4890008952

INTRODUCTION AND SIGNATURE PAGE

Pursuant to the Idaho Hazardous Waste Management Act of 1983 (HWMA), Idaho Code §§ 39-4401 *et seq*., and the "*Rules, and Standards For Hazardous Waste*," as amended, IDAPA 58.01.05.000 *et seq*., specifically IDAPA 58.01.05.012 [40 CFR § 270.1(c)(4)], a Partial Permit (for less than the entire facility) is hereby issued to the United States Department of Energy (DOE) and DOE-designated contractor (see Permit Definitions), hereinafter called the Permittee, at the Idaho National Laboratory (INL), to operate a hazardous waste treatment and storage facility at the Idaho Nuclear Technology and Engineering Center, located in Butte County, Idaho.

The Permittee shall comply with all of the terms and conditions of this Partial Permit (Permit) and Attachments 1 through 10 of this Permit. The Permittee shall comply with all applicable state regulations, including IDAPA 58.01.05.004 through 58.01.05.013 [40 Code of Federal Regulations (CFR), Parts 124, 260 through 266, 268, and 270], and as specified in this Permit.

Applicable state regulations are those which are in effect on the date of final administrative disposition of this Permit and any self-implementing statutory provisions and related regulations which, according to the requirements of the Hazardous and Solid Waste Amendments (HSWA), are automatically applicable to the Permittee's hazardous waste management activities, notwithstanding the conditions of this Permit.

This Permit is based upon the administrative record, as required by IDAPA 58.01.05.013 [40 CFR § 124.9]. The Permittee's failure, in the application or during the permit issuance process, to fully disclose all relevant facts, or the Permittee's misrepresentation of any relevant facts, at anytime, shall be grounds for the termination or modification of this Permit and/or initiation of an enforcement action, including criminal proceedings. To the extent there are inconsistencies between the Permit and the attachments the language of the permit shall prevail. The Permittee must inform the Director of the Idaho Department of Environmental Quality (hereinafter referred to as "Director") of any deviation from the permit conditions or changes in the information on which the application is based, which would affect the Permittee's ability to comply or actual compliance with the applicable regulations or permit conditions, or which alters any permit condition in any way. The Director shall enforce all conditions of this Permit, which are designated in this Permit as state requirements. Any challenges of any permit condition that concern requirements shall be appealed to the Director, in accordance with IDAPA 58.01.05.996 and the Idaho Department of Environmental Quality Rules and Regulations 58.05.03.000 *et seq.*, "Rules Governing Contested Cases and Declaratory Rulings."

The United States Environmental Protection Agency (EPA) shall maintain an oversight role of the state-authorized program and in such capacity, shall enforce any permit condition based on state requirements if, in the EPA's judgment, the Director should fail to enforce that permit condition. Any challenges to the EPA-enforced conditions shall be appealed to the EPA, in accordance with 40 CFR § 124.19.

This Permit is effective as of April 27, 2009 and shall remain in effect until April 26, 2019 unless, in accordance with IDAPA 58.01.05.012, the Permit is revoked and reissued [40 CFR § 270.41], modified [40 CFR § 270.42, Appendix I.A.6], terminated [40 CFR § 270.43], or continued [40 CFR § 270.51].

_____ _____

Date

Toni Hardesty, Director
Idaho Department of Environmental Quality

TABLE OF CONTENTS

TABLE OF CONTENTS 2
LIST OF ATTACHMENTS 6
DEFINITIONS 11
ACRONYMS AND ABBREVIATIONS 15
MODULE I - STANDARD PERMIT CONDITIONS 19
I.A. EFFECT OF PERMIT 19
I.B. ENFORCEABILITY 19
I.C. OTHER AUTHORITY 20
I.D. PERMIT ACTIONS 20
I.E. SEVERABILITY 20
I.F. DUTIES TO COMPLY 21
I.G. DUTY TO REAPPLY 21
I.H. PARTIAL-PERMIT EXPIRATION 21
I.I. CONTINUATION OF EXPIRING PERMIT 21
I.J. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE 21
I.K. DUTY TO MITIGATE 22
I.L. PROPER OPERATION AND MAINTENANCE 22
I.M. DUTY TO PROVIDE INFORMATION 22
I.N. INSPECTION AND ENTRY 22
I.O. MONITORING AND RECORDS 23
I.P. REPORTING PLANNED CHANGES 24
I.Q. REPORTING ANTICIPATED NONCOMPLIANCE 24
I.R. CERTIFICATION OF CONSTRUCTION OR MODIFICATION 24
I.S. TRANSFER OF PERMIT 24
I.T. TWENTY-FOUR HOUR REPORTING 25
I.U. OTHER NONCOMPLIANCE 26
I.V. OTHER INFORMATION 26
I.W. SIGNATORY REQUIREMENT 26
I.X. CONFIDENTIAL INFORMATION 27
I.Y. REPORTS, NOTIFICATIONS, AND SUBMISSIONS 27
I.Z. DOCUMENTS TO BE MAINTAINED AT THE FACILITY 27
MODULE II - GENERAL FACILITY CONDITIONS 29
II.A. DESIGN AND OPERATION OF FACILITY 29

II.B. RECEIPT OF HAZARDOUS AND/OR MIXED WASTE AND DEBRIS 29
II.C. WASTE ANALYSIS PLAN 30
II.D. SECURITY 31
II.E. INSPECTION PLAN 31
II.F. TRAINING PLAN 31
II.G. PREPAREDNESS AND PREVENTION 32
II.H. CONTINGENCY PLAN 32
II.I. MANIFEST SYSTEM 33
II.J. RECORD KEEPING AND REPORTING 33
II.K. CLOSURE 35
II.L. EQUIVALENT MATERIALS/INFORMATION 35
MODULE III - CONTAINER STORAGE AND CONTAINER TREATMENT 39
III.A. PERMITTED CONTAINER STORAGE AND CONTAINER TREATMENT AREAS 39
III.B. PERMITTED AND PROHIBITED WASTES IN THE CONTAINER STORAGE AND CONTAINER TREATMENT AREAS 39
III.C. CONDITION OF CONTAINERS 45
III.D. COMPATIBILITY OF WASTE WITH CONTAINERS 45
III.E. MANAGEMENT OF CONTAINERS 45
III.F. IGNITABLE OR REACTIVE WASTES 46
III.G. INCOMPATIBLE WASTE 46
III.H. SECONDARY CONTAINMENT 46
III.I. INSPECTION SCHEDULES AND PROCEDURES 47
III.J. RECORD KEEPING 47
III.K. CLOSURE 47
MODULE IV - WASTE PILES 48
IV.A. PERMITTED WASTE PILE STORAGE AREAS 48
IV.B. DESIGN AND OPERATING REQUIREMENTS 48
IV.C. PERMITTED & PROHIBITED WASTES IN THE WASTE PILE STORAGE AREAS 48
IV.D. IGNITABLE OR REACTIVE WASTES 49
IV.E. INCOMPATIBLE WASTE 49
IV.F. INSPECTION SCHEDULES AND PROCEDURES 49
IV.G. RECORD KEEPING 50

IV.H. CLOSURE 50
MODULE V - TANK SYSTEM STORAGE AND/OR TANK TREATMENT 51
V.A. PERMITTED STORAGE AND TREATMENT TANKS 51
V.B. PERMITTED AND PROHIBITED WASTES IN THE STORAGE AND TREATMENT TANKS 52
V.C. SECONDARY CONTAINMENT 54
V.D. NEW TANK SYSTEMS 55
V.E. TANK SYSTEM OPERATING CONDITIONS 55
V.F. RESPONSE TO LEAKS OR SPILLS 55
V.G. INSPECTION SCHEDULES AND PROCEDURES 57
V.H. RECORD KEEPING AND REPORTING 57
V.I. CLOSURE 58
MODULE VI - MISCELLANEOUS UNIT TREATMENT 59
VI.A. PERMITTED MISCELLANEOUS TREATMENT UNITS 59
VI.B. PERMITTED/PROHIBITED WASTE IN THE MISCELLANEOUS TREATMENT UNITS 59
VI.C. IGNITABLE OR REACTIVE WASTES 62
VI.D. INCOMPATIBLE WASTE 63
VI.E. SECONDARY CONTAINMENT SYSTEMS 64
VI.F. INSPECTION SCHEDULES AND PROCEDURES 64
VI.G. RESPONSE TO LEAKS OR SPILLS 64
VI.H. RECORD KEEPING AND REPORTING 66
VI.I. CLOSURE 67
MODULE VII - CORRECTIVE ACTION 68
VII.A. APPLICABILITY 68
VII.B. STANDARD CONDITIONS 68
VII.C. NOTIFICATION REQUIREMENTS FOR, AND ASSESSMENT OF, NEWLY-IDENTIFIED SOLID WASTE MANAGEMENT UNITS 70
VII.D. RCRA FACILITY INVESTIGATION 72
VII.E. INTERIM MEASURES 73
VII.F. DETERMINATION OF NO FURTHER ACTION 74
VII.G. CORRECTIVE MEASURES STUDY AND IMPLEMENTATION 75
VII.H. REPORTING REQUIREMENTS 76

VII.I. MODIFICATION OF THE CORRECTIVE ACTION SCHEDULE OF COMPLIANCE 76

APPENDIX A - RCRA FACILITY INVESTIGATION 79

APPENDIX B - CORRECTIVE MEASURES STUDY AND IMPLEMENTATION 96

TABLES 106

LIST OF ATTACHMENTS

The following documents are excerpts from the Permittee's Administrative Record, *i.e.*, Volume 18 of the INL Applications, supplemental reports, and other documents contained in the Department's supporting file for the draft permit. The Director, as deemed necessary, modified specific language in the Attachments. These modifications are described in the permit conditions (Modules I through VII), and thereby supersede the language of the original Attachments. If the language of the Permit conflicts with either the attachments or the original application, the language in the Permit shall prevail.These incorporated Attachments are enforceable conditions of this Permit as modified by the specific permit condition.

BOOK 1

ATTACHMENT 1 FACILITY and PROCESS DESCRIPTION, consisting of:

INL PART A PERMIT APPLICATION, of Volume 18, EPA Form 8700-12, 8700-13 A/B RCRA Subtitle C Site Identification Form, Modified Date: November 19, 2010; and EPA Form 8700-23 Hazardous Waste Permit Information Form, Modified Date:August 7, 2013.

FACILITY DESCRIPTION, Section B, of Volume 18, Modified Date: August 7, 2013.

PROCESS DESCRIPTION, Section D including Appendices D-1, D-2, and D-3 of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 1a CPP-1617 FACILITY and PROCESS DESCRIPTION, consisting of:

FACILITY DESCRIPTION, Section B, of Volume 18, Modified Date: August 7, 2013.

PROCESS DESCRIPTION, Section D, of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 2 WASTE ANALYSIS PLAN consisting of:

WASTE ANALYSIS PLAN, Section C (including Tables, Figures and Waste Analysis Plan Appendices), of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 3 SECURITY, consisting of:

PROCEDURES TO PREVENT HAZARDS, Section F, of Volume 18, Modified Date: August 7, 2013.

SECURITY, Section F-1, of Volume 18, Modified Date: August 7, 2013

ATTACHMENT 4 INSPECTIONS, consisting of:

INSPECTIONS SCHEDULE, Section F-2 (Including Appendices F-1 and F-2), of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 5 PERSONNEL TRAINING, consisting of:

PERSONNEL TRAINING, Section H, of Volume 18, Modified Date: November 19, 2010.

ATTACHMENT 6 PROCEDURES TO PREVENT HAZARDS, consisting of:

PREPAREDNESS and PREVENTION DOCUMENTATION, Sections F-3 through F-5, of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 7 CONTINGENCY PLANS, consisting of:

INTEC CONTINGENCY PLAN, Section G, of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 8 CLOSURE PLANS, consisting of:

CLOSURE AND POSTCLOSURE REQUIREMENTS, Section I, of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 8a RADIOACTIVE MIXED WASTE STAGING FACILITY (CPP-1617) CLOSURE PLAN, consisting of:

CLOSURE AND POST CLOSURE REQUIREMENTS, Section I, of Volume 18, Modified Date: August 7, 2013.

ATTACHMENT 9 WASTE PILE DESIGN EXEMPTION, consisting of:

REQUEST FOR WAIVER TO DESIGN AND OPERATING REQUIREMENTS FOR WASTE PILES, of Volume 18, April 27, 2009.

ATTACHMENT 10 PERMIT REVISION LOG, consisting of:

PERMIT REVISION LOG of Volume 18, Modified Date: August 7, 2013

BOOK 2
ATTACHMENT 1 APPENDICES INFORMATION

FACILITY PHOTOS, Book 2 - Appendix 1, of Volume 18, Modified Date: April 27, 2009.

FACILITY DRAWINGS, Book 2 - Appendix 2 of Volume 18, August 7, 2013.

CONCRETE CONSTRUCTION SPECIFICATIONS, Book 2 - Appendix 3 of Volume 18, April 27, 2009.

STRUCTURAL Steel Specification, Book 2 - Appendix 4 of Volume 18, April 27, 2009.

PHYSICAL PROPERTIES AND CHEMICAL RESISTANCE FOR SERIES 300 STAINLESS STEEL, Book 2 - Appendix 5 of Volume 18, April 27, 2009.

PROFESSIONAL ENGINEER'S CERTIFICATION OF SINKS, ULTRASONIC CLEANER, AND HOLDUP/COLLECTION TANKS, Book 2 - Appendix 6 of Volume 18, April 27, 2009.

PROFESSIONAL ENGINEER'S ASSESSMENT OF THE HFLS TANK DESIGN, Book 2 - Appendix 7 of Volume 18, April 27, 2009.

PROFESSIONAL ENGINEER'S ASSESSMENT OF THE HFLS INSTALLATION, Book 2 - Appendix 8 of Volume 18, April 27, 2009.

FDP SLAB TANK CERTIFICATIONS, Book 2 - Appendix 9 of Volume 18, April 27, 2009.

BOOK 3 ARP WASTE STORAGE AND TREATMENT at the RWMC SDA

ATTACHMENT 1 FACILITY and PROCESS DESCRIPTION, consisting of:

INL PART A PERMIT APPLICATION

FACILITY DESCRIPTION, Section B - FACILITY DESCRIPTION and SECTION D - PROCESS DESCRIPTION

ATTACHMENT 2 WASTE ANALYSIS PLAN

ATTACHMENT 3 SECURITY, consisting of:

Security, Section F-1, of Volume 18

ATTACHMENT 4 INSPECTIONS, consisting of:

INSPECTION SCHEDULE, Section F-2 (Including Appendices F-1 and F-2), of Volume 18,

ATTACHMENT 5 PERSONNEL TRAINING, consisting of:

PERSONNEL TRAINING, Section H, of Volume 18,

ATTACHMENT 6 PROCEDURES TO PREVENT HAZARDS, consisting of:

PREPAREDNESS and PREVENTION DOCUMENTATION, Sections F-3 through F-5, of Volume 18,

ATTACHMENT 7 CONTINGENCY PLANS, consisting of:

RWMC CONTINGENCY PLAN, Section G, of Volume 18

ATTACHMENT 8 CLOSURE PLANS, consisting of:

CLOSURE AND POSTCLOSURE REQUIREMENTS, Section I, of Volume 18,

ATTACHMENT 9 PERMIT REVISION LOG, consisting of:

PERMIT REVISION LOG of Volume 18,

BOOK 3 **APPENDICES INFORMATION**

LIST OF APPENDICES:

APPENDIX 1 RWMC FACILITY DRAWINGS

APPENDIX 2 100-YEAR FLOODPLAIN AND 25-YEAR RUNOFF ANALYSES FOR THE RADIOACTIVE WASTE MANAGEMENT COMPLEX AREA AT THE IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY (INEEL/EXT-02-00093)

APPENDIX 3	CCP-AK-INL-005 CENTRAL CHARACTERIZATION PROJECT ACCEPTABLE KNOWLEDGE SUMMARY REPORT FOR ROCKY FLATS IMMOBILIZED ORGANIC LIQUIDS STORED AT THE IDAHO NATIONAL LABORATORY WASTE STREAMS: ID-RE-S3114 AND ID-RF-S3150-A
APPENDIX 4	REPORT 228 PROJECT NO.: 23927, 25580 MANAGING FREE LIQUID IN NEWLY GENERATED WASTE DRUMS
APPENDIX 5	RPT-TRUW-09, REV. 7 ACCEPTABLE KNOWLEDGE SUMMARY FOR FIRST/SECOND STAGE STAGE (BNINW216) ADVANCED MIXED WASTE TREATMENT PROJECT
APPENDIX 6	RPT-TRUW-15, REV. 10 ACCEPTABLE KNOWLEDGE SUMMARY FOR BUILDING 374 SLUDEGE (BNINW218) ADVANCED MIXED WASTE TREATMENT PROJECT

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DEFINITIONS

For purposes of this Permit, the following definitions shall apply:

a. "Application" shall mean the following:
The HWMA/RCRA Part B Permit Application for the Idaho National Engineering and Environmental Laboratory, Volume 18, for the Idaho Nuclear Technology and Engineering Center, Books 1 and 2, Revision 3, dated December 1999 and all DEQ approved Permit Modification Requests as detailed in Attachment 10, Permit Revision Log.

b. "CERCLA" shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986.

c. "Days" shall mean calendar day(s) unless otherwise specified. Any requirement of submittal under the terms of this Permit that would be due on a Saturday, Sunday, or a federal or state holiday shall be due on the following business day.

d. "Debris" means solid material exceeding a 60 mm particle size that is intended for disposal and that is: a manufactured object; or plant or animal matter; or natural geologic material. However, the following materials are not debris: any material for which a specific treatment standard is provided in Subpart D, Part 268, namely lead acid batteries, cadmium batteries, and radioactive lead solids; Process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and Intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by § 268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection.

e. "Department" shall mean the Idaho Department of Environmental Quality.

f. "Director" shall mean the Director of the Department of Environmental Quality, or his designee, or authorized representative.

g. "Discovery (discovered)" shall mean the initial identification of a SWMU or other Area of Concern, which has the potential to release hazardous waste or hazardous waste constituents to the environment.

h. "DOE" shall mean the United States Department of Energy.

i. "Facility" shall mean all contiguous land, structures, other appurtenances, and improvements under the control of the Department of Energy at the Idaho National Laboratory for a total of approximately 890 square miles, or 601,260 acres. The metes

and bounds of the INL are set forth in the November 21, 1989, Federal Register at 54 FR48184.

j. "HSWA" shall mean the Hazardous and Solid Waste Amendments of 1984.

k. "HWMA" shall mean the State of Idaho, Hazardous Waste Management Act of 1983, as amended.

l. "Hazardous and/or Mixed Waste and Debris" shall mean any combination of hazardous waste, mixed waste, hazardous debris, or mixed debris.

m. "Hazardous debris" means debris that contains a hazardous waste listed in 40 CFR Part 261, or that exhibits a characteristic of hazardous waste identified in 40 CFR Part 261.

n. "INL Site Treatment Plan" shall mean the plan prepared by the United States Department of Engergy in 1995, which identifies how DOE proposes to treat INL's mixed waste with existing technologies or develop technologies where technologies do not exist or need modification, as approved by DEQ pursuant to the Federal Facility Compliance Act of 1992, Pub. L. 102-386, 106 Stat. 1505 (1992). It allows for updates at quarterly meetings and annual revisions that involve public comment.

o. "Hazardous Waste" shall mean a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, or chemical, or infectious characteristics may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed [See Public Law 98-616 Section 1004(5)].

p. "Hazardous Waste Constituent" shall mean any constituent identified in Appendix VIII of IDAPA 58.01.05.005 (40 CFR Part 261), or any constituent identified in Appendix IX of IDAPA 58.01.05.008 (40 CFR Part 264).

q. "Hazardous Waste Management Unit" shall mean those operable units subject to the requirements of IDAPA 58.01.05.012 [40 CFR § 270.14-.25].

r. "IDAPA" shall mean the Idaho Administrative Procedures Act, Chapter 52, Title 67, Idaho Code.

s. "INL" shall mean the Idaho National Laboratory, the Facility.

t. "Mixed Debris" shall mean debris that is both hazardous and radioactive.

u. "Mixed Waste" shall mean waste that is both hazardous and radioactive.

v. "Off-Site" shall mean off the "facility" as defined in Subpart i of this section.

w. "Operator" shall mean the DOE Designated Contractor that has operational responsibilities and control of the HWMU. The DOE Designated Contractor, as operator for INTEC, is CH2M-WG Idaho, LLC (CWI). CWI reports to the DOE-ID.

x. "On-Site" shall mean on the "facility" as defined in Subpart i of this section.

y. "Owner" shall mean the United States Department of Energy (DOE).

z. "Permittee" shall mean both the DOE, as owner, and the DOE Designated Contractor.

aa. "Process Vent" means any open-ended pipe or stack that is vented to the atmosphere either directly, through a vacuum-producing system, or through a tank (e.g., distillated receiver, condenser, bottoms receiver, surge control tank, separator tank, or hot well) associated with hazardous waste distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations.

bb. "RCRA" shall mean the Resource Conservation and Recovery Act of 1976, as amended by HSWA in 1984.

cc. "Readily retrievable" shall mean requested documents/information can be procured in hard copy in a time frame that meets the needs of a DEQ inspector or other person needing the data. At a minimum, requested documents must be available at the start of the next business day.

dd. "Release" shall mean any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of hazardous and/or mixed wastes (including hazardous and/or mixed waste constituents) into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous and/or mixed wastes or hazardous and/or mixed waste constituents).

ee. "Remote-Handled (RH) Waste Disposition Project" shall mean the project described in the Site Treatment Plan that collects RH waste from storage areas at the INL site and prepares them for shipment and disposal. This project shall manage RH mixed transuranic (TRU) waste and RH mixed low-level waste (MLLW). There are contaminants within these waste streams that present significant challenges, specifically sodium and sodium/potassium (NA and NaK), which will require treatment prior to disposal.

ff. "Secondary Waste" shall mean waste generated as a result of hazardous waste operations (e.g., PPE, filters, plastic sheeting, etc.).

gg. "Sodium Deactivation and Sodium Distillation" in this document are inclusive for sodium and sodium potassium alloy (NaK)

hh. "Solid Waste Management Unit" (SWMU) shall mean any discernable unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for

the management of solid or hazardous wastes. Such units include any area at a facility at which solid wastes have been routinely and systematically released.

ii. "Storage" shall mean holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

jj. "Treatment Area" shall mean the area where treatment is conducted.

kk. Volume 18 shall mean the *HWMA/RCRA part B Permit Reapplication for the Idaho National Laboratory, Volume 18 – Idaho Nuclear Technology and Engineering Center: Debris Treatment Proces; Holdup and Collection Tanks; CPP-659/-1659 Storage; CPP-666 FDP Cell Container Storage and Slab Tank Storage; CPP1617 Container Storage, EPA ID No. ID4890008952, Books 1 and 2 of 2, December 2008. Additionally Volume 18 shall mean Book 3 - Radioactive Waste Management Center – WMF-1617 Storage and Treatment Units (S01, X02, X99) and WMF-698 Storage Unit (S01).*

NOTE: Books 1-2 of this Volume 18 Pemit are applicable to INTEC storage and treatment units. Book 3 of this Permit is only applicable to RWMC storage and treatment units. However, the Permit Conditions of this Permit are applicable to both the INTEC and RWMC units, unless otherwise specified in the Permit Condition.

All definitions contained in IDAPA 58.01.05.004, .008, and .010 through .013 (40 CFR Parts 260, 264, 266, 268, 270, and 124) are hereby incorporated, in their entirety, by reference into this Permit, except that any of the definitions used above shall supersede any definition of the same term given in IDAPA 58.01.05.000 et seq. Where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

ACRONYMS AND ABBREVIATIONS

ACI	American Concrete Institute
AEA	Atomic Energy Act
AISC	American Institute of Steel Construction
AK	Acceptable Knowledge
ALARA	As Low As Reasonably Achievable (Radiation Exposures)
AMWTP	Advanced Mixed Waste Treatment Project
ANSI	American National Standards Institute
APHA	American Public Health Association
ARP	Accelerated Retrieval Project
ARS	Argon Repackaging Station
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AVAS	Automatic Voice Annunciating System
AWS	American Welding Society
BTU	British Thermal Unit
CBT	Computer Based Training
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFA	Central Facilities Area
cfm	Cubic Feet per Minute
CFR	Code of Federal Regulations
CH-TRU	Contact Handled Transuranic (elements)
CITRC	Critical Infrastructure Test Range Center
CP	Contingency Plan
CPP	Chemical Processing Plant
CWI	CH2M-WG Idaho, LLC.
º	Degrees
D&D	Decontamination and Decommissioning
DEQ	Department of Environmental Quality
DMS	Data Management System
DOE	Department of Energy
DOE-ID	Department of Energy - Idaho Falls Field Office
DOT	Department of Transportation
DQO	Data Quality Objective
DTU	Debris Treatment Unit
DU	Depleted Uranium
EAL	Emergency Action Level
EAM	Emergency Action Manager
EC	Emergency Coordinator
ECC	Emergency Command Center
ED	Emergency Director
EDMS	Electronic Document Management System
EMT	Emergency Medical Technician
ENS	Emergency Notification System
EOC	Emergency Operations Center
EP	Emergency Plan
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act

EPIP	Emergency Plan Implementing Procedures
ERO	Emergency Response Organization
ES&H	Environmental, Safety, and Health
FAST	Flourinel Dissolution Process and Fuel Storage
‘	Feet or Minutes
FD	Fire Department
FDP	Fluorinel Dissolution Process
FFA/CO	Federal Facilities Agreement/Consent Order
FFCA	Federal Facilities Compliance Act of 1992
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FS	Facility Supervisor
GC	Gas Chromatograph
gpm	Gallons per Minute
HDPE	High-density Polyethylene
HEPA	High-Efficiency Particulate Air
HFLS	HEPA Filter Leaching System
HLLWE	High Level Liquid Waste Evaporator
HOC	Halogenated Organic Compound
HP	Health Physics (Or Health Physicist)
HSP	Health and Safety Plan
HSWA	Hazardous and Solid Waste Amendments of 1984
HVAC	Heating, Ventilation, and Air Conditioning
HWMA	Hazardous Waste Management Act of 1983, as amended
HWMU	Hazardous Waste Management Unit
HWN	Hazardous Waste Numbers
“	Inch(es) or Seconds
IDENT	Identification
IDHW	Idaho Department of Health and Welfare
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IRT	Incident Response Team
ISC	Interim Storage Container
IWTS	Integrated Waste Tracking System
LDR	Land Disposal Restrictions
LEPC	Local Emergency Planning Committee
LLW	Low-Level Waste
LWFC	Liquid Waste Facilities Closure
M&O	Management and Operations
MLLW	Mixed Low-Level Waste
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
No.	Number
NRC	Nuclear Regulatory Commission
NWCF	New Waste Calcining Facility
OJT	On-the-Job Training
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PE	Professional Engineer

PEWE	Process Equipment Waste Evaporator
PM	Preventive Maintenance
ppm	Parts per Million
ppmw	Parts per Million weight percent
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RA	Radiological Assay
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RH	Remote Handled
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RWDP	Remote-Handled Waste DispositionProject
RWMC	Radioactive Waste Management Complex
RMWSF	Radioactive Mixed Waste Staging Facility
RWMIS	Radioactive Waste Management Information System
RTC	Reactor Technology Complex
RTR	Real Time Radiography
SAP	Sampling and Analysis Plan
SAT	Systematic Approach to Training
SARA	Superfund Amendments and Reauthorization Act of 1986
SCBA	Self Contained Breathing Apparatus
SDA	Subsurface Disposal Area
SDS	Sodium Distillation System
SOP	Standard Operating Procedure
SPCC	Spill Prevention, Control, and Countermeasures
SPERT	Special Power Excursion Reactor Test
SRC	Shipment Request and Certification
SS	Shift Supervisor
SST	Stainless Steel Tray
STP	INL Site Teratment Plan
SW-846	Test Methods for Evaluating Solid Waste: Physical/Chemical Methods
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TFF	Tank Farm Facility
TLD	Thermoluminescent Dosimeter
TMI	Three-Mile Island
TOC	Total Organic Carbon
TRU	Transuranic
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, and/or Disposal
TSS	Total Suspended Solids
UBC	Uniform Building Code
UL	Underwriters Laboratories
UPS	Uninterruptible Power Supply
USGS	United States Geological Survey
VO	Volatile Organic
VOC	Volatile Organic Compound

WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan
WCC	Warning Communications Center
WDDF	Waste Determination and Disposition Form
WIPP	Waste Isolation Pilot Project
WTS	Waste Technical Specialist

MODULE I - STANDARD PERMIT CONDITIONS

I.A. EFFECT OF PERMIT

The Permittee is allowed to store hazardous and mixed debris and/or waste in accordance with the conditions of this Partial Permit. The Permittee may also treat hazardous and mixed debris in accordance with the conditions of this Partial Permit. Any storage or treatment of hazardous and mixed debris and/or waste in the Hazardous Waste Management Units (HWMU) described herein, not authorized in this Permit, is prohibited.

Pursuant to IDAPA 58.01.05.012 [40 CFR § 270.4], compliance with this Permit generally constitutes compliance, for purposes of enforcement, with the Idaho Hazardous Waste Management Act (HWMA), as amended, except for the requirements not included in this Permit, which become effective by future statute or regulatory changes, to include those requirements promulgated under IDAPA 58.01.05.011 [40 CFR Part 268] restricting the placement of hazardous and/or mixed waste in or on the land. Issuance of this Permit does not convey any property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of state or local law or regulations.

I.A.1. DOE is the owner and is responsible for the activities that include policy, programmatic, funding and scheduling decisions, as well as general oversight.

I.A.2. The DOE Designated Contractor, as operator, is responsible for the day-to-day operations of the assigned permitted units, and for all permitted activities related to the assigned units, for which the DOE Designated Contractor, its agents, employees, or subcontractors have operational control, including waste characterization and handling, monitoring, record keeping, reporting, and contingency planning.

I.B. ENFORCEABILITY

The terms and conditions of this Permit are enforceable pursuant to the HWMA or any other applicable federal, state, or local law. Violations of this Permit may result in civil penalties in accordance with the HWMA (Idaho Code § 39-4414), and the HWMA Civil Penalty Policy.

I.B.1. Any person who knowingly makes any false statement or representation in any application, label, manifest, record, report, permit, or other document filed, maintained or used for the purposes of complying with the provisions of Idaho Code § 39-4415 shall be guilty of a misdemeanor and subject to a fine of not more than ten thousand dollars ($10,000) or to imprisonment not to exceed one (1) year, or to both, for each separate violation or for each day of a continuing violation.

I.C. OTHER AUTHORITY

The Department expressly reserves any right of entry provided by law and any authority to order or perform emergency or other response activities as authorized by law.

I.D. PERMIT ACTIONS

I.D.1. This Permit may be modified, revoked and reissued, or terminated for cause as specified in IDAPA 58.01.05.012 [40 CFR §§ 270.41, 270.42, or 270.43].

I.D.2. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance on the part of the Permittee does not stay the applicability or enforceability of any permit condition.

I.D.3. The Director may modify this Permit when the standards or regulations on which the Permit was based have been changed by statute, amended standards or regulations, or by judicial decision after the effective date of this Permit.

I.D.4. Except as provided by specific language in this Permit or except for the Director's approval of a Class 1 or 2 Permit Modification, in accordance with IDAPA 58.01.05.012 [40 CFR § 270.42(a) and (b)], any modifications which substantially alter the INL or its operation as covered by this Permit shall be administered as a Class 3 Permit Modification prior to such change taking place, in accordance with IDAPA 58.01.05.012 [40 CFR § 270.42(c)].

I.D.5. Within 45 days of a permit modification being put into effect or approved, the Permittee shall provide clean copies of the relevant portions of the Permit and attachments to incorporate the change (if not already reflected/provided in the change pages submitted with the permit modification request), reprint the documents (as necessary), and submit them to the Director.

I.D.6 The Permittee shall ensure that Attachment 10 is current, consistent with Permit Condition I.D.5.

I.E. SEVERABILITY

The provisions of this Permit are severable, and if any provision of this Permit, or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby. Invalidation of any state or federal statutory or regulatory provision, which forms the basis for any condition of this Permit, does not affect the validity of any other state or federal statutory or regulatory basis for said provision.

I.F. DUTIES TO COMPLY

I.F.1. The Permittee shall comply with all conditions of this Permit, except to the extent and for the duration such noncompliance is authorized by an emergency permit issued in accordance with IDAPA 58.01.05.012 [40 CFR § 270.61]. Any permit noncompliance, other than noncompliance authorized by an emergency permit, constitutes a violation of HWMA, and is grounds for enforcement action for permit termination, revocation and reissuance, or modification of the Permit, or denial of a permit renewal application.

I.F.2. Compliance with the terms of this Permit does not constitute a defense to any order issued or any action brought under §§ 3007, 3008, 3013, or 7003 of RCRA [42 U.S.C. §§ 6927, 6928, 6934 and 6973], §§ 104, 106(a), or 107 of CERCLA [42 U.S.C. §§ 9604, 9606(a), or 9607], as amended by the Superfund Amendments and Reauthorization Act of 1986, or any other state or federal law providing for protection of public health or the environment from any imminent and substantial endangerment to human health or the environment.

I.G. DUTY TO REAPPLY

If the Permittee wishes to continue an activity allowed by this Permit after the expiration date of this Permit, the Permittee shall submit a new application a minimum of one hundred eighty (180) calendar days prior to the expiration of this Permit, in accordance with IDAPA 58.01.05.012 [40 CFR §§ 270.10(h) and § 270.30(b)].

I.H. PARTIAL-PERMIT EXPIRATION

Except as renewed, modified, revoked, reissued, or terminated by the Department, this Permit shall automatically expire ten (10) years from the effective date of this Permit.

I.I. CONTINUATION OF EXPIRING PERMIT

This Permit and all conditions herein shall continue in force until the effective date of a new permit, if the Permittee has submitted a timely and complete application, in accordance with IDAPA 58.01.05.012 [40 CFR §§ 270.10, 270.13 through 270.29], and through no fault of the Permittee, the Director has neither issued or denied a new permit under IDAPA 58.01.05.013 [40 CFR § 124.5] on or before the expiration date of this Permit.

I.J. NEED TO HALT OR REDUCE ACTIVITY NOT A DEFENSE

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit, as specified in IDAPA 58.01.05.012 [40 CFR § 270.30(c)].

I.K. DUTY TO MITIGATE

In the event of noncompliance with this Permit, the Permittee shall take all reasonable steps to minimize releases to the environment resulting from the noncompliance, and shall carry out such measures as are reasonable, to prevent significant adverse impacts on human health or the environment, as specified in IDAPA 58.01.05.012 [40 CFR § 270.30(d)].

I.L. PROPER OPERATION AND MAINTENANCE

The Permittee shall, at all times, properly operate and maintain all facilities and controls (and related appurtenances), which are installed or used by the Permittee to achieve compliance with the conditions of this Permit, as specified in IDAPA 58.01.05.012 [40 CFR § 270.30(e)]. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary equipment or similar systems only when necessary, to achieve compliance with the conditions of this Permit.

I.M. DUTY TO PROVIDE INFORMATION

The Permittee shall furnish to the Department and/or the Director, within a reasonable time, any relevant information which the Department and/or the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit, or to determine compliance with this Permit, as specified in IDAPA 58.01.05.012 [40 CFR § 270.30(h)]. The Permittee shall also furnish to the Department and/or the Director upon request, copies of records required to be kept by this Permit.

I.N. INSPECTION AND ENTRY

Pursuant to IDAPA 58.01.05.012 [40 CFR § 270.30(i)], the Permittee shall allow the Department, the Director, and/or their authorized officers, employees, or representatives, upon the presentation of credentials and other documents as may be required by law, to:

I.N.1. Enter, at reasonable times, upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records are kept as required by the conditions of this Permit;

I.N.2. Have access to and copy, at reasonable times, any records that are kept as required by the conditions of this Permit;

I.N.3. Inspect at reasonable times any portion of the Facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

I.N.4. Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the HWMA or RCRA, any substances or parameters at any location.

I.O. MONITORING AND RECORDS

I.O.1. The Permittee shall retain copies of all reports required by this Permit, the certification required by IDAPA 58.01.05.008 [40 CFR § 264.73(b)(9)], and records of all data used to complete the application for this Permit for a period of at least three (3) years from the date of the report, record, or certification unless a longer retention period for certain information is required by other conditions of this Permit.

I.O.2. Pursuant to IDAPA 58.01.05.012 [40 CFR § 270.30(j)(3)], records of monitoring information shall specify:

I.O.2.a. The date(s), exact place, and times of sampling or measurements;

I.O.2.b. The name(s) of individuals who performed the sampling or measurements;

I.O.2.c. The date(s) analyses were performed;

I.O.2.d. The name(s) of individuals who performed the analyses;

I.O.2.e. The analytical techniques or methods used; and

I.O.2.f. The results of such analyses, including the Quality Assurance/Quality Control summary.

I.O.3. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the debris and/or waste to be analyzed shall be the appropriate method from IDAPA 58.01.05.005 [40 CFR Part 261, Appendix I], or an equivalent method approved by the Director. Laboratory methods shall be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods SW-846 (hereinafter, referred to as SW-846), Standard Methods for the Examination of Water and Wastewater (prevailing edition), or other alternate methods approved in this Permit, or an equivalent method in accordance with Permit Condition I.O.4. of this Permit.

I.O.4. The Permittee may substitute analytical methods, which are equivalent or superior to those specifically approved for use in this Permit, in accordance with the following:

I.O.4.a. The Permittee submits to the Director a request for substitution of analytical method(s) specifically approved for use in this Permit. The request shall provide information demonstrating that the proposed method(s), requested to be substituted, are equivalent or superior in terms of sensitivity, accuracy, and precision (i.e., reproducibility); and

I.O.4.b. The Permittee receives a written approval from the Director for the substitution of analytical method(s). Such approval shall not require a permit modification under IDAPA 58.01.05.012 [40 CFR § 270.42].

I.P. REPORTING PLANNED CHANGES

The Permittee shall give notice as soon as possible to the Director of any planned physical alteration or additions to the permitted Facility, in accordance with IDAPA 58.01.05.012 [40 CFR § 270.30(l)(1)].

I.Q. REPORTING ANTICIPATED NONCOMPLIANCE

The Permittee shall give advance notice to the Director of any planned changes in the permitted Facility or activity, which may result in noncompliance, with requirements of this Permit, in accordance with IDAPA 58.01.05.012 [40 CFR § 270.30(l)(2)]. Advance notice shall not constitute a defense for any noncompliance.

I.R. CERTIFICATION OF CONSTRUCTION OR MODIFICATION

I.R.1. The Permittee may not commence storage or treatment of hazardous and mixed debris and/or waste in a new permitted Hazardous Waste Management Unit or in a modified portion of an existing permitted Hazardous Waste Management Unit, except as provided in IDAPA 58.01.05.012 [40 CFR § 270.42], until the Permittee has submitted to the Director by certified mail, express mail, or hand-delivered letter, along with the attachments required under Permit Condition II.A.2., signed by the Permittee and a registered professional engineer certifying that the permitted unit(s) at the INL have been constructed or modified, in accordance with the approved plans and specifications in compliance with this Permit (IDAPA 58.01.05.012 [40 CFR § 270.30(l)]); and,

I.R.2. The Director has reviewed and inspected (if deemed appropriate) the modified or newly constructed unit(s), and has notified the Permittee in writing that the unit(s) were found in compliance with the conditions of this Permit; or

I.R.3. If within fifteen (15) calendar days after the date of submission of the letter, in Permit Condition I.R.1. of this Permit, the Permittee has not received notice from the Director of the intent to inspect, prior inspection is waived; and the Permittee may commence storage of hazardous and/or mixed waste and debris or treatment of hazardous and mixed debris in the permitted unit(s), certified in accordance with Permit Condition I.R.1. of this Permit.

I.S. TRANSFER OF PERMIT

This Permit shall be transferred to a new owner or operator only if it is modified or revoked and reissued, pursuant to IDAPA 58.01.05.012 [40 CFR § 270.40]. Prior to transferring ownership or operation of the Facility during its operating life, the Permittee shall notify the new owner or operator, in writing, of the requirements of IDAPA 58.01.05.008 and 58.01.05.012 [40 CFR Parts 264 and 270] and this Permit.

I.T. TWENTY-FOUR HOUR REPORTING

I.T.1. In accordance with IDAPA 58.01.05.012 [40 CFR § 270.30(l)(6)], the Permittee shall verbally report to the Idaho State Communications Center any noncompliance with this Permit which may endanger human health or the environment, within twenty-four (24) hours from the time the Permittee becomes aware of the noncompliance, including:

I.T.1.a. Noncompliance with Permit Condition II.A.1. of this Permit; or

I.T.1.b. Information concerning a release of any mixed waste that may endanger public drinking water supplies; or

I.T.1.c. A release or discharge of mixed waste, or of a fire or explosion at the INL that could threaten human health or the environment outside the Facility.

I.T.2. The description of the occurrence and its cause shall, at a minimum, include:

- Name, title, and telephone number of the individual reporting;
- Name, address, and telephone number of the owner or operator;
- Name, address, and telephone number of the Facility;
- Date, time, and type of incident;
- Location and cause of the accident;
- Name and quantity of materials involved;
- The extent of injuries, if any;
- An assessment of actual or potential hazards to the environment and human health, where this is applicable;
- Description of any emergency action taken to minimize possible threat(s) to human health and the environment;
- Estimated quantity and disposition of recovered material that resulted from the incident; and,
- Any other information necessary to evaluate the situation fully, and to develop an appropriate course of action.

I.T.3. Within five (5) calendar days after the Permittee is required to provide verbal notification, as specified in Permit Condition I.T.2. of this Permit, the Permittee shall provide to the Director a written submission.

I.T.3.a. The written submission shall include, but not be limited to, the following:

- Name, address, and telephone number of the individual reporting;
- A description (include cause, location, extent of injuries, if any, and an assessment of actual or potential hazard(s) to the environment and human health outside the INL, where this is applicable) of the incident (noncompliance and/or release);
- The period(s) in which the incident (noncompliance and/or release) occurred (including exact dates and times);
- Whether the results of the incident remain a threat to human health and the environment (whether the noncompliance has been corrected and/or the release has been adequately remediated); and

- If not, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance, and/or the steps taken or planned to adequately remediate the release.

I.T.4. The Permittee need not comply with the five (5) calendar day, written notice requirement if the Director waives the requirement and the Permittee submits a written report, within fifteen (15) calendar days from the time the Permittee is required to provide verbal notification, as specified in Permit Condition I.T.1. of this Permit.

I.T.5. If the facility stops operations in response to a fire, explosion, or release, a report must be submitted within 15 days that includes the following information:

- Name, title, and telephone number of the individual submitting the report;
- Date, time and type of incident;
- Location and suspected cause of the incident;
- Name and quantity of materials involved, if any;
- Any leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment;
- All changes made to the operation of the facility to ensure that the event does not recur.

I.T.5.a. If the required information is provided electronically or verbally within 24 hours of the incident, DEQ, at its' discretion, may provide a written waiver of this reporting requirement.

I.U. OTHER NONCOMPLIANCE

The Permittee shall report all other instances of noncompliance not otherwise required to be reported, in accordance with Permit Condition I.T. of this Permit, on a semi-annual basis from the effective date of the Permit. (Reports shall be due on February 1 and August 1 of each year.) The reports shall contain the information, as applicable, listed in Permit Condition I.T. of this Permit. Reporting shall not constitute a defense for any noncompliance.

I.V. OTHER INFORMATION

Whenever the Permittee becomes aware that any relevant information was omitted in the Permit Application or incorrectly submitted in the Permit Application, or in any report to the Director, the Permittee shall promptly submit such facts or information to the Director in accordance with Permit Condition I.Y. of this Permit.

I.W. SIGNATORY REQUIREMENT

All applications, reports, or information requested by or submitted to the Director shall be signed and certified, in accordance with IDAPA 58.01.05.012 [40 CFR § 270.11].

I.X. CONFIDENTIAL INFORMATION

Pursuant to Title 9, Chapter 3, of the Idaho Code, IDAPA 58.01.05.012 [40 CFR § 270.12], or any other applicable federal, state, or local law, the Permittee may assert a claim of confidentiality regarding any information required to be submitted pursuant to this Permit. The Department shall determine whether said information is exempt from disclosure, pursuant to applicable law.

I.Y. REPORTS, NOTIFICATIONS, AND SUBMISSIONS

All reports, notifications, or other submissions, which are required by this Permit and IDAPA 58.01.05.012 [40 CFR § 270.5], shall be sent or given to the Director in duplicate by certified mail, express mail, or hand-delivered to:

Director
c/o Hazardous Waste Program Manager
Department of Environmental Quality
1410 North Hilton
Boise, Idaho 83706-1255
Telephone No. (208) 373-0502

Twenty-four (24) hour telephone number 1-800-632-8000

The addresses and telephone numbers listed above are current as of the effective date of this Permit and may be subject to change.

I.Z. DOCUMENTS TO BE MAINTAINED AT THE FACILITY

I.Z.1. The Permittee shall maintain until closure is completed and certified by an independent, registered, professional engineer, the following documents and amendments and revisions or modifications to these documents:

I.Z.1.a. A complete copy of this Permit including Attachments and Tables.

I.Z.1.b. Waste Analysis Plan(s) for each HWMU of this Permit, as required by IDAPA 58.01.05.008 [40 CFR § 264.13] and this Permit.

I.Z.1.c. Operating Record, as required by IDAPA 58.01.05.008 [40 CFR § 264.73] and this Permit.

I.Z.1.d. Inspection Procedures, Schedules, Logs, and Records for each HWMU of this Permit, as required by IDAPA 58.01.05.008 [40 CFR §§ 264.15(b)(2), 264.73(b)(5)] and this Permit.

I.Z.1.e. Personnel training requirements for each position, and personnel training records for each individual involved with management or treatment of mixed and hazardous waste at each HWMU in this Permit, as required by IDAPA 58.01.05.008 [40 CFR § 264.16(d)] and this Permit.

I.Z.1.f. The Site-wide Contingency Plan and Contingency Plan(s) for each HWMU of this Permit, as required by IDAPA 58.01.05.008 [40 CFR § 264.53(a)] and this Permit.

I.Z.1.g. Closure Plan(s) for each HWMU of this Permit, as required by IDAPA 58.01.05.008 [40 CFR § 264.112(a)] and this Permit.

I.Z.2. Documents as specified by this permit may be maintained at INTEC records storage, RWMC records storage, records storage in Idaho Falls, and/or Electronic Document Management System [EDMS] Records Vault in a readily retrievable manner. These documents may be maintained solely using an electronic format, as long as the documents are readily retrievable to obtain a printed copy.

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MODULE II - GENERAL FACILITY CONDITIONS

II.A. DESIGN AND OPERATION OF FACILITY

II.A.1. The Permittee shall construct, maintain and operate all permitted Hazardous Waste Management Units included in this partial permit to minimize the possibility of a fire, explosion, or any unplanned, sudden or non-sudden release of hazardous and mixed waste or hazardous and mixed waste constituents to the air, soil, groundwater, or surface water which could threaten human health and/or the environment.

II.A.2. The Permittee shall construct and/or maintain all Hazardous Waste Management Units in accordance with the approved designs, specifications, and maintenance schedules that are included as Attachments 1 through 9 of this Permit. Minor deviations from the approved designs or specifications, necessary to accommodate proper construction and the substitution of equivalent or superior materials or equipment, shall be noted on the as-built drawings, and the rationale for those deviations shall be provided in narrative form. After completion of construction or modification of each new Hazardous Waste Management Unit, the Permittee shall submit final as-built drawings and the narrative report to the Director as part of the construction certification documentation specified in Permit Condition I.R.

II.A.3. The Permittee shall comply with all applicable requirements of the Land Disposal Restrictions of IDAPA 58.01.05.011 [40 CFR § 268].

II.B. RECEIPT OF HAZARDOUS AND/OR MIXED WASTE AND DEBRIS

II.B.1. At the INTEC only (not applicable to the RWMC units identified in Book 3 of this Permit), the Permittee shall not accept hazardous and/or mixed waste and debris generated off-Site that has not been verified in accordance with the waste analysis plan requirements of IDAPA 58.01.05.008 [40 CFR § 264.13(c)].

II.B.2. At the INTEC only (not applicable to the RWMC units identified in Book 3 of this Permit), the Permittee may receive hazardous and/or mixed waste and debris as follows:

II.B.2.a. The Permittee shall only receive hazardous waste and hazardous debris in containers with a design capacity smaller than 0.1 m^3, or

II.B.2.b. The Permittee shall only receive hazardous waste and hazardous debris that is exempt from IDAPA 58.01.05.008 (40 CFR 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

II.B.3. The Permittee may accept hazardous and/or mixed waste and debris generated within the INL Facility boundaries in accordance with the Part A in Attachment 1 of this Permit, and the waste acceptance criteria in Attachment 2 of this Permit.

II.B.4. At the INTEC only (not applicable to the RWMC units identified in Book 3 of this Permit), the Permittee may receive off-Site waste as follows:

II.B.4.a. The Permittee shall only receive off-Site waste in accordance with the Part A in Attachment 1 of this Permit, and the waste acceptance criteria in Attachment 2 of this Permit.

II.B.4.b. The Permittee shall receive and verify off-Site waste in accordance with IDAPA 58.01.005.008 [40 CFR § 264.13(a)(4)], and Attachments 1 and 2 of this Permit.

II.B.4.c. The Permittee may receive off-Site wastes, which have been previously verified at the generator's site, in accordance with Attachments 1 and 2 of this Permit.

II.B.5. At the INTEC only (not applicable to the RWMC units identified in Book 3 of this Permit), the Permittee may receive shipments from DOE-related, conditionally exempt small quantity generators provided the Permittee accepts responsibility as the generator of the waste.

II.B.6. At the INTEC only (not applicable to the RWMC units identified in Book 3 of this Permit), when the Permittee is to receive hazardous and/or mixed waste from an off-site source (except where the Permittee is also the generator), the Permittee shall inform the generator (in writing) that the Permittee has the appropriate permit(s) for, and shall accept, the waste the generator is shipping.

II.B.7. At the INTEC only (not applicable to the RWMC units identified in Book 3 of this Permit), the Permittee shall keep copies of the written notices, and all other documents associated with acceptance of off-site mixed and hazardous waste streams required by Permit Condition II.B.4.a.

II.B.8. The Permittee may reject, and return to the generator, entire shipments or single containers of waste that are not in accordance with the waste characterization, the manifest, or the specific container requirements specified in Attachment 2 of this Permit.

II.C. WASTE ANALYSIS PLAN

The Permittee shall comply with the procedures and requirements of the Waste Analysis Plan (Attachment 2) provisions, in accordance with IDAPA 58.01.05.008 and 58.01.05.011 [40 CFR §§ 264.13 and 268.7] and as follows:

II.C.1. The Permittee shall collect representative samples of waste to be analyzed in accordance with IDAPA 58.01.05.005, 58.01.05.008, and 58.01.011 (40 CFR Part 261, Appendix I and 40 CFR §§ 264.13(a) and 268.7), and as specified in Attachment 2 of this Permit.

II.C.2. At a minimum, the Permittee shall maintain proper functional instruments, use approved sampling and analytical methods, verify the validity of sampling and analytical procedures, and perform correct calculations. If the Permittee uses a contract laboratory to perform analyses, the Permittee shall notify the laboratory in writing of the waste analysis conditions it is to meet, in order that waste analysis conditions of the Permit are met.

II.C.3. The Permittee may use process knowledge (i.e., Acceptable Knowledge) for characterization as specified in Attachment 2 of this Permit. AK documentation shall be maintained in an auditable record (i.e., Operating Record) and confirmed using visual examination.

II.D. SECURITY

The Permittee shall comply with the Security Provisions of IDAPA 58.01.05.008 [40 CFR § 264.14] and the INL site-specific security measures described in Attachment 3 of this Permit.

II.E. INSPECTION PLAN

The Permittee shall comply with the inspection provisions of IDAPA 58.01.05.008 [40 CFR § 264.15] and as follows:

II.E.1. The Permittee shall maintain and retain the Inspection Procedures, Inspection Schedules, Inspection Logs and Records required by Permit Condition II.E., in accordance with Permit Condition I.Z.1.d. and I.Z.2.

II.E.2. The Permittee shall comply with the Inspection Schedules and Logs for the INL, as included in Attachment 4 of this Permit.

II.E.3. The Permittee shall remedy, as required by IDAPA 58.01.05.008 [40 CFR § 264.15(c)], any deterioration or malfunction discovered by an inspection.

II.E.4. The Permittee shall record inspections on the Inspection Logs and Inspection Log Sheets, required by Permit Condition II.E., as specified in IDAPA 58.01.05.008 [40 CFR § 264.15(d)]. At a minimum, the following information shall be recorded:

- The date and time of the inspection,
- The name of the inspector,
- A notation of the observations made, and the date and nature of any repairs or other remedial actions.

II.F. TRAINING PLAN

II.F.1. The Permittee shall comply with the INL Personnel Training Plan, as included in Attachment 5 of this Permit and in accordance with IDAPA 58.01.05.008 [40 CFR § 264.16], until each HWMU is fully closed and certified.

II.F.2. The Permittee shall ensure that all personnel who handle hazardous/mixed waste are trained in hazardous/mixed waste management, safety, and emergency procedures, as applicable to their job description, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.16] and the Personnel Training Plan included in Attachment 5 of this Permit.

II.F.3. The Permittee shall maintain the Personnel Training Plan in Attachment 5 of this Permit and documentation of personnel training received, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.16(e)] and Permit Condition I.Z.1.e. and I.Z.2. of this Permit.

II.G. PREPAREDNESS AND PREVENTION

The Permittee shall comply with the Preparedness and Prevention Provisions of IDAPA 58.01.05.008 [40 CFR § 264 Subpart C] and as follows:

II.G.1. The Permittee shall operate the permitted INTEC/RWMC Units so as to minimize the possibility of a fire, explosion or sudden or non-sudden releases to the air or soil, which could threaten human health or the environment, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.31] and Attachment 6 of this Permit.

II.G.2. At a minimum, the Permittee shall perform preventative maintenance and repair of the INL emergency equipment, safety devices, and miscellaneous equipment included in the attachments of this Permit, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.33] and the manufacturer's specifications. The Permittee shall maintain records of these preventative maintenance and repair activities on this equipment and schedules, reflecting minimum and planned performance of these preventative maintenance activities in the Operating Record at the Facility, in accordance with Permit Condition I.Z.1.c. and I.Z.2. of this Permit.

II.G.3. The Permittee shall maintain access to the communications and alarm systems, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.34] and Attachment 6 of this Permit.

II.G.4. The Permittee shall maintain arrangements with state and local authorities, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.37] and Attachment 7 of this Permit. If state or local officials refuse to enter into preparedness and prevention arrangements with the Permittee for a given HWMU, the Permittee must document this refusal in the Operating Record for the excluded unit.

II.G.5. The Permittee shall maintain the aisle space necessary to allow the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.35] and Attachment 6 of this Permit.

Due to restricted personnel and emergency equipment access and the waste type stored, it is not necessary to maintain adequate aisle space in Room 205 (Hot Sump Tank Removal and Access Cell), Room 216 (Filter Cell/Valve Cubicle), and Room 306 (Equipment Decon Storage Room) in Building CPP-659/-1659 and the FDP Cell in Building CPP-666.

II.H. CONTINGENCY PLAN

The Permittee shall comply with the Contingency Plan matrix provisions of IDAPA 58.01.05.008 [40 CFR § 264 Subpart D] and as follows:

II.H.1. The Permittee shall comply with the Contingency Plan included in Attachment 7 of this Permit.

II.H.2. The Permittee shall review and amend, as necessary, the Contingency Plan, pursuant to IDAPA 58.01.05.008 and IDAPA 58.01.05.012 (40 CFR § § 264.54 and 270.42) and Permit Conditions I.D.4. and I.D.5. of this Permit within fourteen (14) calendar days of the following events:

II.H.2.a. This Permit is revised;

II.H.2.b. The plan fails in an emergency;

II.H.2.c. The Permittee changes the INL design, construction, operation, maintenance, or other circumstances in a way that materially increases the potential for fires, explosions, or releases of mixed waste or mixed waste constituents, or changes the response necessary in an emergency;

II.H.2.d. The list of emergency coordinators changes; or

II.H.2.e. The list of emergency equipment changes.

II.H.3. The Permittee shall assure that a trained Emergency Coordinator or equivalent is available at all times in case of an emergency, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.55] and Attachment 7 of this Permit.

II.H.4. The Permittee shall submit a copy of the Contingency Plan, and all revisions to the plan, to all local police departments, fire departments, hospitals, and state and local emergency response teams that may be called upon to provide emergency services, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.53(b)] and Attachment 7 of this Permit.

II.H.5. The Permittee shall document in the Facility Operating Record the time, date, and details of any incident that requires activating the Contingency Plan. Within 15 days after the incident, the Permittee shall submit a written report on the incident to the Director, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.56(j)] and Attachment 7 of this Permit. Said report shall include, at a minimum, the items in Permit Condition I.T.3.a. of this Permit.

II.I MANIFEST SYSTEM

The Permittee shall comply with the manifest requirements of IDAPA 58.01.05.008 [40 CFR § 264, Subpart E].

II.J. RECORD KEEPING AND REPORTING

In addition to the record keeping and reporting requirements specified elsewhere in this Permit, the Permittee shall comply with the following:

II.J.1. The Permittee shall maintain a written Operating Record at the INL, in accordance with Permit Condition I.Z.1.c., I.Z.2., and IDAPA 58.01.05.008 [40 CFR § 264.73(a)], for all records identified in IDAPA 58.01.05.008 [40 CFR § 264.73(b)(1) through (b)(16)].

II.J.2. The Permittee shall, by March 1 of each year, submit to the Director a waste minimization certification, pursuant to IDAPA 58.01.05.008 [40 CFR 264.73(b)(9)], that the Permittee has a program in place to reduce the volume and toxicity of hazardous waste that he generates to the degree determined by the Permittee to be economically practicable; and the proposed method of treatment, storage, or disposal is that most practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment.

II.J.3. The Permittee shall, by March 1 of each even numbered year, submit to the Director a biennial report covering the Facility activities pursuant to IDAPA 58.01.05.008 [40 CFR 264.75(a) through (j)].

II.J.4. The Permittee shall conduct and complete a source reduction evaluation review and written plan in accordance with the procedures and format provided in the "EPA Waste Minimization Opportunity Assessment Manual" (EPA/626/7-88/003). The review and plan shall be completed in compliance with Permit Condition II.J.5. of this Permit and include, at a minimum, the following general operating and reporting requirements:

II.J.4.a The Permittee shall submit to the Director detailed descriptions of any programs the Permittee may have to assist generators of hazardous waste in reducing the volume or quantity and toxicity of wastes they produce.

II.J.4.b The Permittee shall submit the following information to the Director and shall submit revisions or changes to the Director within thirty (30) calendar days after those revisions or changes:

II.J.4.b.1. A list of generators who received information from the Permittee according to Permit Condition II.J.4.a of this Permit.

II.J.4.b.2. A list of generators who used the Permittee's contractor services on a waste minimization program.

II.J.4.b.3. A list of generators known to the Permittee who have a waste minimization program in place and any known results (i.e. has there been a reduction in wastes submitted for treatment, recycling or disposal).

II.J.5. A waste minimization review and plan shall be submitted to the Director by March 31, 2011 and every four (4) years thereafter, in accordance with Permit Condition II.J.4. of this Permit. The review and plan shall address the entire INL, unless otherwise approved by the DEQ.

II.J.6. All reports, notifications, applications, or other materials, required to be submitted to the Director, shall be submitted in accordance with Permit Condition I.Y. of this Permit.

II.K. CLOSURE

II.K.1. The Permittee shall meet the general closure performance standard, as specified in IDAPA 58.01.05.008 [40 CFR § 264.111], during closure of all permitted Hazardous Waste Management Units at the INTEC and RWMC.

II.K.2. The Permittee shall perform a hazardous waste determination on all solid waste generated during closure including, but not limited to, contaminated process equipment, building components, tanks and ancillary equipment, scrap metal, etc., in accordance with IDAPA 58.01.05.006 [40 CFR § 262.11] and Attachment 2 of this Permit.

II.K.3. The Permittee shall amend the Closure Plans, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.112(c)] and Attachments 8 and 8a of this Permit whenever necessary.

II.K.4 The Permittee shall commence closure of the RWMC Hazardous Waste Management Units, in accordance with IDAPA 58.01.05.08 [40 CFR 264.113(a)], no later than ninety (90) calendar days after the completion of waste storage and treatment activities, as specified in Book 3 Attachment 8.

II.L. EQUIVALENT MATERIALS/INFORMATION

II.L.1. If certain equipment, materials, and administrative information (such as names, phone numbers, addresses) are specified in this Permit, the Permittee is hereby authorized to use equivalent or superior items. Use of such equivalent or superior items shall not be considered a modification of this Permit, but the Permittee shall place in the Operating Record (prior to the institution of such revision) the revision, accompanied by a narrative explanation, and the date the revision became effective. The Director may judge the soundness of the revision during inspections of the Facility, and take appropriate action. The format of tables, forms, and figures are not subject to the requirements of this Permit, and may be revised at the Permittee's discretion.

II.L.2. If the Department determines that the substitution was not equivalent to the original, it will notify the Permittee that the Permittee's claim of equivalency has been denied, the reasons for the denial, and that the original material or equipment must be used. If the product substitution is denied, the Permittee shall comply with the original approved product specification, find an acceptable substitution, or apply for a permit modification, in accordance with Permit Condition I.D.4.

II.M. The Permittee shall comply with all applicable Land Disposal Restriction (LDR) requirements set forth in IDAPA 58.01.05.011 [40 CFR § 268] for all non-WIPP destined waste and the INL Site Treatment Plan (STP) (10/31/95), as applicable and amended.

II.N. AIR EMISSION STANDARDS FOR PROCESS VENTS

II.N.1. The CPP-666 Sodium Distillation System (SDS) is located in Room SB-8. The SDS off-gas is vented to the FDP Cell, through the FDP Cell Off-Gas and CPP-666 HEPA filters, and discharged to the CPP-666 stack through a process vent, therefore, IDAPA 58.01.05.008 [40 CFR § 264.1031] is applicable.

II.N.2. The Permittee shall determine the applicability of IDAPA 58.01.05.008 [40 CFR Part 264 Subpart AA] by documenting the total organic concentration in all feed sources to the SDS.

II.N.2.a. If the SDS manages only mixed hazardous waste with total organic concentrations less than 10 ppmw, then IDAPA 58.01.05.008 [40 CFR Part 264 Subpart AA] does not apply.

II.N.2.b. If the SDS manages mixed hazardous waste with total organic concentrations greater than or equal to 10 ppmw, then IDAPA 58.01.05.008 [40 CFR Part 264 Subpart AA] applies.

II.N.3. The Permittee shall document compliance with the IDAPA 58.01.05.008 [40 CFR Part 264 Subpart AA] standards by:

II.N.3.a. Reducing the input total organic concentrations to the SDS to less than 10 ppmw for all wastes processed; or

II.N.3.b. Reducing total organic emissions from all affected process vents at INL below 1.4 kg/h (3.0 lb/hr) and 2.8 Mg/yr (3.1 tons/yr); or

II.N.3.c. Reducing, by means of a control device, total organic emissions from all affected process vents at INL by 95 weight percent.

II.N.4. The Permittee shall record the following information in the Facility Operating Record, in accordance with IDAPA 05.01.008 [40 CFR § 264.1035]:

II.N.4.a. Up-to-date documentation of the applicability and/or compliance with the process vent standards in Permit Conditions II.N.3., including:

II.N.4.a.1. Information and data identifying all affected process vents, annual throughput and operating hours of each affected unit, estimated emission rates for each affected vent and for the overall facility [i.e., the total emissions for all affected vents at the facility, and the approximate location within the facility of each affected unit (e.g., identify the hazardous waste management units on a facility plot plan)].

II.N.4.a.2. Information and data supporting determinations of vent emissions and emission reductions achieved by add-on control devices based on engineering calculations or source tests. For the purpose of determining compliance, determinations of vent emissions and emission reductions must be made using operating parameter values (e.g., temperatures, flow rates, or vent stream organic compounds and

concentrations) that represent the conditions that result in maximum organic emissions, such as when the waste management unit is operating at the highest load or capacity level reasonably expected to occur. If any action is taken (e.g., managing a waste of different composition or increasing operating hours of affected waste management units) that would result in an increase in total organic emissions from affected process vents at the facility, then a new determination is required.

II.N.5. Records of the monitoring, operating, and inspection information, required by Permit Condition II.N.4., shall be maintained in accordance with Permit Conditions I.Z.1.c. and I.Z.2.

II.N.6. Information and data used to determine whether any other INL process vents are subject to the requirements of IDAPA 58.01.05.008 [40 CFR Part 264 Subpart AA] shall be kept in the Operating Record.

II.N.6.a. The Operating Record shall be updated within thirty (30) days of a change in INL operations that potentially involve regulated process vents.

II.N.6.b. INL process vent data shall be reviewed at least annually for compliance with the IDAPA 58.01.05.008 [40 CFR §§ 264.1030 and .1035].

II.N.7. The Permittee shall modify this permit as necessary to ensure compliance with Permit Condition II.N.3. whenever:

II.N.7.a. The Permittee identifies additional hazardous waste process vents; or

II.N.7.b. The Permittee determines that the SDS is subject to the requirements of IDAPA 58.01.05.008 [40 CFR Part 264 Subpart AA].

II.O. COMPLIANCE SCHEDULE

II.O.1 TREATMENT PROCESS FOR REMOTE-HANDLED (RH) WASTE

II.0.1.a. The permittee shall prepare and submit to the Department a report of the known inventory of Remote-Handled Waste Disposition Project (RWDP) waste stored at the INL within six (6) months of the revision date of this permit. This information shall be updated annually, each November 15 via the Annual Update to the INL Site Treatment Plan (STP) and the Annual STP Report. This information will include the following information, at a minimum:

II.0.1.a.i By waste stream

- Site Treatment Plan ID
- Site Treatment Plan Waste Stream Name
- Waste Type (low-level or transuranic)
- Detailed Waste Description

II.O.1.a.ii By container:

- Generation Date

- Container Description
- Number of Containers
- Stored Volume (gallons)
- Stored Weight (pounds)
- Expected Generation (gallons/year)
- Generation Duration (years)

II.O.1.b. The Permitee shall take all necessary steps to maintain continuous RWDP operations at INTEC in compliance with the provisions of this permit until the waste backlog has been eliminated. Waste operations activities shall be those actions necessary to prepare, characterize, store, treat, and package RH mixed or hazardous waste for off-site disposal. Routine repair, replacement and maintenance shall not be deemed operations. A backlog treatment schedule for RWDP waste shall be provided as required through the STP.

II.O.1.c. If, upon continued technical evaluation of the RWDP waste stored at the INL, the Permittee identifies waste that cannot be treated within the existing facilities, the Permittee shall provide to the Department an alternatives analysis that specifies options for performing treatment of the waste within six (6) months of identification of such waste. If the alternatives analysis identifies that a Permit Modification Request (PMR) is necessary, the Permittee shall submit a PMR for treatment of the waste within 18 months of identification,

II.O.d. The Permittee shall submit to the Department exery six (6) months, in conjunction with the STP quarterly meetings, a report summarizing RWDP operations over the previous six (6) months and the schedule for the following six (6) months.

II.O.e. If for any reason operations are interrupted for a period of greater than 6 months, prior to completing treatment of the RWDP backlog identified in the STP, the Department shall be notified in writing, provided a justification for the interruption, and given a schedule for resuming operations.

MODULE III – CONTAINER STORAGE AND CONTAINER TREATMENT

III.A. PERMITTED CONTAINER STORAGE AND CONTAINER TREATMENT AREAS

Subject to the terms of this Permit, the Permittee may store and treat hazardous and mixed debris and/or hazardous and mixed waste, as specified in Permit Condition III.B. of this Permit, in the container storage and treatment areas of the following buildings:

III.A.1. The New Waste Calcine Facility (NWCF), Building CPP-659/1659. CPP-659 is a six-level building constructed of steel-reinforced concrete, and is approximately 250' long by 145' wide. CPP-1659 is annexed to the west wall of CPP-659 and consists of a single, ground-level floor measuring approximately 56' 7" long by 34' wide. The building is further described in Book 1, Attachment 1 of this Permit.

III.A.2. The Fluorinel Dissolution Process and Fuel Storage (FAST) Facility, Building CPP-666. The FAST is a multiple-level, steel-reinforced concrete structure approximately 571' long by 196' wide. The building is further described in Book 1, Attachment 1 of this Permit.

III.A.3. The Radioactive Mixed Waste Staging Facility (RMWSF) consists of a 40 ft x 20 ft (CPP-1617) metal building and a 227 ft x 280 ft partially paved, fenced external storage area. The RMWSF and Building CPP-1617 are further described in Book 1, Attachment 1a of this Permit.

III.A.4. The Radioactive Waste Management Complex (RWMC) Building WMF-698 is an ARP storage enclosure and is a tension-membrane building, measuring 130 ft x 160 ft with a 20-ft-minimum interior clearance at the eaves. The building is further described in Book 3, Attachment 1.

III.A.5. RWMC Building WMF-1617 (also known as ARP V) is a free-standing single large tension-membrane building which covers the exhumation footprint in Pit 9. This enclosure measures approximately 380 ft x 165 ft and 53 ft in height at the tallest point. The airlock enclosure is 88 ft. x 120 ft. The building is further described in Book 3, Attachment 1.

III.A.6 The Trailer Storage Areas at WMF-1617, WMF-1619, and WMF-1621 are external storage areas to the buildings listed. These areas are further described in Book 3, Attachment 1.

III.B. PERMITTED AND PROHIBITED WASTES IN THE CONTAINER STORAGE AND CONTAINER TREATMENT AREAS

III.B.1. <u>Container Storage Units in the NWCF</u>

The Permittee may provide container storage in the NWCF for those wastes identified for container storage in Book 1, Attachment 1 of this Permit, and as follows:

III.B.1.a. Storage of hazardous and/or mixed waste and debris is authorized as follows:

III.B.1.a.(1) The Permittee shall only store hazardous waste and hazardous debris in containers with a design capacity smaller than 0.1 m^3, or

III.B.1.a.(2) The Permittee shall only store hazardous waste and hazardous debris that is exempt from IDAPA 58.01.05.008 (40 CFR 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

III.B.1.b. Waste must meet the unit-specific waste acceptance criteria in Attachment 2 of this Permit.

III.B.1.c. The maximum permitted capacity for container storage in the NWCF is 541,578 gallons, with the maximum waste volume for each room set as follows:

ROOM	MAXIMUM (S01) STORAGE VOLUME
Room 205 – Hot Sump Tank Removal & Access Cell	54,200 gallons
Room 206 – Adsorber Cell	12,400 gallons
Room 207 – Off-Gas Cell	11,600 gallons
Room 214 – Calciner Cell	9,800 gallons
Room 215 – Blend & Hold Cell	8,200 gallons
Room 216 – Filter Cell/Valve Cubicle	10,300 gallons
Room 218 – Manipulator (PaR) Parking Area	3,200 gallons
Room 306 – Equipment Decontamination Storage Room	4,800 gallons
Room 308 – Remote Decon Cell	5,800 gallons
Room 309 – Filter Handling Cell	4,800 gallons
Room 323 – Crane Maintenance & Transfer Area	3,400 gallons
Room 326 – Transfer Area	1,300 gallons
Room 415 – Low Level Decontamination Room	23,500 gallons
Room 416 – Shielded Storage Room	5,300 gallons
Room 417 – Vehicle Entry Way	78,200 gallons
Room 418 – Equipment Decontamination Room	166,700 gallons
Room 419 – Transfer Room	26,400 gallons
Room 421 – Decontamination Room	10,039 gallons
Room 422 – Decontamination Room	10,039 gallons
Room 428 – Crane Maintenance Area	4,400 gallons
CPP-1659 – Contaminated Equipment Maintenance Area	87,200 gallons

III.B.2. <u>Container Storage Units in the FAST (Building CPP-666)</u>

The Permittee may provide container storage in the FAST for those wastes identified for container storage in Book 1, Attachment 1 of this Permit, and as follows:

III.B.2.a. Storage of hazardous and mixed debris is authorized as follows:

III.B.2.a.(1) The Permittee shall only store hazardous debris in containers with a design capacity smaller than 0.1 m^3, or

III.B.2.a.(2) The Permittee shall only store hazardous debris that is exempt from IDAPA 58.01.05.008 (40 CFR § 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

III.B.2.b. Storage of hazardous and mixed waste containing free liquids is authorized as follows:

III.B.2.b.(1) The permittee may store liquid bearing wastes at all container storage areas in building CPP-666.

III.B.2.c. Waste must meet the unit-specific waste acceptance criteria in Attachment 2 of this Permit.

III.B.2.d. The maximum permitted capacity for container storage in Building CPP-666 is 43,773 gallons, with the maximum waste volume for each room set as follows:

ROOM	MAXIMUM (S01) STORAGE VOLUME
CPP-666 – FDP Cell	37,300 gallons
CPP-666 – Room 301	4,304 gallons
CPP-666 – Room 114C	1,000 gallons
CPP-666 – Room 115	1,000 gallons
CPP-666 – Room 180	55 gallons
CPP-666 – Room B-4	55 gallons
CPP-666 – Room B-5	55 gallons
CPP-666 –Room SB-8 (VES-FC-186 Transfer Vessel)	4 gallons

III.B.3. Container Storage Units in the RMWSF:

The Permittee may provide container storage in the RMWSF for those wastes identified for container storage in Book 1, Attachment 1a of this Permit, and as follows:

III.B.3.a. Storage of hazardous and mixed waste/debris is authorized as follows:

III.B.3.a.(1) The Permittee shall only store hazardous waste/debris in containers with a design capacity smaller than 0.1 m^3; or

III.B.3.a.(2) The Permittee shall only store hazardous waste/debris that is exempt from IDAPA 58.01.05.008 (40 CFR 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

III.B.3.b. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2 of this Permit.

III.B.3.c. The maximum permitted storage capacity for hazardous and mixed waste/debris at the RMWSF is 2,244,156 gallons, with the maximum waste volume for each area set as follows:

AREA	MAXIMUM (S01) STORAGE VOLUME
RMWSF (CPP-1617)	2,244,156 gallons

III.B.3.d. The Permittee may store containers containing ignitable liquids in the heated cargo containers within the CPP-1617 fenced area provided the cargo containers are equipped

with explosion-proof fixtures. {IDAPA 58.01.05.008 [40 CFR § 264.17(a)]}.

III.B.4. Container Storage Units at the RWMC

The Permittee may provide container storage at the RWMC for those wastes identified for container storage in Book 3, Attachment 1 of this Permit, and as follows:

III.B.4.a. Storage of mixed waste/debris is authorized as follows:

III.B.4.a.(1) The Permittee shall only store mixed waste/debris that is exempt from IDAPA 58.01.05.008 (40 CFR 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

III.B.4.b. Waste must meet the unit-specific waste acceptance criteria in Book 3, Attachment 2 of this Permit.

III.B.4.c. The maximum permitted storage capacity for mixed waste/debris at the RWMC is 138,187 gallons, with the maximum waste volume for each area set as follows:

AREA	MAXIMUM (S01) STORAGE VOLUME
WMF-698	95,040 gallons
WMF-1617 Room 103 (Drum Compactor Area) Room 104 (Equipment Airlock) Room 105 (DPS Room) Room 106 (Utility Area)	 1,567 gallons 7,040 gallons 220 gallons 21,120 gallons
Trailer Storage Areas Near WMF-1617 ARP VII area (South of WMF-1619) ARP VIII area (West of WMF-1621)	 4,400 gallons 4,400 gallons 4,400 gallons

III.B.5. Container Treatment Units in the NWCF:

The Permittee may provide container treatment in the NWCF for those wastes identified for container treatment in Book 1, Attachment 1 of this Permit, and as follows:

III.B.5.a. Container treatment of hazardous and mixed debris is authorized.

III.B.5.b. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2, and the receipt and storage prohibitions in Permit Conditions II.B., III.B.1.a., and III.B.2.a. of this Permit.

III.B.5.c. Container treatment may be performed in the portable treatment containers (portable soak tanks) VES-NCD-138, TK-NCD-139, and TK-NCD-137.

III.B.5.d. Treatment in the portable treatment containers shall consist of chemical extraction by soaking debris in treatment solutions for extended periods of time.

III.B.5.e. The portable treatment containers may be used in the Steam Spray Booth (Room 418), Decon Cubicles (Rooms 421 and 422), and Decon Cell (Room 308), in Building CPP-659/-1659.

III.B.5.f. The portable treatment containers shall be drained, sludge (if any) removed, rinsed with an appropriate solvent, flushed and completely drained after treatment and before removal from the Steam Spray Booth, Decon Cubicles, and Decon Cell in accordance with Attachment 1 of this Permit.

III.B.5.g. The portable treatment containers shall be rinsed with an appropriate solvent, any sludge removed, flushed, and completely drained prior to switching from RCRA-regulated treatment to non RCRA-regulated decontamination activities. All rinsates shall be managed as hazardous/mixed waste. The Permittee shall document the performance of this cleaning regime in accordance with Permit Conditions I.Z. of this Permit.

III.B.5.h. The maximum permitted capacity for container treatment in the NWCF is 7,600 gallons per day of treated media, with the maximum daily volume of treated media for each container set as follows:

CONTAINER	CONTAINER VOLUME	MAXIMUM (T04) VOLUME OF HWMA/RCRA TREATED MEDIA
VES-NCD-138	538 gallons	4,300 gallons per day
TK-NCD-139	127 gallons	1,100 gallons per day
TK-NCD-137	270 gallons	2,200 gallons per day

III.B.6. SIZING AND REPACKAGING TREATMENT IN CPP-659 and in CPP-666 FDP Cell

The Permittee may conduct sizing and repackaging activities in CPP-659 and CPP-666 FDP Cell for those wastes identified for such treatment in Book 1, Attachment 1 of this Permit, and as follows:

III.B.6.a. The Permittee may conduct sizing and repackaging activities on hazardous/mixed debris, in support of off-Site shipment or subsequent on-Site management, as specified in this permit.

III.B.6.b The Permittee shall conduct all sizing and repackaging activities in CPP-659, Rooms 216, 306, 308, 309, 323, 418, 421, 422, and 428 and in CPP-666 FDP Cell.

TREATMENT METHOD	MAXIMUM (T04) TREATMENT VOLUME
Sizing Sizing may include cutting, crushing, bending, folding, and other similar activities. Examples of equipment used to size debris waste includes: conventional rotating or reciprocating saw, die – punch, etc.	520 gallons/day per Room/FDP Cell

TREATMENT METHOD	MAXIMUM (T04) TREATMENT VOLUME
Repackaging Repackaging includes opening waste containers, removing the waste, and subsequently placing the waste into new containers, as necessary	520 gallons/day per Room/FDP Cell

III.B.7. COMPACTION TREATMENT IN CPP-659 and in CPP-666 FDP Cell

The Permittee may conduct compaction treatment in CPP-659 and CPP-666 FDP Cell for those wastes identified for such treatment in Book 1, Attachment 1 of this Permit, and as follows:

III.B.7.a The Permittee may conduct waste compaction in support of off-Site shipment or subsequent on-Site management of hazardous/mixed debris as specified in this permit.

III.B.7.b. The Permittee shall conduct waste compaction in CPP-659, Rooms 216, 306, 308, 309, 323, 418, 421, 422, 428, and in CPP-666 FDP Cell

TREATMENT METHOD	MAXIMUM (T04) TREATMENT VOLUME
Compaction Compaction may include compressing, crushing, etc. the waste, as necessary so that it may be placed/stored in appropriate waste storage/shipping containers	520 gallons/day per Room/FDP Cell

III.B.8. ABSORBENT ADDITION TREATMENT IN CPP-659 AND IN CPP-666 FDP CELL

The Permittee may conduct absorbent addition treatment in CPP-659 and CPP-666 FDP Cell for those wastes identified for such treatment in Book 1, Attachment 1 of this Permit, and as follows:

III.B.8.a. The Permittee may conduct absorbent addition activities in support of off-Site shipment or subsequent on-Site management of hazardous and mixed waste as specified in this permit.

III.B.8.b. Absorbent addition activities will be performed in CPP-659, Rooms 308 and 309 and in the CPP-666 FDP Cell.

TREATMENT METHOD	MAXIMUM TREATMENT VOLUME – TO4
Absorbent Addition Absorbent addition consists of adding appropriate absorbent material to hazardous/mixed waste, so that no free liquids are present in the treated waste form.	520 gallons/day per Room/FDP Cell

III.B.9. MACROENCAPSULATION AT RMWSF

III.B.9.a. The Permittee may conduct macroencapsulation activities with subsequent on-Site management of that hazardous and/or mixed waste in support of off-Site shipment of that waste as specified in this permit.

III.B.9.b. Macroencapsulation activities will be performed in RMWSF.

TREATMENT METHOD	MAXIMUM TREATMENT VOLUME – TO4
Commercial Macroencapsulation Process Macroencapsulation will be performed using commercially available macroencapsulation units that have been pre-approved by the proposed disposal facility.	9,600 gallons/day total volume treated for both processes
Custom Macroencapsulation Process Macroencapsulation will be performed in boxes by creating a jacket of inert inorganic material that completely surrounds the waste. Typically the inert inorganic material will be commercially available cement grout.	

III.C. CONDITION OF CONTAINERS

If a container holding waste is not in good condition (*e.g.*, severe rusting, apparent structural defects) or if it begins to leak, the Permittee shall: transfer the waste from said container to a container that is in good condition; transfer the container to an overpack container; or otherwise manage the waste in accordance with IDAPA 58.01.05.008 [40 CFR § 264.171] and Attachments 1 and 1a of this Permit.

III.D. COMPATIBILITY OF WASTE WITH CONTAINERS

The Permittee shall assure that the ability of the container to contain the waste is not impaired, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.172] and Attachments 1 and 6 of this Permit.

III.E. MANAGEMENT OF CONTAINERS

III.E.1. The Permittee shall keep all storage containers closed during storage, and shall not open, handle, or store containers in a manner which may rupture the container or cause it to leak, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.173] and Attachments 1, 1a, and 6 of this Permit.

III.E.2. The Permittee may keep the portable treatment containers, in Permit Condition III.B.5, III.B.6, III.B.7, III.B.8, and III.B.9 of this Permit open during treatment provided the containers are visually monitored during treatment. The Permittee shall not otherwise manage treatment containers in a manner which may rupture the container or cause it to leak, in accordance with IDAPA 58.01.05.008 [40 CFR §§ 264.17 and 264.173] and Book 1, Attachments 1 and 6 of this Permit.

III.F. IGNITABLE OR REACTIVE WASTES

The Permittee shall take precautions to prevent accidental ignition or reaction of ignitable or reactive wastes in the permitted container storage and treatment areas by following the procedures specified, in accordance with IDAPA 58.01.05.008 [40 CFR §§ 267.17 and 264.176] and Attachments 1, 1a, and 6 of this Permit.

III.G. INCOMPATIBLE WASTE

III.G.1. The Permittee shall not place incompatible wastes or wastes and material that are incompatible in the same storage or treatment container, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.177(a)] and Attachments 1, 1a, and 6 of this Permit.

III.G.2. The Permittee shall not place waste or materials in an unwashed storage or treatment container that previously held an incompatible waste or material, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.177(b)] and Attachments 1, 1a, and 6 of this Permit.

III.G.3. The Permittee shall not store or treat waste that is incompatible with any waste or material stored or treated nearby, without separating or protecting the incompatible waste or material from commingling by means of a dike, berm, or wall in accordance with IDAPA 58.01.05.008 [40 CFR § 264.177] and Attachments 1, 1a, and 6 of this Permit.

III.G.4. The Permittee shall inspect the permitted container storage and treatment areas and remove any waste, debris, or constituent residues from a storage or treatment area prior to storing potentially incompatible wastes in the area, in accordance with Attachments 1, 1a, and 6 of this Permit.

III.H. SECONDARY CONTAINMENT

III.H.1. The Permittee shall ensure that the secondary containment systems for the container treatment areas in Permit Condition III.B.5, III.B.6, III.B.7, III.B.8., and III.B.9 of this Permit are free of cracks or gaps to prevent any migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.175] and Book 1, Attachment 1 of this Permit.

III.H.2. The Permittee shall follow Permit Conditions VI.G.1.b., VI.G.1.c., and VI.G.1.d. of this Permit for de minimis spills into the secondary containment system from normal debris treatment processes (i.e., transfers into and out of tanks, condensate drippage, etc.).

III.H.3. Secondary containment systems for the RMWSF shall be constructed and maintained to contain 10% of the total volume of waste containers or 100% of the volume of the largest waste container, whichever is greater, stored within the waste management units, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.175(b)(3)] and Book 1, Attachment 1a of this Permit.

III.H.4. If containers with free liquid are stored within RWMC buildings WMF-1617 and WMF-698, then secondary containment will be provided through the use of secondary containment pans. Secondary containment pans will have enough containment capacity to contain either 10% of the volume of containers or 100% of the largest container, which ever is greater, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.175(b)(3)] and Book 3, Attachment 1 of this Permit.

III.I. INSPECTION SCHEDULES AND PROCEDURES

The Permittee shall inspect the permitted container storage and treatment areas, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.174] and the Inspection Schedules contained in Attachment 4 of this Permit, to detect leaking containers and deterioration of containers and the containment system caused by corrosion and other factors.

III.J. RECORD KEEPING

The Permittee shall document the results of all certification, inspections, and waste analysis performed in the Operating Record, in accordance with Permit Conditions I.Z. and II.J. of this Permit.

III.K. CLOSURE

The Permittee shall close the permitted container storage and treatment areas in accordance with IDAPA 58.01.05.008 [40 CFR Subpart G and 40 CFR § 264.178], the procedures set forth in Attachments 8, and 8a, and Permit Condition II.K. of this Permit.

MODULE IV – INTEC WASTE PILES

IV.A. PERMITTED WASTE PILE STORAGE AREAS

Subject to the terms of this Permit, the Permittee may store hazardous and mixed debris, as specified in Permit Condition IV.C. of this Permit, in the waste pile storage areas of the NWCF, Building CPP-659/-1659.

IV.B. DESIGN AND OPERATING REQUIREMENTS

The Permittee is exempt from the IDAPA 58.01.05.008 [40 CFR § 264.251(a)] design requirements, as provided by the Director, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.251(b)] and shown in Book 1, Attachment 9 of this Permit.

IV.C. PERMITTED & PROHIBITED WASTES IN THE WASTE PILE STORAGE AREAS

IV.C.1. Waste Pile Units in the NWCF:

The Permittee may provide waste pile storage in the NWCF for those wastes identified for waste piles storage in Book 1, Attachment 1 of this Permit, and as follows:

IV.C.1.a. Storage of hazardous and mixed debris is authorized.

IV.C.1.b. Storage of hazardous and mixed debris containing free liquids is prohibited.

IV.C.1.c. Waste must meet the unit-specific waste acceptance criteria in Attachment 2 of this Permit.

IV.C.1.d. The maximum permitted capacity for waste pile storage in the NWCF is 209 cubic meters, with the maximum waste volume for each room set as follows:

ROOM	MAXIMUM (S03) STORAGE VOLUME
Room 206 – Adsorber Cell	43 cubic meters
Room 207 – Off-Gas Cleanup Cell	3 cubic meters
Room 214 – Calciner Cell	8 cubic meters
Room 215 – Blend and Hold Cell	3 cubic meters
Room 216 - Filter Cell/Valve Cubicle	39 cubic meters
Room 308 - Remote Decon Cell	22 cubic meters
Room 309 - Filter Handling Cell	18 cubic meters
Room 322 – Off-Gas Blower Cell	5 cubic meters
Room 323 - Crane Maintenance & Transfer Area	13 cubic meters
Room 326 - Transfer Area	5 cubic meters
Room 416 - Shielded Storage Room	20 cubic meters
Room 418 – Steam Spray Booth	30 cubic meters

IV.D. IGNITABLE OR REACTIVE WASTES

IV.D.1. The Permittee shall not place ignitable or reactive waste in a waste pile unless the waste and waste pile satisfy all applicable requirements of IDAPA 58.01.05.011 [40 CFR § Part 268], and

IV.D.1.a. The waste is treated, rendered, or mixed before or immediately after placement in the pile so that:

IV.D.1.a.(1) The resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under IDAPA 58.01.05.005 [40 CFR § Part 261.21 or 261.23], and

IV.D.1.a.(2) The Permittee complies with IDAPA 58.01.05.008 [40 CFR § Part 264.17(b)], or

IV.D.1.a.(3) The waste is managed in such a way that it is protected from any material or conditions which may cause it to ignite or react.

IV.E. INCOMPATIBLE WASTE

IV.E.1. The Permittee shall not place incompatible waste or wastes and material that are incompatible in the same waste pile unless the Permittee complies with IDAPA 58.01.05.008 [40 CFR § 264.17] and Book 1, Attachments 1 and 6 of this Permit.

IV.E.2. The Permittee shall separate waste piles from other nearby incompatible material stored in containers, other piles, or open tanks, or protect them by means of a dike, berm, wall, or other device in accordance with IDAPA 58.01.05.008 [40 CFR § 264.257] and Book 1, Attachments 1 and 6 of this Permit.

IV.E.3. The Permittee shall not place waste on the same base where incompatible wastes or materials were previously piled, unless the base has been decontaminated sufficiently to ensure compliance with IDAPA 58.01.05.008 [40 CFR § 264.17] and Book 1, Attachments 1 and 6 of this Permit.

IV.F. INSPECTION SCHEDULES AND PROCEDURES

The Permittee shall inspect waste piles on a weekly basis to detect the presence of free liquids or the deterioration or malfunction of the run-on and run-off protection systems, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.254(b)] and the Inspection Schedules in Book 1, Attachment 4 of this Permit.

IV.G. RECORD KEEPING

The Permittee shall document the results of all certifications, inspections and waste analyses performed in the Operating Record, in accordance with Permit Conditions I.Z. and II.J. of this Permit.

IV.H. CLOSURE

The Permittee shall close the permitted waste pile areas in accordance with IDAPA 58.01.05.008 [40 CFR Subpart G and 40 CFR § 264.258], the procedures set forth in Book 1, Attachment 8, and Permit Condition II.K. of this Permit.

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MODULE V – INTEC TANK SYSTEM STORAGE AND/OR TANK TREATMENT

V.A. PERMITTED STORAGE AND TREATMENT TANKS

Subject to the terms of this Permit, the Permittee may store and treat hazardous and mixed waste, as specified in Permit Condition V.B. of this Permit, in the following storage and treatment tanks in the NWCF, Building 659/-1659 and CPP-666:

V.A.1. Low-level Decon Room Sinks

A small sink, SH-NCD-934, is located in the low-level, Decon Room (415) of Building CPP-659. The sink is constructed of stainless steel and permitted for treatment of small debris items. Make-up solutions can be fed to the sink through permanent fittings via the chemical make-up tanks, or made up directly in the sink. Debris items can be scrubbed, left to soak, or sparged with air/steam. The small sink and treatment processes are further described in Book 1, Attachment 1 of this Permit.

A large sink, SH-NCD-933, is located in the low-level Decon Room (415) of Building CPP-659. The large sink is similar to the small sink, except for size and location of utilities. Make-up solutions can be fed to the sink through permanent fittings via the chemical make-up tanks, or made up directly in the sink. Debris items can be scrubbed, left to soak, or sparged with air/steam. The large sink and treatment processes are further described in Book 1, Attachment 1 of this Permit.

V.A.2. Low-level Decon Room Ultra-Sonic Cleaner

The ultra-sonic cleaner, UC-NCD-921, is located in the low-level, Decon Room (415) of Building CPP-659. The ultra-sonic cleaner is constructed of stainless steel, has an acoustic lid, and a removable polypropylene tank insert that is used for caustic solutions. The ultra-sonic cleaner uses a high frequency mechanical vibration to produce a strong cleaning action at the solid-liquid interfaces (cavitation). Cleaning is usually performed in a basket to allow cavitation on all sides. The ultra-sonic cleaner and treatment processes are further described in Book 1, Attachment 1 of this Permit.

V.A.3. Holdup and Collection Tanks

The holdup tank, VES-NCD-123, is located in Room 219 and the collection tank, VES-NCD-129, is located in Room 203 of Building CPP-659. The tanks are used for collection and storage of liquid, mixed waste from RCRA debris treatment activities. Occasionally, the tanks are used for pH adjustment of the collected liquid pending future processing. VES-NCD-123 is a horizontal, cylindrical tank on two (2) saddle supports. VES-NCD-129 is a vertical, cylindrical tank mounted on four (4) support legs. Both tanks are constructed of stainless steel. The holdup and collection tanks and treatment processes are further described in Book 1, Attachment 1 of this Permit.

V.A.4. The HEPA Filter Leaching System (HFLS)

The HEPA Filter Leaching System consists of a stainless steel leaching tank (VES-NCD-141) and a stainless steel drying tank (VES-NCD-142) that are located in Room 309 of Building CPP-659. The HFLS is designed to treat spent HEPA filters by leaching the hazardous contaminants from the filters using Nitric Acid. A minimum of three (3) leaching cycles followed by two (2) rinse water cycles are performed on each filter. After the filters are allowed to drip dry, they are transferred to the drying tank where they are further dried by circulating heated air. The HFLS and treatment processes are further described in Book 1, Attachment 1 of this Permit. HEPA filters to be treated can also be stored in Room 309, if necessary, during treatment process shutdowns or during maintenance to the remote handling equipment.

The HFLS may also be used for the radiological decontamination (pre-treatment) of HEPA filters to meet off-site treatment facility Waste Acceptance Criteria. When performing decontamination operations, the number/length of leaching and rinsing cycles may be reduced, and drying may or may not be performed. Steam may also be used to pre-dry the filters by driving off most of the residual liquid.

V.A.5. The FDP Cell Slab Tank

The FDP Cell Slab Tank is located at the base of the FDP Cell in CPP-666. The Slab Tank is a critically safe low volume tank that is available to store liquids within the FDP Cell.

V.A.6. The FDP Area Sodium Distillation System (SDS)

The FDP Area SDS in located in CPP-666, Room SB-8 at the -31' level. The SDS consists of 3 tanks: Distillation Vessel (VES-FC-101), Collection Vessel (VES-FC-85), and Transfer Vessel (VES-FC-186). The SDS treats sodium contaminated debris waste.

V.B. PERMITTED AND PROHIBITED WASTES IN THE STORAGE AND TREATMENT TANKS

V.B.1. Tank Storage Units in the NWCF

The Permittee may provide tank storage in the NWCF for those wastes identified for NWCF tank storage in Book 1, Attachment 1 of this Permit, and as follows:

V.B.1.a. Storage of hazardous and mixed waste is authorized.

V.B.1.b. The Permittee may only store hazardous waste that is exempt from IDAPA 58.01.05.008 (40 CFR § 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

V.B.1.c. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2 of this Permit.

V.B.1.d. The maximum permitted capacity for tank storage in the NWCF is 4,520 gallons, with the maximum waste volume for each tank set as follows:

TANK	TANK DIMENSIONS	MAXIMUM (S02) STORAGE VOLUME
VES-NCD-123 - Holdup Tank	7'6" and tangent to tangent length 9'	3,800 gallons
VES-NCD-129 - Collection Tank	4' and tangent to tangent length of 5'6"	530 gallons
VES-NCD-141	L 2' 11", W 2' 5", and H 2' 2"	~ 120 gallons
VES-NCD-142	L 2' 11", W 2' 5", and H 1' 4"	~ 70 gallons

V.B.2. Tank Storage at FAST/FDP Area (SDS)

The Permittee may provide tank storage in the FAST Slab Tank (VES-FC-184) and in the FDP Area, Sodium Distillation System (SDS) located in Room SB-8, which includes tanks VES-FC-101, VES-FC-85, and VES-FC-186, for those wastes identified for tank storage in Book 1, Attachment 1 of this Permit, and as follows:

V.B.2.a. Storage of mixed waste is authorized.

V.B.2.b. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2 of this Permit.

V.B.2.c. The FAST Slab Tank dimensions are 8 feet by 5 feet by 0.33 feet and has a maximum volume of sixty five gallons.

V.B.2.d. The SDS tank dimensions are as follows:

V.B.2.d.1. VES-FC-101 (distillation vessel) – 72 inches long with an outer diameter of 16.5" and inner diameter of 12.88 inches and has a maximum capacity of 34.524 gallons

V.B.2.d.2. VES-FC-85 (collection vessel) – 36 inches long with an outer diameter of 13.26 inches and an inner diameter of 12.51 inches and has a maximum capacity of 16.151 gallons

V.B.2.d.3. VES-FC-186 (transfer vessel) – 20 inches long with an outer diameter of 10 inches and inner diameter of 8 inches and has a maximum capacity of 4.061 gallons

V.B.3. <u>Tank Treatment Units in the NWCF</u>

The Permittee may provide tank treatment in the NWCF only for those wastes identified for tank treatment in Book 1, Attachment 1 of this Permit, and as follows:

V.B.3.a. Treatment of hazardous and mixed waste is authorized.

V.B.3.b. The Permittee may only treat hazardous waste that is exempt from IDAPA 58.01.05.008 (40 CFR § 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

V.B.3.c. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2 of this Permit.

V.B.3.d. The maximum permitted capacity for tank treatment in the NWCF is 17,006 gallons per day, with the maximum tank/debris treatment volumes for each tank set as follows:

TANK	TANK DIMENSIONS	MAXIMUM (T01) TREATMENT VOLUME
SH-NCD-934 - Small Sink	18" X 20" X 18"	672 gallons per day*
SH-NCD-933 - Large Sink	119" X 24" X 19"	5,688 gallons per day*
UC-NCD-921 - Ultra-sonic Cleaner	26" X 26" X 27"	1,896 gallons per day*
VES-NCD-123 - Holdup Tank	7'6" and tangent to tangent length of 9'	7,600 gallons per day
VES-NCD-129 - Collection Tank	4' and tangent to tangent length of 5'6"	1,060 gallons per day
VES-NCD-141 - HEPA Filter Leaching Vessel	2'11" X 2'5"X 2'2"	90 gallons per day*
VES-NCD-142 - HEPA Filter Drying Vessel	2'11" X 2'5" 1'4"	90 gallons per day*

* Indicates volume of hazardous and mixed debris treated per day.

V.B.3.e. The treatment tanks shall be rinsed with an appropriate solvent, flushed, and completely drained prior to switching from RCRA-regulated treatment to non RCRA-regulated decontamination activities. The Permittee shall document the performance of this cleaning regime in accordance with Permit Conditions I.Z. and II.J. of this Permit.

V.B.4. Tank treatment in the FAST Slab Tank is not authorized.

V.C. SECONDARY CONTAINMENT

V.C.1 The Permittee shall design, install, and operate secondary containment systems that are capable of detecting and collecting releases, and which prevent any migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water during use of the tank systems, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.193] and Book 1, Attachment 1 of this Permit.

V.C.2. The boundaries of the secondary containment system for the storage and treatment tanks are dependent on the position of the cell drain valves during storage and

treatment. The primary and secondary containment boundaries and materials of construction are defined in Book 2, Appendix 1, of this Permit.

V.D. NEW TANK SYSTEMS

V.D.1. The Permittee shall obtain and keep on file (at the Facility) written statements from an independent, qualified installation inspector or independent, qualified registered professional engineer certifying to the design and attesting that proper installation procedures for any new tank systems were used, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.192(b) and (g)], Permit Conditions I.Z. and II.J., and Book 1, Attachment 1 of this Permit.

V.E. TANK SYSTEM OPERATING CONDITIONS

V.E.1. The Permittee shall not place waste or treatment reagents in a tank system if they could cause the tank, ancillary equipment, or containment system to rupture, leak, corrode, or otherwise fail, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.194(a)] and Book 1, Attachments 1 and 6 of this Permit.

V.E.2. The Permittee shall use appropriate controls and practices to prevent spills and overflows from the tank or containment systems, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.194(b)(1) and (2)] and Book 1, Attachment 1 of this Permit.

V.F. RESPONSE TO LEAKS OR SPILLS

V.F.1. The Permittee shall immediately remove a tank system from service if there is a leak or spill from the tank system or its secondary containment, or if the system or secondary containment are unfit for use, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196] and Book 1, Attachment 1 of this Permit. The Permittee shall then:

V.F.1.a. Immediately stop the flow of hazardous or mixed waste into the tank system or secondary containment system and inspect the system to determine the cause of release, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(a)] and Book 1, Attachment 1 of this Permit.

V.F.1.b. Within 24 hours, or as soon as practical, remove as much of the waste as is necessary to prevent further releases of hazardous waste to the environment and to allow inspection and repair of the tank system, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(a) and (b)] and Book 1, Attachment 1 of this Permit.

V.F.1.c. Immediately conduct a visual inspection of the release and, based upon that inspection, prevent migration of and remove visible contamination from soil or surface water, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(c)] and Book 1, Attachment 1 of this Permit.

V.F.1.d. If the collected material is a HWMA/RCRA-regulated material, manage it in accordance with all applicable requirements of IDAPA 58.01.05.006 through 58.01.05.008 [40 CFR Parts 261 through 264]. The Permittee shall note that if the collected material is discharged through a point source to U.S. waters or to a POTW, it is subject to requirements of the Clean Water Act. If the collected material is released to the environment, it may be subject to reporting under 40 CFR Part 302.

V.F.1.e. Follow the verbal and written reporting requirements for any release to the environment, in accordance with Permit Conditions V.H.3. and V.H.4. of this Permit.

V.F.1.f. The Permittee shall follow Permit Conditions V.F.1.b., V.F.1.c., and V.F.1.d. of this Permit for de minimis spills into the secondary containment system from normal debris treatment processes (i.e., transfers into and out of tanks, condensate drippage, etc.).

V.F.2. The Permittee shall close the system in accordance with IDAPA 58.01.05.008 [40 CFR § 264.197] and Book 1, Attachment 8 of this Permit, unless he satisfies the following requirements:

V.F.2.a. For a release caused by a spill that has not damaged the integrity of the system, the Permittee shall remove the released waste and make any necessary repairs before returning the tank system to service, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(e)(2)] and Book 1, Attachment 1 of this Permit.

V.F.2.b. For a release caused by a leak from a primary tank system to a secondary containment system, the Permittee shall repair the tank system prior to returning it to service, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(e)(3)] and Book 1, Attachment 1 of this Permit.

V.F.2.c. For a release to the environment, caused by a leak from an aboveground portion of the ancillary equipment that does not have secondary containment, the Permittee shall repair the tank system prior to returning it to service, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(e)(4)] and Book 1, Attachment 1 of this Permit.

V.F.2.d. If the Permittee replaces a component of the tank system to eliminate the leak, that component must satisfy the requirements for new tank systems or components in IDAPA 58.01.05.008 [40 CFR § § 264.192 and 264.193].

V.F.3. If the Permittee has repaired a tank system in accordance with Permit Condition V.F.2. of this Permit and the repair has been extensive (e.g., installation of an internal liner, repair of a ruptured primary containment or secondary containment vessel), the tank system must not be returned to service until the Permittee obtains a certification by an independent, qualified, registered, professional engineer that the repaired system is capable of handling hazardous waste without release for the intended life of the system. The certification shall be submitted to the Director within seven (7) days after returning the tank system to use, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(f)], Permit Condition I.Y., and retained in accordance with Permit Conditions I.Z. and II.J., and Book 1, Attachment 1 of this Permit.

V.F.4 In addition to the requirements of Permit Condition V.F. above, the following requirements apply to the FDP Cell Slab Tank only:

V.F.4.a. Detection of liquids in the FDP Cell sump shall be reported in accordance with Permit Condition I.T.

V.F.4.b. The operator shall determine if the source of sump liquids is a leak in Slab Tank.

V.F.4.b.i. If the source of liquids is determined to be non-waste (e.g., steam leak, pump priming water, etc) then operations of the slab tank may continue provided the level of liquids remains less than the sixty-five gallon capacity of the tank.

V.F.4.b.ii. If the source of liquids either is a leak in slab tank or can not be determined, the Permittee shall respond in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196]. Liquids shall be containerized or removed from the FDP Cell.

V.G. INSPECTION SCHEDULES AND PROCEDURES

V.G.1. The Permittee shall develop and maintain a schedule and procedures for inspecting the overfill controls, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.195(a)] and Book 1, Attachment 4 of this Permit.

V.G.2. The Permittee shall inspect at least once each operating day:

V.G.2.a. Data gathered from monitoring and leak detection equipment and overfill controls to ensure that the tank system is being operated according to design; and

V.G.2.b The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system and ancillary equipment, to detect erosion or signs of release of hazardous waste.

V.G.2.c. The Permittee may rely on the inspection requirements of Permit Condition V.G.2.a. of the Permit to also meet the inspection requirements of V.G.2.b. of the Permit for VES-NCD-123 and VES-NCD-129.

V.H. RECORD KEEPING AND REPORTING

V.H.1 The Permittee shall document the results of all certifications, inspections, and waste analyses in the Operating Record, in accordance with Permit Conditions I.Z. and II.J. of this Permit.

V.H.2. Releases from tanks that are totally contained within a secondary containment system need not be reported. However, said releases shall be recorded in the Operating Record, in accordance with Permit Conditions I.Z. and II.J. of this Permit, and shall include:

V.H.2.a. Date and time of the release;

V.H.2.b. Tank identification;

V.H.2.c. Name and title of the employee documenting the release;

V.H.2.d. Size and amount of the release; and

V.H.2.e. All actions taken.

V.H.3. The Permittee shall verbally report to the Director any release to the environment within 24 hours of its detection, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(d)(1) and (2)], Permit Condition I.T., and Book 1, Attachment 1 of this Permit.

V.H.4. In addition to complying with the requirements of Permit Condition I.T. of this Permit, within 30 calendar days of detecting a release to the environment from a tank system, the Permittee shall report the following to the Director in accordance with Permit Condition I.Y. of this Permit:

V.H.4.a. Likely route of migration of the release;

V.H.4.b. Characteristics of the surrounding soil, including soil composition, geology, and hydrogeology, taking into account possible climatic effect on the soil characteristics;

V.H.4.c. Results of any monitoring, sampling, or air dispersion modeling conducted in connection with the release;

V.H.4.d. Proximity of downgradient drinking water, surface water, and populated areas; and

V.H.4.e. Description of response action taken or planned.

V.I. CLOSURE

The Permittee shall close the permitted storage and treatment tanks in accordance with IDAPA 58.01.05.008 [40 CFR Subpart G and 40 CFR § 264.197], the procedures set forth in Book 1, Attachment 8, and Permit Condition II.K. of this Permit.

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MODULE VI - MISCELLANEOUS UNIT TREATMENT

VI.A. PERMITTED MISCELLANEOUS/OTHER TREATMENT UNITS

Subject to the terms of this Permit, the Permittee may treat hazardous and mixed debris, as specified in Permit Condition VI.B. of this Permit, in the following miscellaneous treatment units in the NWCF, Building CPP-659/-1659, in the CPP-666 FDP Cell, CPP-666 Room SB-8, and at the RMWSF. Additionally, the Permittee may treat hazardous and mixed debris, as specified in Permit Condition VI.B. of this Permit in the WMF-1617 Retrieval Area, Drum Packaging Stations, and Drum Compactor at the RWMC:

VI.B. PERMITTED/PROHIBITED WASTE IN THE MISCELLANEOUS TREATMENT UNITS

VI.B.1. Miscellaneous Treatment Unit for Scarification and Spalling in the NWCF:

The Permittee may provide scarification and spalling in the miscellaneous treatment unit only for those wastes identified for scarification and spalling in Book 1, Attachment 1 of the Permit, and as follows:

VI.B.1.a.

UNIT	MAXIMUM (X02) VOLUME OF HWMA/RCRA TREATMENT MEDIA
Steam Spray Booth and Glovebox - Room 418	30 short tons per day

VI.B.2 Miscellaneous Treatment Units for Chemical/Physical Extraction in the NWCF:

The Permittee may provide chemical/physical extraction in the miscellaneous treatment units only for those wastes identified for chemical/physical extraction in Book 1, Attachment 1 of the Permit, and as follows:

VI.B.2.a. Treatment of hazardous and mixed debris is authorized.

VI.B.2.b. The Permittee may only treat hazardous waste that is exempt from IDAPA 58.01.05.008 (40 CFR § 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

VI.B.2.c. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2 of this Permit.

VI.B.2.d. Chemical/physical extraction shall consist of steam and/or pressurized hot water washing, solvent extraction, liquid abrasive spray blasting, and carbon dioxide blasting.

VI.B.2.e. The Permittee may perform chemical/physical extraction in the following units at the following maximum capacities:

UNITS	MAXIMUM (X99) VOLUME OF HWMA/RCRA TREATMENT MEDIA
Steam Spray Booth and Glove Box - Room 418	8,660 gallons per day
Decon Cubicle - Room 421	8,660 gallons per day
Decon Cubicle - Room 422	8,660 gallons per day
Decon Cell - Room 308	8,660 gallons per day

VI.B.2.f. The Permittee must drain all decontamination solutions from the decontamination cell, CPP-659 Room 308, immediately upon completion of debris treatment.

VI.B.3. Miscellaneous/Other Treatment Unit (T04) for Deactivation of Sodium at CPP-666 FDP Cell within the Argon Repackaging Station (ARS)

VI.B.3.a Treatment of hazardous and mixed debris is authorized.

VI.B.3.b. The Permittee may only treat hazardous waste that is exempt from IDAPA58.01.05.008 (40 CFR § 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

VI.B.3.c. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2 of this Permit.

VI.B.3.d. Deactivation of sodium shall consist of reaction with water in an immersion bath or by misting/wetting of the waste surface within the ARS, or exposure to air in the FDP Cell.

VI.B.3.e. The Permittee may perform deactivation of sodium in the following units at the following maximum capacities:

UNITS	MAXIMUM (T04) VOLUME OF HWMA/RCRA TREATMENT MEDIA
FDP Cell	6.2 gallons (50 pounds) per day total

VI.B.4. Miscellaneous/Other Treatment Unit (T04) for Distillation of sodium at CPP-666 FDP Area, Room SB-8

VI.B.4.a Treatment of hazardous and mixed debris is authorized.

VI.B.4.b. The Permittee may only treat hazardous waste that is exempt from IDAPA58.01.05.008 (40 CFR § 264 Subpart CC), as provided in IDAPA 58.01.05.008 (40 CFR § 264.1082).

VI.B.4.c. Waste must meet the unit-specific waste acceptance criteria in Book 1, Attachment 2 of this Permit.

VI.B.4.d. Distillation of sodium shall be conducted in the Sodium Distillation System (SDS) which consists of the: Distillation Vessel (VES-FC-101), Collection Vessel (VES-FC-85), and the Transfer Vessel (VES-FC-186).

VI.B.4.e. The Permittee may perform distillation of sodium in the SDS unit in the following vessels at the following maximum capacities:

UNIT	**MAXIMUM (T04) VOLUME OF HWMA/RCRA TREATMENT MEDIA**
SDS: VES-FC-101 VES-FC-85 VES-FC-186	6.2 gallons (50 pounds) per day total

VI.B.4.f. The Distillation Vessel will be evacuated until a vaccum of 200 mTorr is achieved before heating systems are turned on.

VI.B.4.g. The operating pressure for distillation treatment is 1 mTorr to 10 Torr.

VI.B.4.h. The operating temperature for distillation treatment is 500 °F to 1200 °F.

VI.B.4.i The SDS will be maintained/operated under an inert atmosphere when waste is present.

VI.B.5. <u>MACROENCAPSULATION at the RMWSF, CPP-1617 (T04)</u>

Subject to the terms of this Permit, the Permittee may treat mixed waste in containers through macroencapsulation (either commercial or custom process) at the RMWSF, CPP-1617 building and fenced area.

TREATMENT METHODS	MAXIMUM T04 TREATMENT VOLUME
Building CPP-1617 and Fenced Area Macroencapsulation (commercial or custom)	9,600 gallons/day total amount for both units combined

VI.B.5.a. The treatment process, macroencapsulation, consists of equipment placed within the RMWSF to provide for container handling and contamination control to allow for the macroencapsulation of waste.

VI.B.5.b. The treatment of mixed waste through macroencapsulation (Process Code T04), is authorized with a throughput rate not to exceed 9,600 gallons per day, or 312 tons/year in the RMWSF, CPP-1617.

VI.B.5.c. The Permittee shall document in the Operating Record the amount of treatment via macroencapsulation performed each day when such treatment occurs and the total amount of treatment via macroencapsulation performed during the twelve (12) month period previous to that day.

VI.B.5.d. Wastes acceptable for the treatment process are defined as wastes that have been characterized as having the EPA HWNs defined in the current Part A Permit Application in Attachment 1 of this Permit.

VI.B.5.e. During the treatment process, the Permittee shall not place incompatible wastes, or wastes and materials that are incompatible, in the same container, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.177].

VI.B.5.f. The Permittee shall inspect the macroencapsulation activity in accordance with Permit Condition II.E and Attachment 4 of this Permit.

VI.B.5.g. The Permittee shall document inspection and operation of the macroencapsulation process in the Operating Record, in accordance with Permit Conditions I.Y and II.E.

VI.B.6. <u>MISCELLANEOUS TREATMENT at RWMC WMF-1617 (X02 and X99)</u>

VI.B.6.a. MISCELLANEOUS TREATMENT. The Permittee may conduct treatment activities on mixed waste/debris, in support of off-Site shipment or subsequent on-Site management, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601],and as specified in Book 3, Attachment 1, Section D of this Permit.

VI.B.6.a.1. The Permittee shall conduct all miscellaneous treatment activities in WMF-1617 Retrieval Area and Room 105 (Drum Packaging Stations) and Drum Compactor Area (Room 103) as follows:

VI.B.6.a.1.a. X99 - Miscellaneous Treatment units at WMF-1617 consist of the following: Retrieval Area, 4 Drum Packaging Stations, and Drum Compactor.

Miscellaneous treatment in WMF-1617 includes any/all of the following, opening waste containers, staging waste in the retrieval area associated with waste processing activities, removing waste from the container, segregating/sorting waste, opening/crushing inner containers with liquid content, absorbent addition for liquids, segregation/treatment of WIPP prohibited items, sizing waste to fit into containers, and subsequently placing the waste into new containers.

TREATMENT METHODS	MAXIMUM X99 TREATMENT VOLUME
WMF 1617 Retrieval Area includes: Drum/Tray Staging Sorting Table Treatment @ 50 drums treated/day	200 drum equivalents total = 11,000 gallons/day
WMF-1617 Room 105 – Drum Packaging Station (DPS) @ 50 drums/day	2,750 gallons/day
WMF-1617 Room 103 – Drum Compactor (absorbent addition)	10 gallons/day

VI.B.6.a.1.b. X02 – Miscellaneous Mechanical Treatment units at WMF-1617 consists of the Drum Compactor

Miscellaneous mechanical treatment in WMF-1617 includes compaction/crushing of drum carcasses and/or liner

TREATMENT METHODS	MAXIMUM X02 TREATMENT VOLUME
WMF-1617, Room 103 Drum Compactor @ 100 drums/day	5,500 gallons/day

VI.C. IGNITABLE OR REACTIVE WASTES

The Permittee shall take precautions to prevent accidental ignition or reaction of ignitable or reactive wastes in the miscellaneous treatment units, in accordance with IDAPA 58.01.05.008 [40 CFR §§ 264.17 and 264.601] and Attachments 1 and 6 of this Permit.

VI.C.1. The Permittee shall not perform treatment of waste containing pyrophoric radionuclides at the RWMC.

VI.D. INCOMPATIBLE WASTE

VI.D.1. The Permittee shall not place incompatible wastes or materials that are incompatible in the same treatment container, in accordance with IDAPA 58.01.05.008 [40 CFR §§ 264.177(a) and 264.601] and Attachments 1 and 6 of this Permit.

VI.D.2. The Permittee shall not place waste or materials in an unwashed treatment container that previously held an incompatible waste or material, in accordance with IDAPA 58.01.05.008 [40 CFR §§ 264.177(b) and 264.601] and Attachments 1 and 6 of this Permit.

VI.D.3. The Permittee shall not treat wastes that are incompatible with any waste or any materials stored or treated nearby, without separating or protecting the incompatible waste or material from commingling by means of a dike, berm, or wall, in accordance with IDAPA 58.01.05.008 [40 CFR §§ 264.17 and 264.601] and Attachments 1 and 6 of this Permit.

VI.D.4. The Permittee shall not place waste on the same base where incompatible wastes or materials were previously placed, unless the base has been decontaminated sufficiently to ensure compliance with IDAPA 58.01.05.008 [40 CFR §§ 264.17 and 264.601] and Attachments 1 and 6 of this Permit.

VI.E. SECONDARY CONTAINMENT SYSTEMS

VI.E.1. The Permittee shall ensure that the secondary containment systems for the miscellaneous treatment unit areas are free of cracks or gaps to prevent any migration of waste or accumulated liquid out of the system to the soil, groundwater, or surface water at any time, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 1 of this Permit.

VI.E.2. The boundaries of the secondary containment systems for the INTEC miscellaneous treatment units are dependent on the position of the cell drain valves during treatment. The primary and secondary containment boundaries and materials of construction are defined in Book 2, Appendix 1, of this Permit.

VI.E.3. The secondary containment for the Miscellaneous Treatments Units at the RWMC consists of secondary containment pans compatible with the waste that is being treated. Detailed information on the secondary containment systems are provided in Book 3, Attachment 1, Section D, of this Permit.

VI.F. INSPECTION SCHEDULES AND PROCEDURES

The Permittee shall inspect the permitted miscellaneous treatment units in accordance with IDAPA 58.01.05.008 [40 CFR § 264.602], and the Inspection Schedules contained in Attachment 4 of this Permit, to assure compliance with the environmental performance standards of IDAPA 58.01.05.008 [40 CFR § 264.601].

VI.G. RESPONSE TO LEAKS OR SPILLS

VI.G.1. The Permittee shall immediately remove a miscellaneous treatment unit from service if there is a leak or spill from the treatment unit or its secondary containment, or if the system or secondary containment are unfit for use, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 1 of this Permit. The Permittee shall then:

VI.G.1.a. Immediately stop the flow of hazardous waste into the treatment system or secondary containment system and inspect the system to determine the cause of release, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 1 of this Permit.

VI.G.1.b. Within 24 hours, or as soon as practical, remove as much of the waste as is necessary to prevent further releases of hazardous waste to the environment and to allow inspection and repair of the treatment system, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 1 of this Permit.

VI.G.1.c. Immediately conduct a visual inspection of the release and based upon that inspection, prevent migration of and remove visible contamination from soil or surface water, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 1 of this Permit.

VI.G.1.d. If the collected material is a HWMA/RCRA-regulated material, manage it in accordance with all applicable requirements of IDAPA 58.01.05.005 through 58.01.05.008 [40 CFR Parts 261 through 264]. The Permittee shall note that if the collected material is discharged through a point source to U.S. waters or to a POTW, it is subject to requirements of the Clean Water Act. If the collected material is released to the environment, it may be subject to reporting under 40 CFR Part 302.

VI.G.1.e. The Permittee shall verbally report to the Director any release to the environment within 24 hours of its detection, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(d)(1) and (2)], Permit Condition I.T., and Attachment 1 of this Permit.

In addition to complying with the requirements of Permit Condition I.T. of this Permit, within thirty (30) calendar days of detecting a release to the environment from a miscellaneous treatment unit, the Permittee shall report the following to the Director in accordance with Permit Condition I.Y. of this Permit:

VI.G.1.f. The Permittee shall follow Permit Conditions VI.G.1.b., VI.G.1.c., and VI.G.1.d. of this Permit for de minimis spills into the secondary containment system from normal debris treatment processes (i.e., transfers into and out of tanks, condensate drippage, etc.) at INTEC and miscellaneous treatment within WMF-1617.

VI.G.2. The Permittee shall close the miscellaneous treatment unit, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 8 of this Permit, unless he satisfies the following requirements:

VI.G.2.a. For a release caused by a spill that has not damaged the integrity of the system, the Permittee shall remove the released waste and make any necessary repairs before

returning the treatment system to service, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 1 of this Permit.

VI.G.2.b. For a release caused by a leak from a miscellaneous treatment unit to a secondary containment system, the Permittee shall repair the miscellaneous treatment unit prior to returning it to service, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601] and Attachment 1 of this Permit.

VI.G.2.c. If the Permittee replaces a component of the miscellaneous treatment unit to eliminate the leak, that component must satisfy the requirements for new components, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.601].

VI.G.3. If the Permittee has repaired a miscellaneous treatment unit in accordance with Permit Condition VI.G.2. of this Permit, and the repair has been extensive (e.g., installation of an internal liner, repair of a ruptured primary containment or secondary containment vessel), the miscellaneous treatment unit must not be returned to service until the Permittee obtains a certification by an independent, qualified, registered, professional engineer that the repaired system is capable of handling hazardous waste, without release, for the intended life of the system. The certification shall be submitted to the Director within seven (7) days after returning the miscellaneous treatment unit to use, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(f)], Permit Condition I.Y., and retained in accordance with Permit Conditions I.Z.1.c., I.Z.2., and II.J., and Attachment 1 of this Permit.

VI.H. RECORD KEEPING AND REPORTING

VI.H.1. The Permittee shall document the results of all certifications, inspections, and waste analyses in the Operating Record in accordance with Permit Conditions I.Z. and II.J. of this Permit.

VI.H.2. Releases from miscellaneous treatment units that are totally contained within a secondary containment system need not be reported. However, said releases shall be recorded in the Operating Record, in accordance with Permit Conditions I.Z. and II.J. of this Permit, and shall include :

VI.H.2.a. Date and time of the release;

VI.H.2.b. Miscellaneous treatment unit identification;

VI.H.2.c. Name and title of the employee documenting the release;

VI.H.2.d. Size and amount of the release; and

VI.H.2.e. All actions taken.

VI.H.3. The Permittee shall verbally report to the Director any release to the environment within 24 hours of its detection, in accordance with IDAPA 58.01.05.008 [40 CFR § 264.196(d)(1) and (2)], Permit Condition I.T., and Attachment 1 of this Permit.

VI.H.4. In addition to complying with the requirements of Permit Condition I.T. of this Permit, within thirty (30) calendar days of detecting a release to the environment from a miscellaneous treatment unit, the Permittee shall report the following to the Director in accordance with Permit Condition I.Y. of this Permit:

VI.H.4.a. Likely route of migration of the release;

VI.H.4.b. Characteristics of the surrounding soil, including soil composition, geology, and hydrogeology, taking into account possible climatic effect on the soil characteristics;

VI.H.4.c. Results of any monitoring, sampling, or air dispersion modeling conducted in connection with the release;

VI.H.4.d. Proximity of downgradient drinking water, surface water, and populated areas; and

VI.H.4.e. Description of response action taken or planned.

VI.I. CLOSURE

The Permittee shall close the permitted miscellaneous treatment units, in accordance with IDAPA 58.01.05.008 [40 CFR Subpart G and 40 CFR § 264.603], the procedures set forth in Attachment 8, and Permit Condition II.K. of this Permit.

MODULE VII - CORRECTIVE ACTION

VII.A. APPLICABILITY

Sections 3004 (u) and 3004 (VII) of RCRA (42 U.S.C. §§ 6924 (u) and (v)); HWMA (Idaho Code § 39-4409 (5)); and IDAPA 58.01.05.008 [40 CFR § 264.101] require corrective action, as necessary, to protect human health and the environment for all releases of hazardous waste or hazardous waste constituents from any Solid Waste Management Unit (SWMU) at the facility, for all permits issued after November 8, 1984. A Federal Facility Agreement (FFA) under Section 120(e)(2) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 42 U.S.C. § 9620) is a mechanism to be used to investigate and clean up releases of hazardous wastes and hazardous waste constituents, as necessary, to protect human health and the environment. On December 4, 1991 the U.S. Environmental Protection Agency, the State of Idaho, and the United States Department of Energy (Parties) executed a Federal Facilities Agreement and Consent Order (FFACO) to integrate and satisfy the requirements of CERCLA and the corrective action requirements of RCRA. The FFACO is fully incorporated into this Permit and enforceable through this Permit as corrective action requirements. All investigations and cleanups included in the FFACO will meet or exceed all applicable or relevant and appropriate state and federal requirements including RCRA, HWSA, and HWMA to the extent required by CERCLA Section 121, 42 U.S.C. § 9621.

The corrective action requirements for the facility will be satisfied by the FFACO, except for those units not covered by the FFACO as set out in Permit Conditions VII.A.1 to VII.A.3.

VII.A.1. Module VII applies to those releases or threats of releases not included in the Statement of Work by the Parties to the FFACO.

VII.A.2. In the event the FFACO is vacated, Module VII applies to those units for which a Record of Decision has not been signed.

VII.A.3. Module VII applies to those releases or threats of releases which are discovered after the termination of the FFACO.

VII.B. STANDARD CONDITIONS

VII.B.1. The Permittee shall take corrective action as necessary to protect human health and the environment for those units listed in Tables 1 and 2 of this Permit.

VII.B.2. Failure to submit the information required by the Permit Conditions identified within Module VII of this Permit or falsification of any submitted information is grounds for termination of this Permit in accordance with IDAPA 58.01.05.012 [40 CFR § 270.43] and/or grounds for an enforcement action pursuant to Permit Condition I.B. of this Permit.

VII.B.3. All plans, reports, notifications, and other submissions to the Director, as required by the Permit Conditions identified within Module VII of this Permit, shall be signed and certified in accordance with Permit Condition I.W. of this Permit.

VII.B.4. The Permittee shall submit, by certified mail, express mail, or hand delivery, a minimum of three (3) copies of each plan, report, notification, or other submissions, required by the Permit Conditions identified within Module VII of this Permit, to the following addressees:

Please submit two (2) copies to:

Director, Idaho Department of Environmental Quality
c/o Administrator, State Waste Management & Remediation Program
1410 North Hilton
Boise, Idaho 83706-1255
Telephone No. (208) 373-0502

An additional copy to:

Chief, RCRA Permits Section WCM-127
U.S. Environmental Protection Agency
1200 Sixth Avenue
Seattle, Washington 98101

VII.B.5. All plans and schedules, as required by the Permit Conditions in Module VII of this Permit, upon written approval from the Director, shall be incorporated into Module VII of this Permit in accordance with Permit Condition VII.H. of this Permit. Any noncompliance with such approved plans and schedules shall be deemed noncompliance with this Permit.

VII.B.6. The Permittee shall only receive extension(s) of the specified compliance schedule due date(s) for the submittal(s) required by the permit conditions within Module VII of this Permit, upon written approval from the Director, in accordance with Permit Condition VII.H. of this Permit.

VII.B.7. If the Director determines that further actions beyond those provided by the permit conditions within Module VII of this Permit, or changes to permit conditions stated herein, are warranted, the Director shall modify the permit condition(s) in Module VII in accordance with Permit Condition VII.H. of this Permit.

VII.B.8. All raw data, such as laboratory reports, drilling logs, geological and hydrogeological investigations, bench-scale or pilot-scale data, and other supporting information gathered or generated during activities undertaken pursuant to the permit conditions in Module VII of this Permit shall be maintained at the facility during the effective term of this Permit, including any reissued permits, and be readily available for inspection.

VII.B.9. Should the FFACO be vacated, investigations completed under the FFACO/CERCLA remedial process may be utilized in complying with Module VII of this Permit in so much as the terms “Preliminary Assessment,” “Site Investigation,” “Remedial Investigation,” “Feasibility Study,” “Remedial Design,” and “Remedial Action” may be utilized in lieu of the terms “RCRA Facility Investigation,” “Corrective Measures Study,” and “Remedy Selection,” where appropriate.

VII.B.10. To the extent that work required by Module VII of this Permit must be done under permit(s) or approval(s) pursuant to other federal, state, or local regulatory authorities, the Permittee shall use its best efforts to obtain such permits. For the purposes of this Permit condition the term "best efforts" shall, at a minimum, mean submittal of a complete application for the permit(s) and/or approval(s) no later than sixty (60) calendar days after the information necessary to prepare the application is available to the Permittee.

VII.B.11. To the extent that work required by Module VII of this Permit must be done on property not owned or controlled by the Permittee, the Permittee shall use its best efforts to obtain site access agreements from the present owner(s) of such property no later than two (2) weeks prior to the scheduled commencement of work. Best efforts shall mean, at a minimum, a certified letter from the Permittee to the current property owner(s) requesting access to such property and if a reply is received from the property owner, follow-up letters from the Permittee, as appropriate, to clarify the work contemplated and address the owner's reasonable concerns. In the event that the Permittee cannot obtain the necessary access agreements, the Permittee shall notify the Director in writing. The Director shall, consistent with their legal authority, assist the Permittee in obtaining such agreements.

VII.C. NOTIFICATION REQUIREMENTS FOR, AND ASSESSMENT OF, NEWLY-IDENTIFIED SOLID WASTE MANAGEMENT UNITS

VII.C.1. The Permittee shall notify the Director in writing, by certified mail, express mail, or hand delivery, of any newly identified SWMU(s). The Permittee shall submit written notification to the Director within thirty (30) calendar days after discovery of newly identified SWMU(s). The notification shall include the location of the new SWMU(s) and information on the suspected or known wastes at the site.

VII.C.2. Within ninety (90) calendar days after discovery of the newly identified SWMU(s), the Permittee shall submit a Solid Waste Management Unit Assessment Plan to the Director by certified mail, express mail or hand delivery.

VII.C.3. The Solid Waste Management Unit Assessment Plan shall include the information or the means by which the following information shall be obtained:

VII.C.3.a. Information concerning past and present operations at the unit(s); and

VII.C.3.b. Any groundwater, surface water, soil (surface or subsurface strata), or air sampling and analysis data needed to determine whether a release of hazardous waste and/or hazardous constituent(s) from such unit(s) is likely to occur. The Solid Waste Management Unit Assessment Plan shall demonstrate that the sampling and analysis program, if applicable, is capable of yielding representative samples and must include parameters sufficient to identify migration of hazardous waste and/or hazardous constituent(s) from the newly identified Solid Waste Management Unit(s) to the environment.

VII.C.4. The Permittee shall receive written approval from the Director for the Solid Waste Management Unit Assessment Plan; or

VII.C.5. The Permittee shall receive written notice from the Director of the Solid Waste Management Unit Assessment Plan's deficiencies and the written notice shall specify a due date for submittal of a revised assessment plan; or

VII.C.6. The Permittee shall receive written notice from the Director of the revisions incorporated, by the Director, in the Solid Waste Management Unit Assessment Plan. The revised assessment plan shall become the approved Solid Waste Management Unit Assessment Plan.

VII.C.7. The Solid Waste Management Unit Assessment Plan, as approved by the Director, as specified in Permit Conditions VII.C.4., VII.C.5., or VII.C.6. of this Permit, shall be incorporated within Module VII of this Permit in accordance with Permit Condition VII.I. of this Permit. The Permittee shall be notified in writing of the approval of the permit modification.

VII.C.8. The Permittee shall implement the approved Solid Waste Management Unit Assessment Plan within thirty (30) calendar days after receipt of written notice of the permit modification approval specified in Permit Condition VII.C.7. of this Permit.

VII.C.9. The Solid Waste Management Unit Assessment Plan shall contain a schedule, which includes the submission date for a Solid Waste Management Unit Assessment Report, not to exceed thirty (30) calendar days after the completion of the requirements identified in the approved Solid Waste Management Assessment Plan referenced in Permit Condition VII.C.8. of this Permit.

VII.C.10. The Solid Waste Management Unit Assessment Report shall describe all results obtained from the implementation of the approved Solid Waste Management Unit Assessment Plan. At a minimum, the Report shall provide the following information for each newly identified SWMU:

VII.C.10.a. The location of each newly-identified SWMU(s) in relation to any/all previously identified SWMUs, building numbers, or other descriptive landmarks;

VII.C.10.b. The type and function of the unit, including general dimensions and a structural description;

VII.C.10.c. The period during which the unit was operated; and

VII.C.10.d. All wastes that were or are being managed at the SWMU, including results of any sampling and analysis used to determine whether releases of hazardous wastes and/or hazardous constituent(s) have occurred, are occurring, or are likely to occur from the unit.

VII.C.11. Based on the results of the Solid Waste Management Unit Assessment Report, the Director shall determine the need for further investigations at specific unit(s) included in the Solid Waste Management Unit Assessment. If the Director determines that such investigations are needed, the Director shall require the Permittee to prepare a plan for such investigations. This plan shall be reviewed for approval in accordance with the requirements of Permit Condition VII.D. of this Permit.

VII.C.12. The Permittee shall notify the Director, in writing by certified mail, express mail, or hand delivery, of any release(s) of hazardous waste and hazardous waste constituent(s) discovered during the course of groundwater monitoring, field investigation, environmental auditing, or other activities undertaken during the RCRA Facility Investigation. The written notification shall be received by the Director no later than fifteen (15) calendar days after discovery. Such releases may be from already documented or newly identified units. The Director may require further investigation of the newly identified releases. Further investigation, if required, shall be performed in accordance with the requirements of Permit Condition VII.D. of this Permit.

VII.D. RCRA FACILITY INVESTIGATION

The Permittee shall conduct a RCRA Facility Investigation to determine the nature and extent of known and suspected releases of hazardous waste and/or hazardous constituent(s) from each Solid Waste Management Unit at the facility and to gather data to support the Corrective Measures Study. The Permittee shall conduct the RCRA Facility Investigation in accordance with the requirements specified in Appendix A of this Permit.

VII.D.1. The Permittee shall prepare and submit the RCRA Facility Investigation, Task I Report, as specified in Appendix A of this Permit for each SWMU identified in Table 1 of this Permit in which a release of hazardous waste or hazardous constituent(s) has not been documented.

VII.D.1.a. The Permittee shall conduct a RCRA Facility Investigation - Phase I, in accordance with Appendix A, Task I.D of this Permit, for each SWMU in which a release of hazardous waste or hazardous constituent(s) has not been documented, as specified in Table 1 of this Permit.

VII.D.1.b. The Permittee shall evaluate the RCRA Facility Investigation - Phase I and identify SWMU(s) that require additional investigation under the RCRA Facility Investigation Phase II (Task II and Task III).

VII.D.1.c. Based on the data collected in the RCRA Facility Investigation - Phase I, the Permittee shall prioritize each SWMU, identified for additional investigation pursuant to Permit Condition VII.D.1.b. of this Permit, according to the SWMU's potential for imminent threat to human health and the environment.

VII.D.1.d. Based on the classification of the SWMU (s), pursuant to Permit Condition VII.D.1.c. of this Permit, the Permittee shall identify a need, if applicable, and recommend an alternate RCRA Facility Investigation schedule(s) for the additional investigation of any SWMU's potential for imminent threat to human health and the environment.

VII.D.1.e. The Director may modify the RCRA Facility Investigation schedules, specified in Tables 4, 5, and 6 of this Permit, pursuant to Permit Conditions VII.I.1. and VII.I.4. of this Permit, to allow additional investigations under the RCRA Facility investigation - Phase II (Task II and III) to be conducted according to the prioritization of the Solid Waste Management Units, in accordance with Permit Conditions VII.D.1.c. and VII.D.1.d. of this Permit.

VII.D.1.f. The Permittee shall prepare and submit the results of the RCRA Facility Investigation - Phase I in the Task I Report.

VII.D.2. The Permittee shall conduct the RCRA Facility Investigation, for all of the SWMUs listed in Table 1 of this Permit, in accordance with the schedule specified in Table 4 of this Permit.

VII.D.3. The Permittee shall conduct a RCRA Facility Investigation, excluding the RCRA Facility Investigation -Phase I requirements, as specified in Appendix A of this Permit, for each SWMU, specified in Table 2 of this Permit, in which a release of hazardous waste or hazardous waste constituent(s) has been documented. The RCRA Facility Investigation shall be conducted concurrently with the RCRA Facility Investigation - Phase I specified in Permit Condition VII.D.1.a. of this Permit.

VII.D.4. The Permittee shall conduct the RCRA Facility Investigation for the SWMUs specified in Table 2 of this Permit in accordance with the schedule specified in Table 5 of this Permit.

VII.D.5. The RFI compliance schedules specified in Tables 4 and 5 of this Permit may be modified in accordance with Permit Condition VII.I. of this Permit.

VII.E. INTERIM MEASURES

VII.E.1. If during the course of any activity initiated in compliance with the permit conditions of Module VII of this Permit, the Director determines that a release or potential release of hazardous waste and/or constituent(s) from an SWMU poses a threat to human health and/or the environment, the Director may require the Permittee to perform specific interim measures.

VII.E.2. The Director shall notify the Permittee in writing of the requirement to perform the interim measures specified in the Interim Measures Plan, in accordance with Permit Condition VII.E.3. of this Permit. The Permittee shall comply with the specified Interim Measures Plan alternative (Permit Condition VII.E.3.a. or VII.E.3.b. of this Permit) designated in the written notification.

VII.E.3. The Permittee shall perform the requirements of the Interim Measures Plan in accordance with the alternative specified in either Permit Condition VII.E.3.a. or VII.E.3.b. of this Permit.

VII.E.3.a. The Director shall determine specific actions to implement the interim measures. The Director shall provide an Interim Measures Plan with the written notification specified in Permit Condition VII.E.2. of this Permit. or;

VII.E.3.b. Within thirty (30) calendar days after receipt of written notification requiring the Interim Measures Plan as specified in Permit Condition VII.E.2. of this Permit, the Permittee shall provide, by certified mail, express mail, or hand delivery, the Interim Measures Plan to the Director for approval.

VII.E.4. The Interim Measures Plan shall identify specific action(s) to be taken to implement the interim measures and a schedule for implementing the required measures. At a minimum, the Interim Measures Plan shall consider, but not be limited to, the

following factors:

VII.E.4.a. Time required to develop and implement a final remedy;

VII.E.4.b. Actual and potential exposure of human and environmental receptors;

VII.E.4.c. Actual and potential contamination of drinking water supplies and sensitive ecosystems;

VII.E.4.d. The potential for further degradation of the medium absent of interim measures;

VII.E.4.e. Presence of hazardous waste that may pose a threat of release;

VII.E.4.f. Presence and concentration of hazardous waste including hazardous waste constituent(s) in solids that have the potential to migrate to groundwater or surface water;

VII.E.4.g Weather conditions that may affect the current levels of contamination;

VII.E.4.h. Risks of fire, explosion, or accident; and

VII.E.4.i. Other situations that may pose threats to human health and/or the environment.

VII.E.5. The Interim Measures Plan shall be incorporated into this Permit in accordance with Permit Condition VII.H. of this Permit.

VII.F. DETERMINATION OF NO FURTHER ACTION

VII.F.1. Based on the results of the RFI and other relevant information, the Permittee may petition the Director to terminate all or parts of the Corrective Action for Solid Waste Management Units Schedule of Compliance.

VII.F.1.a. This petition shall contain information demonstrating that there are no releases of hazardous waste including hazardous waste constituents from SWMU(s) at the facility that pose a threat to human health and the environment.

VII.F.1.b. If, based upon a review of the Permittee's petition the results of the RFI, and other information the Director determines that releases or suspected releases which were investigated either are non-existent or do not pose a threat to human health and the environment, the Director shall grant the request to terminate all or part of the Corrective Action for Solid Waste Management Units Schedule of Compliance.

VII.F.2. A determination of no further action shall not preclude the Director from requiring continued or periodic monitoring of air, soil, ground water, or surface water, when site specific circumstances indicate that a release of hazardous waste including hazardous waste constituents are likely to occur, if necessary to protect human health and the environment.

VII.F.3. A determination of no further action shall not preclude the Director from requiring further investigations, studies, or remediation at a later date, if new information or subsequent analysis indicates that a release or the likelihood of a release from a SWMU at the facility is likely to pose a threat to human health or the environment. In such a case, the Director shall initiate a modification to the Corrective Action for Solid Waste Management Units Schedule of Compliance according to the procedures in Permit Condition VII.I. to rescind the determination made in accordance with Permit Condition VII.F.1.

VII.G. CORRECTIVE MEASURES STUDY AND IMPLEMENTATION

VII.G.1. Based on the results of the RCRA Facility Investigation, the Permittee shall identify, screen, and develop the alternative or alternatives for removal, containment, treatment and/or other redemption of the contamination. The Permittee shall conduct the Corrective Measures Study in accordance with the requirements specified in Appendix B (Task I, II, III, and V) of this Permit.

VII.G.2. Upon the Director's approval of the Corrective Measures Study, pursuant to Permit Condition VII.G.1. of this Permit, the Permittee shall prepare and submit, to the Director, by certified mail, express mail, or hand delivery, for approval, the Corrective Measures Implementation Program Plan, in accordance with the requirements specified in Appendix B, Task V.A. of this Permit.

VII.G.3. Upon the Director's approval of the Corrective Measures Implementation Program Plan, pursuant to Permit Condition VII.G.2. of this Permit, the Permittee shall conduct the Corrective Measures Implementation Program Plan in accordance with the requirements specified in Appendix B, Task V of this Permit [the corrective measures design (Task V.B.) and construction of the corrective measures (Task V.C.)].

VII.G.4. The Permittee shall conduct the Corrective Measures Study and prepare the Corrective Measures Implementation Program Plan, as specified in Permit Conditions VII.G.1. and VII.G.2. of this Permit, in accordance with the schedule specified in Table 6 of this Permit.

VII.G.5. The Permittee shall prepare and submit, to the Director for approval a compliance schedule for conducting the Corrective Measures Implementation Program Plan, as required by Permit Condition VII.G.3. of this Permit.

VII.G.5.a. The Permittee shall provide a justification for each compliance date in the compliance schedule based on the complexity of the Corrective Measures Implementation Program Plan and reasonable contract and administrative time requirements.

VII.G.5.b. On or before the compliance date for submittal of the draft Corrective Measures Implementation Program Plan specified in Table 6 of this Permit, the Permittee shall submit the compliance schedule and subsequent justification, pursuant to Permit Condition of this Permit, by certified mail, express mail, or hand delivery, to the Director for approval.

VII.G.5.c. Upon the Director's approval of the Corrective Measures Implementation Program Plan compliance schedule, the compliance schedule shall be incorporated into this Permit concurrently with the final Corrective Measures Implementation Program Plan,

in accordance with IDAPA 58.01.05.012 [40 CFR §§ 270.41 and 270.42].

VII.G.6. The Permittee shall conduct the Corrective Measures Implementation, as specified in Permit Condition VII.G.3. of this Permit, in accordance with Permit Condition VII.G.5. of this Permit.

VII.G.7. The Corrective Measures Study and Corrective Measures Implementation compliance schedules, specified in Table 6 of this Permit, shall be modified in accordance with Permit Condition VII.I. of this Permit.

VII.H. REPORTING REQUIREMENTS

VII.H.1. The Permittee shall submit to the Director signed semiannual progress reports of all activities (*i.e.*, Solid Waste Management Unit Assessments, Interim Measures, RCRA Facility Investigations, and/or Corrective Measures Studies) conducted pursuant to the permit conditions of Module VII of this Permit. The Permittee shall initially submit the semiannual progress reports no later than ninety (90) calendar days after being notified in writing that the approved Solid Waste Management Unit Assessment Plan has been incorporated within Module VII of this Permit, through a permit modification in accordance with Permit Condition VII.I. of this Permit.

VII.H.2. At a minimum, the semiannual progress reports shall contain the following:

VII.H.2.a. A description of the work completed;

VII.H.2.b. Summaries of all findings and summaries of all raw data;

VII.H.2.c. Summaries of all problems or potential problems encountered during the reporting period and actions taken or to be taken to rectify problems; and

VII.H.2.d. Projected work for the next reporting period.

VII.H.3. The Permittee shall maintain copies of other reports, drilling logs, etc. at the facility during the effective period of this Permit. The Permittee shall provide copies of the said reports, logs, etc. to the Director upon request.

VII.H.4. As specified under Permit Condition VII.F.3. of this Permit, the Director may require the Permittee to conduct new or more extensive assessments, investigations, or studies, as needed, based on information provided in these progress reports or other supporting information.

VII.I. MODIFICATION OF THE CORRECTIVE ACTION SCHEDULE OF COMPLIANCE

Requests for modifications of the final compliance dates pursuant to the permit conditions in Module VII of this Permit shall be submitted to the Director for approval, in accordance with IDAPA 58.01.05.012 [40 CFR §§ 270.41 and 270.42]. The Corrective Action Schedule of Compliance (Module VII of this Permit) final compliance dates subject to modification include:

VII.I.1. The compliance date(s), as specified in Table 5 of this Permit, for submittal of the

RCRA Facility Investigation Final Report (Appendix A, Task V);

VII.I.2. The compliance date(s), as specified in Table 6 of this Permit for submittal of the Corrective Measures Study Report (Appendix A, Task I, II, & III);

VII.I.3. The compliance date(s), as specified in Table 6 of this Permit, for submittal of the final Corrective Measures Implementation Program Plan (Appendix A, Task V.A.), in accordance with Permit Condition VII.F.2. of this Permit;

VII.I.4. Once established in accordance with Permit Condition VII.G.5. of this Permit, the compliance date(s) for submittal of the corrective measures final (100% completion) design and construction plans, in accordance with Permit Condition VII.G.3. of this Permit;

VII.I.5. Compliance dates, as specified in Tables 5 and 6 of this Permit, for implementing the approved plans and/or reports; and

VII.I.6. Compliance dates for quarterly submittal of progress reports.

VII.I.7. Pursuant to IDAPA 58.01.05.012 [40 CFR § 270.42(a)], the compliance schedules specified in Tables 5 and 6 of this Permit, shall be modified if the Director determines that good cause exists for which the Permittee had no control and for which there is no reasonable available remedy.

VII.I.8. Failure to obtain adequate funds or appropriations to conduct the Corrective Measures Implementation Program Plan, pursuant to Permit Condition VII.G.3. of this Permit, shall be considered good cause for modification of the compliance schedule(s), Table 6 of this Permit, as specified in Permit Condition VII.I.7. of this Permit, only in accordance with the following permit conditions:

VII.I.8.a. The Permittee shall use its best effort to secure all funds that may be required for implementation of the requirements specified in Permit Condition VII.G.3. of this Permit pursuant to the compliance schedule in Table 6 of this Permit;

VII.I.8.b. If necessary, the Permittee shall seek, by the most expeditious means possible, appropriations from the U.S. Congress for funding to achieve the compliance schedule in Table 6 of this Permit, in accordance with Sections 1-4 and 1-5 of executive Order 12088 as implemented by the Office of Management and Budget Circular A-106, as amended. Section 1-5 of executive Order 12088 states “The head of each executive agency shall ensure that sufficient funds for compliance with applicable pollution control standards are requested in the Agency budget.”

VII.I.8.c. Within five (5) calendar days after failing to obtain adequate funding, the Permittee shall submit to the Director, by certified mail, express mail, or hand delivery, a written request and justification, for modification of the compliance schedule specified in Table 6 of this Permit. The written justification shall demonstrate that good cause exists, pursuant to the permit conditions under VII.I.8. of this Permit. The Permittee shall also provide an alternate schedule of compliance for conducting the Corrective Measures Implementation for the subsequent fiscal year.

VII.I.8.d. Upon evaluation, if the Director determines that good cause exists in accordance with the permit conditions under VII.I.8. of this Permit, the Director shall modify the compliance schedule.

VII.I.8.e. For any approved modification, the compliance schedule specified in Table 6 of this Permit shall be modified to provide relief from the original compliance schedule time-frames only for the subsequent fiscal year. All successive compliance dates after the end of such fiscal year shall be modified to reflect the original time-frames specified prior to the modification request under Permit Condition VII.I.8. of this Permit.

VII.I.9. Failure to obtain adequate funds or appropriations from Congress shall not, in any way, release the Permittee from it's obligation to comply with the Corrective Measures Implementation (as required by Permit Condition VII.G.3 of this Permit) or any other requirement of this Permit or RCRA.

VII.I.10. If adequate funds for Corrective Measures Implementation are not available, the Director reserves the right to pursue any action or actions deemed necessary to protect human health and the environment, not excluding judicial recourse or termination of this Permit.

VII.I.11. The Permittee shall submit a request for modifications of the interim compliance dates that do not affect the final compliance dates, to the Director for approval. If the Director approves the interim compliance date modifications, Tables 4, 5 and/or 6 of this Permit shall incorporate the modified compliance dates as approved and such change shall not be considered a permit modification under IDAPA 58.01.05.012 [40 CFR § 270.41].

APPENDIX A - RCRA FACILITY INVESTIGATION

TASK I: DESCRIPTION OF CURRENT CONDITIONS

The Permittee shall submit for the Director's approval a report providing the background information pertinent to the Facility (Idaho National Laboratory), contamination and interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data shall be included.

I.A. BACKGROUND INFORMATION

I.A.1. Map(s), consistent with the requirements set forth in IDAPA 58.01.05.012 [40 CFR § 270.14(b)(19)] and be of sufficient detail and accuracy to locate and report all current and future work performed at the site, depicting the following:

I.A.1.a. All solid or hazardous waste treatment, storage or disposal areas including all solid waste management units, active after November 19, 1980;

I.A.1.b. All known past solid or hazardous waste treatment, storage or disposal areas including solid waste management units regardless of whether they were active on November 19, 1980;

I.A.1.c. All known past or present product and waste underground tanks or piping;

I.A.1.d. The location of all production and groundwater monitoring wells. These wells shall be clearly labeled and ground and top of casing elevations and construction details included.

I.A.2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage, and disposal activities at the Facility;

I.A.3. Approximate dates or periods of past product (to aid in the evaluation of determining the source for any contamination) and waste spills, type of materials spilled, and a description of the response actions conducted, including any inspection reports or technical reports generated as a result of the response; and

I.A.4. A list of documents and studies prepared for the Facility.

I.B. NATURE, EXTENT, AND RATE OF MIGRATION OF CONTAMINATION

The Permittee shall prepare and submit for the Director's approval a preliminary report describing the existing information on the nature and extent of contamination.

I.B.1. The report shall summarize all possible source areas of contamination. This, at minimum, should include all regulated units, solid waste management units, waste and product spill areas, and other suspected source areas of contamination. For each area, the Permittee shall identify the following:

I.B.1.a. Location of area (on a Facility map);

I.B.1.b. Quantities of solid and hazardous wastes;

I.B.1.c. Hazardous waste or hazardous waste constituents, to the extent known; and

I.B.1.d. Identification of areas where additional information is necessary.

I.B.2. The report shall include an assessment and description of the existing degree and extent of contamination. This should include:

I.B.2.a. Available monitoring data and qualitative information on locations and levels of contamination at the Facility;

I.B.2.b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, hydrogeochemistry, water quality, meteorology, and air quality; and

I.B.2.c. The potential impact(s) on human health and the environment, including demography, groundwater and surface water use, and land use.

I.C. PAST/CURRENT ACTIVITIES

The Permittee shall document investigatory and/or remedial activities which were or are being undertaken at the Facility. This shall include:

I.C.1. Objectives of these activities; how the activities are mitigating potential threats to human health and the environment and/or are consistent with and integrated into RCRA Facility Investigation work at the Facility;

I.C.2. Design, construction, operation, and maintenance requirements; and

I.C.3. Schedules for all activities, including progress reports.

I.D. RCRA FACILITY INVESTIGATION-PHASE I

I.D.1. For each SWMU in which a release of hazardous waste or hazardous waste constituents has not been documented, as specified on Table 1 of this Permit, the Permittee shall conduct a RCRA Facility Investigation-Phase I to document a release or absence of a release of hazardous waste or hazardous waste constituents.

I.D.2. The Permittee shall prepare and submit a RCRA Facility Investigation-Phase I Workplan to the Director for approval. The RCRA Facility Investigation-Phase I Workplan shall include the development of several plans, which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RCRA Facility Investigation-Phase I Workplan to increase or decrease the amount of information collected to accommodate the Facility specific situation. The Facility Investigation-Phase I Workplan shall include, but not be limited to the following:

I.D.2.a. RCRA Facility Investigation-Phase I Project Management Plan. The Permittee shall prepare a Project Management Plan which shall include a discussion of the technical approach, schedules, and personnel. The Project Management Plan shall evaluate

each Solid Waste Management Unit based on its actual or potential threat to human health and the environment and prioritize the investigatory and/or remedial activities accordingly. The Project Management Plan shall also include a description of qualifyications of personnel performing or directing the RCRA Facility Investigation, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

I.D.2.b. RCRA Facility Investigation-Phase I Data Collection Quality Assurance Plan. The Permittee shall prepare a plan documenting all monitoring procedures, including; sampling, field measurements and sample analyses performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid, and properly documented. The Data Quality Assurance Plan shall include, but not be limited to, the following:

(1) A Data Collection Strategy section which shall include, but not be limited to; the level of precision and accuracy for all data (factors which should be considered include the environmental conditions at the time of sampling, number of sampling points, and the representatives of selected media and selected analytical parameters), a description of methods and procedures to assess the precision, accuracy and completeness of the measurement data, a description of the measures to be taken to assure that data generated by the Permittee and outside laboratories or consultants during the RCRA Facility Investigation-Phase I can be compared to each other (these data shall be comparable during the entire RCRA Facility Investigation), <u>and</u> details relating to the schedules and information to be provided in quality assurance reports which shall include, but not be limited to:

- Periodic assessment of measurement data accuracy, precision, and completeness;
- Results of performance audits;
- Results of system audits; and
- Potential quality assurance problems and recommended solutions.

(2) A Sample Collection section which shall include, but not be limited to a discussion of, selecting appropriate sampling locations (depths, etc.), providing a statistically significant number of sampling sites, determining conditions under which sampling should be conducted, determining which media are to be sampled (*e.g.*, groundwater, air, soil, sediment, etc.), determining which parameters are to be measured and where, selecting the frequency of sampling and length of sampling period, selecting the type of samples (*e.g.*, composites Versus grabs) and number of samples to be collected, measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points, selecting appropriate sample containers, sample preservation, chain-of-custody (*e.g.*, standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment as well as prepared sample labels containing all information necessary for effective sample tracking), and documenting field sampling operations and procedures, including:

- Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (*e.g.*, filters, and absorbing reagents);
- Procedures and forms for recording the exact location and specific

considerations associated with sample acquisition;
- Documentation of specific sample preservation method;
- Calibration of field devices;
- Collection of replicate samples;
- Submission of field-biased blanks, where appropriate;
- Potential interferences present at the Facility;
- Construction materials and techniques, associated with monitoring wells and piezometer;
- Field equipment listing and types of sample containers;
- Sampling order; and
- Decontamination procedures.

(3) A Field Measurements section which shall include, but not be limited to, a discussion of selecting appropriate field measurements (locations, depth, etc.), providing a statistically significant number of field measurements, measuring all necessary ancillary data, determining conditions under which field measurements should be conducted, determining which media are to be addressed by appropriate field measurements (*e.g.*, groundwater, air, soil, sediment, etc.), determining which parameters are to be measured and where, selecting the frequency of field measurements and length of field measurements period, and documenting field measurements and procedures, including:

- Procedures and forms for recording raw data and the exact location, time and Facility-specific considerations associated with the data acquisition;
- Calibration of field devices;
- Collection of replicate measurements;
- Submission of field-biased blanks;
- Potential interferences present at the Facility;
- Construction associated with monitoring wells and piezometers used to collect field data;
- Field equipment listing;
- Order in which field measurements were made; and
- Decontamination procedures.

(4) A Sample Analysis section which shall specify: chain-of-custody procedures [*i.e.*, identification of a responsible party to act as sample custodian at the laboratory who is “Facility authorized” to sign for incoming field samples - obtain documents of shipment - and verify the data entered onto the sample custody records, provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and specification of laboratory sample custody procedures (*e.g.*, for sample handling, storage, and disbursement for analysis)]; sample storage procedures and storage times; sample preparation methods; analytical procedures (*i.e.*, scope and application of the procedure, sample matrix, potential interferences, precision and accuracy of the methodology, and method detection limits); calibration procedures and frequency; data reduction, validation and reporting; preventative maintenance procedures and schedules; corrective action (for laboratory problems); turnaround time; and internal quality control checks, laboratory performance and systems audits and frequency, including:

- Method blank(s);

- Laboratory control sample(s);
- Calibration check sample(s);
- Replicate sample(s);
- Matrix-spiked sample(s);
- "Blind" quality control sample(s);
- Control charts;
- Surrogate samples;
- Zero and span gases; and
- Reagent quality control checks.

I.D.2.c. RCRA Facility Investigation-Phase I Data Management Plan. The Permittee shall develop and initiate a RCRA Facility Investigation-Phase I Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

- A Data Record section which shall include; unique sample or field measurement code, sampling or field measurement location and sample or measurement type, sampling or field measurement raw data, laboratory analysis ID number, and result of analysis.
- A Tabular Display section which shall present; raw data, results for each medium or each constituent monitored, data reduction for statistical analysis, sorting of data by potential stratification factors (*e.g.*, location, soil layer, topography), and summary data.
- A Graphical Format section (*e.g.*, bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.) which shall present: sampling location and sampling grid; boundaries of sampling area, and areas where additional data is required; levels and extent of contamination at each sampling location; contamination levels, averages, and maxima; changes in concentration in relation to distance from the source, time, depth, or other parameters; and features affecting intramedia transport and potential receptors.

I.D.2.d. RCRA Facility Investigation-Phase I Health and Safety Plan. The Permittee shall prepare a Health and Safety Plan, which shall include:

- Facility description including delineation of work area and availability of resources such as roads, water supply, electricity, and telephone service;
- Known hazards and risks associated with each activity conducted;
- Key personnel and alternatives responsible for site safety, response operations, and for protection of public health;
- Levels of protection to be worn by personnel in work areas (and justification);
- Procedures to control site access; and
- The Facility Health and Safety Plan shall be consistent with all applicable federal, state, and local regulations such as: NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site activities (1985), EPA Order 1440.1 - Respiratory Protection, EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field activities, Facility Contingency Plan, EPA Standard Operating Guide (1984), OSHA regulations (*i.e.*, 29 CFR Parts 1910 and 1926 including Interim Final Rule (29 CFR Part 1910) published in the December 19,

1986 Federal Register), state and local regulations, and other applicable EPA guidance.

I.D.3. Determination of Further Action

I.D.3.a. The Permittee shall provide recommendations for further investigation under a RCRA Facility Investigation-Phase I at the identified Solid Waste Management Unit(s) based on documentation of a known or prior release from the specified SWMU(s) in the final Task I report.

I.D.3.b. The list of recommended SWMU(s) for further investigation under a RCRA Facility Investigation-Phase I shall be prioritized based on the actual or potential threat to human health or the environment.

TASK II: RCRA FACILITY INVESTIGATION-PHASE II WORKPLAN

The Permittee shall prepare a RCRA Facility Investigation-Phase II Workplan. This RCRA Facility Investigation-Phase II Workplan shall include the development of several plans, which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RCRA Facility Investigation-Phase II Workplan to increase or decrease the amount of information collected to accommodate the facility-specific situation. The RCRA Facility Investigation-Phase II Workplan shall include, but not be limited to, the following:

II.A. PROJECT MANAGEMENT PLAN

The Permittee shall prepare a Project Management Plan which shall include a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan shall evaluate each SWMU based on it's actual or potential threat to human health and the environment and prioritize the investigator and/or remedial activities accordingly. The Project Management Plan shall also include a description of qualifications of personnel performing or directing the RCRA Facility Investigation, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

II.B. DATA COLLECTION QUALITY ASSURANCE PLAN

The Permittee shall prepare a plan documenting all monitoring procedures, including: sampling, field measurements and sample analyses performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information and data is properly documented.

II.B.1. The Data Collection Strategy section of the Data Collection Quality Assurance Plan shall include, but not be limited to, those requirements set forth under section I.D.2.b.(1) of this appendix.

II.B.2. The Sample Collection section of the Data Collection Quality Assurance Plan shall include, but not be limited to, those requirements set forth under Section I.D.2.b.(2) of this appendix.

II.B.3. The Field Measurements section of the Data Collection Quality Assurance Plan shall include, but not be limited to, those requirements set forth under Section I.D.2.b.(3) of

this appendix.

II.B.4. The Sample Analysis section of the Data Collection Quality Assurance Plan shall include, but not be limited to, those requirements set forth under Section I.D.2.b.(4) of this appendix.

II.C. DATA MANAGEMENT PLAN

The Permittee shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation. This plan shall include, but not be limited to, those requirements set forth under Section I.D.2.c. of this appendix.

II.D. HEALTH AND SAFETY PLAN

The Permittee shall prepare a Health and Safety Plan which shall include, but not be limited to, those requirements set forth under Section I.D.2.d. of this appendix.

II.E. COMMUNITY RELATIONS PLAN

The Permittee shall prepare a plan for the dissemination of information to the public regarding investigation activities and results.

TASK III: FACILITY INVESTIGATION

The Permittee shall conduct a facility investigation to characterize the Facility (environmental setting), define the source(s) and degree and extent of contamination, and identify actual or potential receptors. This investigation shall be conducted in accordance with Task II and shall produce data of adequate technical quality to support the development and evaluation of the corrective measure alternative or alternatives during the Corrective Measures Study.

III.A. ENVIRONMENTAL SETTING

III.A.1. Hydrogeology

III.A.1.a. A description of the regional and site specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the Facility, including:

- Regional and site specific stratigraphy; description of strata including strike and dip, identification of stratigraphic contacts;
- Structural geology: description of local and regional structural features (*e.g.*, folding, faulting, tilting, jointing, etc.);
- Depositional history;
- Locations and amounts of recharge and discharge; and
- Regional and site specific groundwater flow, including seasonal and temporal variations in the groundwater flow regime.

III.A.1.b. An analysis of any topographic features that might influence the groundwater flow

system. (Note: Stereographic analysis of aerial photographs may aid in this analysis).

III.A.1.c. Based on field data, test, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the Facility (*i.e.*, the aquifers and any intervening saturated and unsaturated units), including:

- Hydraulic conductivity and porosity (total and effective);
- Lithology, grain size, sorting, degree of cementation;
- An interpretation of hydraulic interconnections between saturated zones; and
- The attenuation capacity and mechanisms of the natural earth materials (*e.g.*, ion exchange capacity, organic carbon content, mineral content, etc.).

III.A.1.d. Based on field studies and cores, structural and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:

- Sand and gravel deposits in unconsolidated deposits;
- Zones of fracturing or channeling in consolidated or unconsolidated deposits;
- Zones of high and low permeability that might direct and restrict the flow contaminants;
- The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs; and
- Water-bearing zones above the first confining layer that may serve as pathways for contaminant migration including perched zones of saturation.

II.A.1.e. Based on data obtained from groundwater monitoring wells and piezometer(s) installed upgradient and downgradient of the potential contaminant source(s), a representative description of water level or fluid pressure monitoring including:

- Potentiometric maps;
- Hydrologic cross sections showing vertical gradients;
- The flow system, including the vertical and horizontal components of flow; and
- Any temporal changes in hydraulic gradients, for example, due to seasonal influences.

III.A.1.f. A description of manmade influences that may affect the hydrogeology of the site, identifying:

- Active and inactive local water-supply and production wells with an approximate schedule of pumping; and
- Manmade hydraulic structures (pipelines, French drains, ditches, unlined ponds, septic tanks, National Pollution Discharge Elimination System outfalls, retention areas, etc.).

III.A.2. Soils

The Permittee shall characterize the soil and rock units above the water table in the vicinity of the contaminant release(s). Such characterization shall include, but not be limited to, the following information:

III.A.2.a. SCS soil classification;

III.A.2.b. Surface soil distribution;

III.A.2.c. Soil profile, including ASTM classification of soils;

III.A.2.d. Transects of soil stratigraphy;

III.A.2.e. Hydraulic conductivity (saturated and unsaturated);

III.A.2.f. Relative permeability;

III.A.2.g. Bulk density;

III.A.2.h. Porosity;

III.A.2.i. Soil sorptive capacity;

III.A.2.j. Cation exchange capacity;

III.A.2.k. Soil organic content;

III.A.2.l. Soil pH;

III.A.2.m. Particle size distribution;

III.A.2.n. Depth of water table;

III.A.2.o. Moisture content;

III.A.2.p. Effect of stratification on unsaturated flow;

III.A.2.q. Infiltration;

III.A.2.r. Evapotranspiration;

III.A.2.s. Storage capacity;

III.A.2.t. Vertical flow rate;

III.A.2.u. Mineral content; and

III.A.2.v. Redox potential.

III.A.3. Surface Water and Sediment

The Permittee shall characterize the temporal and permanent surface water bodies in the vicinity of the Facility. Such characterization shall include, but not be limited to, the following information:

III.A.3.a. Location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume for lakes and estuaries;

III.A.3.b. Location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment for surface impoundments;

III.A.3.c. Location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (*i.e.*, 100 year event) for streams, ditches, drains, swamps and channels;

III.A.3.d. Drainage patterns;

III.A.3.e. Evaporation;

III.A.3.f. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (NH_3, NO_3-NO2-, PO_{4-3}), chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc., and

III.A.3.g. Description of sediment characteristics including, deposition area, thickness profile, and physical and chemical parameters (*e.g.*, grain size, density, organic carbon content, ion exchange, pH, etc.)

III.A.4. Air

The Permittee shall provide information characterizing the climate in the vicinity of the Facility. Such information shall include, but not be limited to:

III.A.4.a. A description of the following parameters:

- Annual and monthly rainfall averages;
- Monthly temperature averages and extremes;
- Wind speed and direction;
- Relative humidity/dew point;
- Atmospheric pressure;
- Evaporation data;
- Development of inversions; and
- Climate extremes that have been known to occur in the vicinity of the Facility, including frequency of occurrence.

III.A.4.b. A description of topographic and manmade features which affect air flow and emission patterns, including;

- Ridges, hills or mountain areas;
- Canyons or valleys;
- Surface water bodies (*e.g.*, rivers, lakes, bays, etc.);
- Wind breaks and forests, and
- Buildings.

III.B. SOURCE CHARACTERIZATION

The Permittee shall collect analytical data to characterize the wastes and the areas where wastes have been placed, collected or removed including: type, quantity, physical form, disposition, and Facility characteristics affecting release (*e.g.*, Facility security, and engineered barriers). This shall include the quantification of the following specific characteristics (as well as the documentation of the procedures used in making the determinations), at each source area:

III.B.1. Unit/Disposal Area Characteristics;

III.B.1.a. Location of unit/disposal area;

III.B.1.b. Type of unit/disposal area;

III.B.1.c. Design features;

III.B.1.d. Operating practices (past and present);

III.B.1.e. Period of operation;

III.B.1.f. General physical conditions; and

III.B.1.g. Method used to close the unit/disposal area.

III.B.2. Waste Characteristics:

III.B.2.a. Type of waste placed in the unit;

- Hazardous Classification (*e.g.*, ignitable, reactive, corrosive, toxic);
- Quantity; and
- Chemical composition.

III.B.2.b. Physical, chemical, and biological characteristics;

- Physical form (solid, liquid, gas);
- Physical description (*e.g.*, powder, oily sludge);
- Temperature;
- pH;
- General chemical class (*e.g.*, acid, base, solvent);
- Molecular weight;
- Density;
- Boiling point;
- Viscosity;
- Solubility in water;
- Cohesiveness of the waste;
- Vapor pressure;
- Flash point;
- Sorption;
- Biodegradability/bioconcentration/biotransformation;
- Photodegradation rates;
- Hydrolysis rates; and
- Chemical transformations.

III.C. CONTAMINATION CHARACTERIZATION

The Permittee shall collect analytical data on groundwater, soils, surface water, sediment, and subsurface gas contamination in the vicinity of the Facility. These data shall be sufficient to define the extent, origin, direction, and rate on movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found, and conditions during sampling, and the identity of the individuals performing the sampling and analysis. The data shall also include an assessment of the risk of explosion from each SWMU. The Permittee shall address and document all the procedures used in addressing the following types of contamination at the Facility:

III.C.1. Groundwater contamination

The Permittee shall conduct a ground-water investigation to characterize any plumes of contamination at the Facility. This investigation shall at a minimum provide the following information:

III.C.1.a. A description of the horizontal and vertical extent of any immiscible or dissolved contaminant plume(s) originating from the Facility;

III.C.1.b. The horizontal and vertical direction of contamination movement;

III.C.1.c. The velocity of contaminant movement;

III.C.1.d. The horizontal and vertical concentration profiles of reasonable suspected hazardous wastes and/or hazardous constituents in the plume(s);

III.C.1.e. An evaluation of factors influencing the plume movement;

III.C.1.f. An extrapolation of future contaminant movement.

III.C.2. Soil contamination

The Permittee shall conduct an investigation to characterize any contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

III.C.2.a. A description of the vertical and horizontal extent of any contamination;

III.C.2.b. A description of contaminant and soil chemical properties within the contaminant source area and plume. This precludes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;

III.C.2.c. Specific contaminant concentrations;

III.C.2.d. The velocity and direction of contaminant movement; and

III.C.2.e. An extrapolation of future contaminant movement.

III.C.3. Surface Water and Sediment Contamination

The Permittee shall conduct an investigation of surface water contamination at the Facility. The investigation shall include, but not be limited to, the following information:

III.C.3.a. A description of the horizontal and vertical extent of any immiscible or dissolved contaminant plume(s) originating from the Facility, and the extent of contamination in underlying sediments;

III.C.3.b. The horizontal and vertical direction of contaminant movement;

III.C.3.c. The contaminant velocity;

III.C.3.d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;

III.C.3.e. An extrapolation of future contaminant movement; and

III.C.3.f. A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

III.C.4. Air Contamination

The Permittee shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information:

III.C.4.a. A description of the horizontal and vertical direction and velocity of contaminant movement;

III.C.4.b. The rate and amount of the release; and

III.C.4.c. The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

III.C.5. Subsurface Gas Contamination

The Permittee shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste and hazardous waste constituents in the ground water. This investigation shall include the following information:

III.C.5.a. A description of the horizontal and vertical extent of subsurface gases migration;

III.C.5.b. The chemical composition of the gases being emitted;

III.C.5.c. The rate, amount, and density of the gases being emitted;

III.C.5.d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

III.D. POTENTIAL RECEPTORS

The Permittee shall collect data describing the human populations and environmental systems that may be affected by contaminant exposure from the Facility. Chemical analysis of biological samples may also be needed. Data on observable effects in ecosystems may also be obtained. The following characteristics shall be identified:

III.D.1. Current and possible future uses of ground water and surface water, including type of use and location of ground water users.

III.D.2. Human use of or access to the Facility and adjacent lands, including but not limited to:

III.D.2.a. Recreation;

III.D.2.b. Hunting;

III.D.2.c. Residential;

III.D.2.d. Commercial;

III.D.2.e. Zoning; and

III.D.2.f. Relationship between population locations and prevailing wind direction.

III.D.3. A description of the biota in surface water bodies on, adjacent to, or affected by the Facility.

III.D.4. A description of the ecology overlying and adjacent to the Facility.

III.D.5. A demographic profile of the people who use or have access to the Facility and adjacent land, including, but not limited to; age, sex, and sensitive subgroups.

III.D.6. A description of any endangered or threatened species near the Facility.

TASK IV: INVESTIGATION ANALYSIS

The Permittee shall prepare an analysis and summary of all Facility investigations and their results. The objective of this task shall be to ensure that the investigation data is sufficient in quality and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to produce the Corrective Measures Study.

IV.A. DATA ANALYSIS

The Permittee shall analyze all Facility investigation data outlined in Task III and prepare a report on the type and extent of contamination at the Facility including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to on-site and off-site background levels as appropriate, *i.e.* at the Facility and/or surrounding communities).

IV.B. PROTECTION STANDARDS

IV.B.1. Ground-water Protection Standards

For regulated units, the Permittee shall provide information to support the Department's selection/development of Ground-water Protection Standards for all of the Appendix IX constituents found in the ground water during the Facility Investigation (Task IV). The Ground-water Protection Standards shall consist of:

IV.B.1.a. The background level of a constituent or chemical agent in the groundwater; or

IV.B.1.b. For any of the constituents listed in IDAPA 58.01.05.008 [Table 1 of 40 CFR § 264.94], the respective value given in Table 1 if the background level of the constituent is below the value given in Table 1; or

IV.B.1.c. A Director-approved Alternate Concentration Limit (ACL). For any proposed Alternate Concentration Limits, the Permittee shall include a justification based upon the criteria specified in IDAPA 58.01.05.008 [40 CFR § 264.94(b)].

IV.B.2. Soil Protection Standards

For regulated units, the Permittee shall provide information to support the Director's selection/development of Soil Protection Standards for all of the hazardous wastes and hazardous waste constituents found in the soil during the Facility Investigation (Task IV). The Soil Protection Standards shall consist of:

IV.B.2.a. The background concentration levels for any suspected hazardous inorganic constituent(s) in the soil shall be established by collecting a minimum of sixteen (16) background samples in similar geologic strata (location of background samples shall be approved by the Director) and establishing an initial background arithmetic mean and Variance for each inorganic constituents. The arithmetic mean and variance shall be calculated based on at least four (4) replicate measurements of each constituents and comparing these results with it's initial background arithmetic mean. The comparison shall consider individually each inorganic constituent, and shall use Cochran's Approximation to the Behrens-Fisher Student's T-test at the 0.05 level of confidence, as specified in IDAPA 58.01.05.008 [40 CFR Part 264, Appendix IV].

IV.B.2.b. The background concentration levels for any suspected synthetically produced hazardous organic constituent(s) in the soil shall be zero (0) or below the method detection limit for that constituent.

IV.B.2.c. Or; a Director-approved alternate Significance Limit. For any proposed Significance Limit, the Permittee shall include a justification based upon the criteria specified in IDAPA 58.01.05.008 [40 CFR § 264.94(b)].

IV.B.3. Other Relevant Protection Standards

The Permittee shall identify all relevant and applicable standards for the protection of human health and the environment (*e.g.* National Ambient Air Quality Standards, state or federal approved water quality standards, etc.).

TASK V: SCHEDULE OF ACTIVITIES AND REPORTS

V.A. PROGRESS REPORTS

The Permittee shall at a minimum provide the Director with signed, quarterly progress reports containing:

V.A.1. A description and estimate of the percentage of the RCRA Facility Investigation-Phase II completed;

V.A.2. Summaries of all the findings;

V.A.3. Summaries of all changes made in the RCRA Facility Investigation during the reporting period;

V.A.4. Summaries of all contacts with representatives of the local community, public interest groups or state government during the reporting period;

V.A.5. Summaries of all problems or potential problems encountered during the reporting period;

V.A.6. Actions being taken to rectify problems;

V.A.7. Changes in personnel during the reporting period;

V.A.8. Projected work for the next reporting period; and

V.A.9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

V.B. RCRA FACILITY INVESTIGATION-TASK I FINAL REPORT

V.B.1. The Permittee shall submit the RCRA Facility Investigation Task I Final and Summary Reports to the Director. The Final Report shall describe the procedures, methods, and results of all the RCRA Facility Investigations-Phase I findings for the SWMU(s) under investigation in Phase I and their releases, including information on the type and extent of contamination at the Facility, sources and migration pathways, and actual or potential receptors. The report shall present all information gathered under the approved RCRA Facility Investigation-Phase I Workplan and schedule. The Final Report shall contain adequate information to support corrective action decisions at the Facility. The Summary Report shall summarize the findings in the Final Report.

V.B.2. The Director shall either approve or disapprove the Reports in writing. If the Director determines that the Final or Summary Reports are not adequate, the Director shall notify the Permittee in writing of the Report's deficiencies and specify a due date for submittal of the revised Final and Summary Task I Reports.

V.C. RFI TASK III & IV FINAL REPORT

V.C.1. The Permittee shall submit RCRA Facility Investigation-Phase II, Task III & IV Final and Summary Reports. The Final Reports shall describe the procedures, methods, and results of all the Facility investigations of SWMU(s) and their releases, including information on the type and extent of contamination at the Facility, sources and

migration pathways, and actual or potential receptors. The Report shall present all information gathered under the approved Task II and III workplan and schedule. The Final Report shall contain adequate information to support further corrective action decisions at the Facility. The Summary Report shall summarize the findings in the Final Report.

V.C.2. After the Permittee submits the Final and Summary Reports, the Director shall either approve or disapprove the Reports in writing. If the Director determines that the Final and Summary Reports are not adequate, the Director shall notify the Permittee in writing of the Reports' deficiencies and specify a due date for submittal of the revised Final and Summary Reports. The permit shall be modified in accordance to IDAPA 58.01.05.012 [40 CFR § 270.42(a)] to include the approved Final and Summary Reports.

V.D. RCRA FACILITY INVESTIGATION SCHEDULE

The Permittee shall perform the RCRA Facility Investigation activities in accordance with the schedules specified in Table 3 of this Permit.

APPENDIX B - CORRECTIVE MEASURES STUDY AND IMPLEMENTATION

TASK I: DEVELOPMENT OF CORRECTIVE ACTION ALTERNATIVE(S)

Based on the results of the RCRA Facility Investigation, the Permittee shall identify, screen and develop the alternative or alternatives for removal, containment, treatment and/or other remediation of the contamination based on the objectives established for the corrective action.

I.A. DESCRIPTION OF CURRENT SITUATION

The Permittee shall submit an update to the information describing the current situation at the Facility and the known nature and extent of the contamination as documented by the RCRA Facility Investigation Task I Report. The Permittee shall provide an update to the information presented in the Task I Report to the Director regarding previous response activities and any interim measures which have or are being implemented at the Facility. The Permittee shall also make a Facility-specific statement of the purpose for the response, based on the results of the RCRA Facility Investigation. The statement of purpose shall identify the actual or potential exposure pathways that should be addressed by corrective measures.

I.B. ESTABLISHMENT OF CORRECTIVE ACTION OBJECTIVES

The Permittee shall establish site-specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RCRA Facility Investigation, EPA guidance, and the requirements of any applicable state and federal statutes. At a minimum, all corrective actions concerning groundwater releases from regulated units must be consistent with, and as stringent as, those required under the Groundwater Protection Standards.

I.C. SCREENING OF CORRECTIVE MEASURE TECHNOLOGIES

The Permittee shall review the results of the RCRA Facility Investigation to identify technologies which are appropriate for the Facility. The Permittee shall screen technologies to eliminate those which have severe limitations for a given set of waste and site-specific conditions. The screening may eliminate technologies based on inherent technology limitations. Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

I.C.1. Site Characteristics - Site data shall be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics shall be eliminated from further consideration.

I.C.2. Waste Characteristics - Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics shall be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site).

I.C.3. Technology Limitations - During the screening process, the level of technology development, performance record, and inherent construction, operation, and

maintenance problems shall be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

I.D. IDENTIFICATION OF CORRECTIVE MEASURE ALTERNATIVES

The Permittee shall develop the corrective measure alternatives based on the corrective action objectives. The Permittee shall rely on engineering practice to determine which technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternative or alternatives. The alternative developed should represent a workable number of option(s) that each appear to adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Permittee shall document the reasons for excluding any technologies.

TASK II: EVALUATION OF THE CORRECTIVE MEASURE ALTERNATIVES

The Permittee shall describe each corrective measure alternative that passes the screening in Task I and evaluate each corrective measure alternative and its components. The evaluation shall be based on technical, environmental, human health and institutional concerns. The Permittee shall also develop cost estimates of each corrective measure.

II.A. TECHNICAL/ENVIRONMENTAL/HUMAN HEALTH/INSTITUTIONAL

For each corrective measure alternative, the Permittee shall provide a description which includes but is not limited to the following: preliminary process flow sheets, preliminary sizing and type of construction for buildings and structures, and rough quantities of utilities required. The Permittee shall evaluate each alternative in four areas.

II.A.1. Technical - The Permittee shall evaluate each corrective measure alternative based on performance, reliability, implementability, and safety.

II.A.1.a. The Permittee shall evaluate performance based on effectiveness and useful life of the corrective measure:

- Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation shall also consider the effectiveness of combinations of technologies; and

- Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measure technologies, with the exception of destruction, deteriorate with time. Deterioration can often be slowed through proper system operation and maintenance, but the technology may eventually require replacement. Each corrective measure shall be evaluated in terms of the projected service lives of its component technologies. Resource availability in

the future life of the technology, as well as appropriateness of the technologies, must be considered in estimating the useful life of the project.

II.A.1.b. The Permittee shall provide information on the reliability of each corrective measure including its operation and maintenance requirements and its demonstrated reliability:

- Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities shall be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and
- Demonstrated and expected reliability measures are ways of measuring the risk and effect of failure. The Permittee shall evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

II.A.1.c. The Permittee shall describe the implementation of each corrective measure including the relative ease of installation (constructability) and the time required to achieve a given level of response:

- Constructability is determined by conditions both internal and external to the Facility conditions and includes such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the Facility (*i.e.*, remote location versus a congested urban area). The Permittee shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities; and
- The Permittee shall address the time it takes to implement a corrective measure and the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

II.A.1.d. The Permittee shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

II.A.2. Environmental - The Permittee shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the Facility conditions and pathways of contamination addressed by each alternative. The Environmental Assessment for each alternative shall include, at a minimum, an evaluation of: the short- and long-term beneficial and adverse effects of the response alternative; and adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse effects.

II.A.3. Human Health - The Permittee shall assess each alternative in terms of the extent to which it mitigates short- and long-term potential exposure to any residual contamination and protects human health both during and after implementing the

corrective measures. The assessment shall describe the types and levels of contaminants on-site, potential exposure routes, and potentially affected populations. Each alternative shall be evaluated to determine the level of exposure to contaminants and the reduction over time.

For management of mitigation measures, the relative reduction of impact shall be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to the Director.

II.A.4. Institutional - The Permittee shall assess the effects of federal, state and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

II.B. COST ESTIMATE

The Permittee shall develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include both capital and operation and maintenance costs.

II.B.1. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs.

II.B.1.a. Direct capital costs include:

- Construction costs: Costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure.
- Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action; these materials remain until the corrective action is complete;
- Land and site-development costs: Expenses associated with purchase of land and development of existing property; and
- Buildings and services costs: Costs of process and non-process buildings, utility connections, purchased services, and disposal costs.

II.B.1.b. Indirect capital costs include:

- Engineering expenses: Costs of administration, design, construction supervision, drafting, and testing of corrective measure alternatives;
- Legal fees and license or permit costs: administrative and technical costs necessary to obtain licenses and permits for installation and operation;
- Start-up and shakedown costs: Costs incurred during corrective measure start-up; and
- Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate Facility characterization.

II.B.2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Permittee shall consider the following operation and maintenance cost components:

II.B.2.a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;

II.B.2.b. Maintenance materials and labor costs: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

II.B.2.c. Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;

II.B.2.d. Purchased services: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;

II.B.2.e. Disposal and treatment costs: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;

II.B.2.f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;

II.B.2.g. Other costs: Items that do not fit any of the above categories.

TASK III: RECOMMENDATION OF A CORRECTIVE MEASURE OR MEASURES

The Permittee shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. The Permittee shall submit summary tables of the corrective measure alternative recommendations. Tradeoffs among health risks, environmental effects, and other pertinent factors shall be highlighted. The Director shall approve the corrective measure alternative or alternatives to be implemented based on the results of Tasks II and III. The following criteria shall be used to select the final corrective measure or measures.

III.A. TECHNICAL

III.A.1. Performance - corrective measure or measures which are most effective at performing their intended functions and maintaining performance over extended periods of time;

III.A.2. Reliability - corrective measure or measures which do not require frequent or complex operation and maintenance activities and that have proven effective under waste and facility conditions similar to those anticipated;

III.A.3. Implementability - corrective measure or measures which can be constructed and operating to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time; and

III.A.4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation.

III.B. HUMAN HEALTH

The corrective measure or measures must comply with existing federal and state criteria, standards, or guidelines for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

III.C. ENVIRONMENTAL

The corrective measure or measures posing the least adverse impact (or greatest improvement) over the shortest period of time on the environment shall be favored. The corrective measure(s) shall be assessed as to the degree to which it employs treatment that reduces toxicity, mobility or volume of hazardous wastes and/or hazardous waste constituent(s).

TASK IV: CORRECTIVE MEASURE(S) IMPLEMENTATION

The purpose of the Corrective Measure Implementation program is to design, construct, operate, maintain, and monitor the performance of the corrective measure or measures selected to protect human health and the environment.

IV.A. CORRECTIVE MEASURE IMPLEMENTATION PROGRAM PLAN

The Permittee shall prepare a Corrective Measure Implementation Program Plan. This program shall include the development and implementation of several plans, which require concurrent preparation. It may be necessary to revise plans as the work is performed to focus efforts on a particular problem. The Permittee shall furnish all personnel, materials and services necessary for the implementation of the corrective measure(s).

IV.A.1. The Permittee shall prepare a Program Management Plan which shall document the overall management strategy for performing the design, construction, operation, maintenance and monitoring of corrective measure(s). The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation. The Program Management Plan shall also include a description of qualifications of key personnel directing the Corrective Measures Implementation program, including contract personnel.

IV.A.2. The Permittee shall revise the Community Relations Plan, performed as part of the RCRA Facility Investigation Workplan, to incorporate any changes addressing the community during the design and construction activities.

IV.B. CORRECTIVE MEASURE(S) DESIGN

The Permittee shall prepare final construction plans and specifications to implement the corrective measure(s) at the Facility as defined in the Corrective Measure Study. At a minimum, the following shall be included, but not be limited to:

IV.B.1. Design plans and specifications:

IV.B.1.a. Design strategy and basis.

IV.B.1.b. Currently accepted environmental control measures, construction practices and techniques, and the constructability of the design.

IV.B.1.c. Assumptions, detailed drawings (*e.g.*, process flow diagrams, general arrangement, and any applicable piping and instrumentation diagrams), equipment and specifications, and material and energy balances (if applicable).

IV.B.1.d. Discussion of the possible sources of error and potential operation and maintenance problems.

IV.B.2. Operations and maintenance plan:

IV.B.2.a. Normal and alternate operation and maintenance practices (*e.g.*, tasks for operation, tasks for maintenance, prescribed treatment or operation conditions, and schedule identifying frequency).

IV.B.2.b. Routine monitoring and laboratory testing (*e.g.*, description of monitoring tasks, required laboratory tests and their interpretation, required Quality Assurance/Quality Control, and a schedule of monitoring frequency).

IV.B.2.c. Equipment description (including equipment identification, installation of monitoring components, maintenance procedures, and replacement schedule), and records and reporting (*e.g.*, daily operating logs, laboratory records, records for operating costs, reporting emergencies, personnel and maintenance records, and required monthly and annual reports to be submitted to the Director).

IV.B.2.d. Alternate operating and maintenance procedures to prevent undue hazard due to system failure and analysis of vulnerability and additional resource requirements should a failure occur.

IV.B.2.e. Safety plan during routine operation and safety tasks in the event of systems failure.

IV.B.3. Cost estimate

IV.B.4. Project schedule (identifying timing for initiation and completion of all critical path tasks, dates for completion of the project and major milestones).

IV.B.5. Construction quality assurance objectives (including but not limited to the responsibility and authority, personnel qualifications, inspection activities, sampling requirements, and documentation).

IV.B.6. Health and Safety Plan (the Health and Safety Plan developed for the RCRA Facility Investigation shall be modified to address the activities to be performed to implement the corrective measure(s)).

IV.B.7. Design phases:

IV.B.7.a. Preliminary design, approximately 30% design completion. The Permittee shall have field verified the existing condition of the Facility. The technical design requirements of the project shall be at an adequate level of completion to enable a determination if the final design will provide an operable and usable corrective measure. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the program. The Permittee shall include with the preliminary submission design calculations reflecting the same percentage of completion as the designs they support.

IV.B.7.b. Intermediate design, approximately 60% completion. The intermediate design shall include the Design Plans and Specifications, Operation and Maintenance Plan, Project Schedule, Quality Assurance Plan and Specifications for the Health and

Safety Plan.

IV.B.7.c. Equipment start-up and operator training identifying the contractor requirements for providing appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

IV.B.7.d. Additional studies to supplement the available technical corrective measure implementation data may be required. Upon written notification from the Director, the Permittee shall provide sufficient sampling, testing and analysis to optimize the required treatment and/or disposal operations and systems. A final report of the testing shall include all data taken during the testing and a summary of the results of the studies.

IV.B.7.e. Submittal of the pre-final design, approximately 95% completion. The pre-final design submittal shall include the Design Plans and Specifications, Operations and Maintenance Plan, Project Schedule, Quality Assurance Plan and Specifications for the Health and Safety Plan.

IV.B.7.f. Submittal of final design, approximately 100% completion. The final design submittal shall include the Final Design Plans and Specifications, and Final Operation and Maintenance Plan, Final Quality Assurance Plan, Final Project Schedule and Final Health and Safety Plan specifications.

IV.C. CORRECTIVE MEASURE(S) CONSTRUCTION

Following the Director's approval of the final design, the Permittee shall develop and implement a construction quality assurance program to ensure, with a reasonable degree of certainty, that a completed corrective measure(s) meets or exceeds all design criteria, plans, and specifications. The Construction Quality Assurance Plan is a Facility-specific document which must be submitted to the Department for approval prior to the start of construction. At a minimum, the Construction Quality Assurance Plan shall include the elements, which are summarized below. Upon the Director's approval of the Construction Quality Assurance Plan, the Permittee shall construct and implement the corrective measures in accordance with the approved design, schedule, and the Construction Quality Assurance Plan. The Permittee shall also implement the elements of the approved Operation and Maintenance Plan.

IV.C.1. The responsibility and authority of all organizations and the qualifications of all personnel shall be described in the Construction Quality Assurance Plan.

IV.C.2. The observations and tests that shall be used to monitor the construction and/or installation of the components of the corrective measure(s) shall be summarized in the Construction Quality Assurance Plan. The plan shall include the scope and frequency of each type or inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records, waste disposal records, etc. The inspections shall also ensure compliance with all health and safety procedures.

IV.C.2.a. A preconstruction inspection and meeting shall be held to discuss methods for documenting and reporting inspection data, reviewing the distribution and storage of

documents and reports, reviewing work area safety, discussing appropriate modifications to the Construction Quality Assurance Plan, and conducting a site Visit.

IV.C.2.b. Upon preliminary project completion, the Permittee shall notify the Director for the purposes of conducting a pre-final inspection which shall consist of a walk-through inspection of the entire site. The inspection is to determine whether the project is complete and consistent with the contract documents and the corrective measures as approved by the Director. The Permittee shall operationally test the treatment equipment. The Permittee shall certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. This pre-final inspection report shall outline the outstanding construction items, actions required to resolve items, completion date(s) for these items, and the date of the final inspection.

IV.C.2.c. Upon completion of all outstanding construction items, the Permittee shall notify the Director, by certified mail, express mail, or hand delivery, for the purposes of conducting a final inspection. The final inspection shall focus on confirming that outstanding items have been resolved.

IV.D. SAMPLING REQUIREMENTS

The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems shall be presented in the Construction Quality Assurance Plan.

IV.E. DOCUMENTATION

Reporting requirements for construction quality assurance activities shall be described in detail in the Construction Quality Assurance Plan. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measure reports, and design acceptance reports.

TASK V: REPORTS

V.A. CORRECTIVE MEASURES STUDY REPORTS

The Permittee shall prepare Corrective Measures Study reports in accordance with the schedule specified in Table 5 of this Permit.

V.B. PROGRESS REPORTS

The progress reports shall contain, at a minimum, the following information:

- A description and estimate of the percentage of the Corrective Measures Study completed;
- Summaries of all findings;
- Summaries of all changes made in the Corrective Measures Study during the reporting period;
- Summaries of all contacts with representative(s) of the local community, public interest groups or state government during the reporting period;
- Summaries of all problems or potential problems encountered during the reporting period;

- Actions being taken to rectify problems;
- Changes in personnel during reporting period;
- Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

V.C. CORRECTIVE MEASURE CONSTRUCTION REPORT

At the completion of construction, the Permittee shall submit a Corrective Measure Construction report to the Director. The report shall establish that the project was built according to the specifications and that the corrective measure is performing adequately. The Corrective Measure Construction report shall include all of the daily inspection summary reports; inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications and as-built drawings. The report shall include, but not be limited to, the following elements:

- Certification of the design and construction;
- Explanation of any modifications to the plans and why these were necessary;
- Listing of the criteria established for judging the functioning of the corrective measure and also explaining any modification to these criteria;
- Results of Facility monitoring, indicating that the corrective measure shall meet or exceed the performance criteria; and
- Explanation of the operation and maintenance (including monitoring) to be undertaken at the Facility.

TABLES

TABLE 1
SOLID WASTE MANAGEMENT UNITS (SWMUs) AT THE INL UNDER INVESTIGATION FOR RELEASES To be submitted by Permittee in accordance with Permit Condition II.K.3. of the ANL-W Partial Permit (Effective Date: August 16, 2004).

TABLE 2
SWMUs AT THE INL WITH KNOWN RELEASES To be submitted by Permittee in accordance with Permit Condition II.K.3. of the ANL-W Partial Permit (Effective Date: August 16, 2004).

TABLE 3
SWMUs AT THE INL WITH NO FURTHER ACTION DETERMINATIONS To be submitted by Permittee in accordance with Permit Condition II.K.3. of the ANL-W Partial Permit (Effective Date: August 16, 2004).

TABLE 4

RCRA FACILITY INVESTIGATION COMPLIANCE SCHEDULE
FOR SOLID WASTE MANAGEMENT UNITS (SWMUs)
WITH SUSPECTED RELEASES

RFI ACTIVITY	DUE DATE
SUBMIT RFI - PHASE I WORKPLAN (TASK I.D.)	Within 180 calendar days of a final determination of applicability made in accordance with Permit Condition VII.A.2.
SUBMIT FINAL TASK I REPORT	Within 270 calendar days of the Director's approval of the RFI – Phase I workplan.
SUBMIT DRAFT RFI - PHASE II (TASK II AND III) WORKPLAN AND SCHEDULE	Within 90 calendar days of the Director's approval of the final Task I Report
INITIATE RFI - PHASE II (TASK II AND III) ACTIVITIES	Within 60 calendar days of the Director's approval of the Task II and III workplan and schedule.
SUBMIT TASK IV DRAFT REPORT	As specified in the Director's approved RFI - Phase II (Task II and III) workplan and schedule.
SUBMIT TASK IV FINAL AND SUMMARY REPORTS	As specified in the Director's approved RFI - Phase II (Task II and III) workplan and schedule.
PROGRESS REPORTS ON TASKS I THROUGH IV	Quarterly (every 90 calendar days) beginning 90 calendar days after the effective date of this Permit.

TABLE 5	
RCRA FACILITY INVESTIGATION COMPLIANCE SCHEDULE FOR SOLID WASTE MANAGEMENT UNITS (SWMUs) WITH KNOWN RELEASES	
RFI ACTIVITY	DUE DATE
SUBMIT FINAL TASK I REPORT (excluding RFI - Phase I, Task I.D.)	Within 180 calendar days of the final determination that the Corrective Action portion of this Permit must be implemented.
SUBMIT DRAFT RFI-PHASE II (Task II & III) WORKPLAN and SCHEDULE	Within 90 calendar days of the Director's approval of the final Task I Report.
INITIATE RFI-PHASE II (TASK II & III) ACTIVITIES	Within 45 calendar days of the Director's approval of the Task II and III workplan and schedule
SUBMIT TASK IV DRAFT REPORT	As specified in the Director's approved RFI-Phase II (Task II and III) workplan and schedule.
SUBMIT TASK IV FINAL & SUMMARY REPORTS	As specified in the Director's approved RFI-Phase II (Task II and III) workplan and schedule.
PROGRESS REPORTS ON TASKS I through IV	Quarterly (every 90 calendar days) beginning 90 calendar days of the effective date of this Permit.

TABLE 6	
CORRECTIVE MEASURES STUDY AND IMPLEMENTATION COMPLIANCE SCHEDULE FOR SOLID WASTE MANAGEMENT UNITS (SWMUs)	
CMS SUBMISSION/CMI SUBMISSION	DUE DATES
Submit CMS Workplan (TASK I & II)	Within 60 calendar days of the Director's approval of the RCRA Facility Investigation Final Report.
Submit Draft CMS Report (TASK I, II, & III)	Within 300 calendar days of the Director's approval of the CMS Workplan.
Submit Final CMS Report (TASK I, II, & III)	Within 60 calendar days of receiving the Director's comments on the draft CMS Report.
Submit Draft CMI Program Plan (TASK IV.A)	Within 90 calendar days of the Director's approval of the final CMS report.
Submit Final CMI Program Plan (TASK IV.A)	Within 60 calendar days of receiving the Director's comments on the draft CMI Program Plan.
Submit Corrective Measures Design Preliminary Design Approximately 30% Complete	As specified in the Director's approved CMI Program Plan.
Submit Corrective Measures Design Preliminary Design Approximately 60% Complete	As specified in the Director's approved CMI Program Plan.
Submit Corrective Measures Design Preliminary Design Approximately 95% Complete	As specified in the Director's approved CMI Program Plan.
Submit Final Corrective Measures Design	As specified in the Director's approved CMI Program Plan.
Progress Reports on Tasks I through IV	Quarterly, every 90 calendar days beginning 90 calendar days after the Director's approval of the final RFI report.
Submit Draft CQA Program Plan	As specified in the Director's approved CMI Program plan.
Submit Final CQA Program Plan	Within 60 calendar days of the Director's approval of the draft CQA.
Construction of Corrective Measures	Within 60 calendar days of the Director's approval of the final CQA.
Pre-Final Inspection	Forty-five (45) calendar days following report of pre-final inspection
Corrective Measures Construction Report	Within 90 calendar days following completion of construction.
Corrective Measures Implementation Quarterly Progress Reports	Quarterly, every 90 calendar days.

OMB#: 2050-0024 Expires 12/31/2014

SEND COMPLETED FORM TO: The appropriate State or Regional Office.	United States Environmental Protection Agency **RCRA SUBTITLE C SITE IDENTIFICATION FORM**	
1. Reason for Submittal MARK ALL BOX(ES) THAT APPLY	**Reason for Submittal:** ❑ To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location). ❑ To provide Subsequent Notification (to update site identification information for this location). ❑ As a component of a First RCRA Hazardous Waste Part A Permit Application. ☒ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment # **Volume 18 Book 3 HWMA/RCRA Storage and Treatment Permit for the ARP, Revision Date: October 18, 2012)** ❑ As a component of the Hazardous Waste Report (If marked, see sub-bullet below)	
	❑ Site was a TSD facility and/or generator of ≥1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations	
2. Site EPA ID Number	**EPA ID Number:** ID4890008952	
3. Site Name	**Name:** IDAHO NATIONAL LABORATORY	
4. Site Location Information	**Street Address:**	
	City, Town, or Village: SCOVILLE	**County:** BUTTE, CLARK, JEFFERSON, BONNEVILLE, BINGHAN
	State: ID	**Country:** USA / **Zip Code:** 83415
5. Site Land Type	❑ Private ❑ County ❑ District ☒ Federal ❑ Tribal ❑ Municipal ❑ State ❑ Other	
6. NAICS Code(s) for the Site (at least 5-digit codes)	A. 92411	B. 54171
	C. 336992	D. Not Applicable
7. Site Mailing Address	**Street or P. O. Box:** 1955 FREMONT AVENUE	
	City, Town, or Village: IDAHO FALLS	
	State: ID	**Country:** USA / **Zip Code:** 83415
8. Site Contact Person	**First Name:** TERESA	**MI:** L / **Last Name:** PERKINS
	Title: DIRECTOR, ENVIRONMENT & SUSTAINABILITY DIVISION	
	Street or P. O. Box: 1955 FREMONT AVENUE	
	City, Town, or Village: IDAHO FALLS	
	State: ID	**Country:** USA / **Zip Code:** 83415
	Email: PERKINTL@ID.DOE.GOV	
	Phone: (208) 526-1483	**Ext.:** N/A / **Fax:** 208-526-1926
9. Legal Owner and Operator of the Site	**A. Name of Site's Legal Owner:** US DEPARTMENT OF ENERGY IDAHO OPERATIONS OFFICE	**Date Became Owner:** 01/01/1952
	Owner Type: ❑ Private ❑ County ❑ District ☒ Federal ❑ Tribal ❑ Municipal ❑ State ❑ Other	
	Street or P. O. Box: 1955 FREMONT AVENUE	
	City, Town, or Village: IDAHO FALLS	**Phone:** (208) 526-1483
	State: ID	**Country:** USA / **Zip Code:** 83415
	B. Name of Sites Operator: CH2M-WG IDAHO, LLC.	**Date Became Operator:** 05/01/2005
	Operator Type: ☒ Private ❑ County ❑ District ❑ Federal ❑ Tribal ❑ Municipal ❑ State ❑ Other	

10. Type of Regulated Waste Activity (at your site)

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities; Complete all parts 1-10.

Y ☒ N ❑ 1. Generator of Hazardous Waste

If "Yes" mark only one of the following - a,b, or c

☒ a. LQG: Generates, in any calendar month, 1,000 kg/mo kg/mo (2,200 lbs./mo) or more of hazardous waste; **or** Generates an any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs./mo) of acute hazardous waste **or** Generates, in any calendar month **or** accumulates at any time, more than 100 kg/mo (220 lbs./mo) of acute hazardous spill cleanup material.

❑ b. SQG: 100 to 1,000 kg/mo (220 - 2,200 lbs./mo.) of non-acute hazardous waste.

❑ c. CESQG: Less than 100 kg/mo (220 lbs./mo.) of non-acute hazardous waste

If "Yes" above, indicate other generator activities in 2-4.

Y ❑ N ☒ 2. Short-Term Generator (generate from a short term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section

Y❑ N ☒ 3. United States Importer of Hazardous Waste

Y ☒ N ❑ 4. Mixed Waste (hazardous and radioactive) Generator

Y☒ N ❑ 5. Transporter of Hazardous Waste. If "Yes", mark all that apply.

☒ a. Transporter

❑ b. Transfer Facility (at your site)

Y☒ N ❑ 6. Treater, Storer, or Disposer of Hazardous Waste: Note: A hazardous waste Part B permit is required for these activities.

Y☒ N ❑ 7. Recycler of Hazardous Waste

Y❑ N ☒ 8. Exempt Boiler and/or Industrial Furnace. If "Yes", mark all that apply.

❑ a. Small Quantity On-site Burner Exemption

❑ b. Smelting, Melting, and Refining Furnace Exemption

Y❑ N ☒ 9. Underground Injection Control

Y☒ N ❑ 10. Receives Hazardous Waste from Off-site

B. Universal Waste Activities; Complete all parts 1-2

Y☒ N ❑ 1. 1. Large Quantity Handler of Universal Waste (you accumulate 5,000kg or more)[refer to your State regulations to determine what is regulated]. Indicate types of universal waste managed at your site. If "Yes", mark all that apply.

a. Batteries	☒
b. Pesticides	☒
c. Mercury containing equipment	☒
d. Lamps	☒
e. Other (specify)_____	❑
f. Other (specify)_____	❑
g. Other (specify)_____	❑

Y ☒ N ❑ 2. Destination Facility for Universal Waste

Note: A hazardous waste permit may be required for this activity

C. Used Oil Activities; Complete all parts 1-4.

Y❑ N ☒ 1. Used Oil Transporter

If "Yes", mark all that apply.

❑ a. Transporter

❑ b. Transfer Facility (at your site)

Y❑ N ☒ 2. Used Oil Processor and/or Re-refiner

If "Yes", mark all that apply.

❑ a. Processor

❑ b. Re-refiner

Y❑ N ☒ 3. Off-Specification Used Oil Burner

Y❑ N ☒ 4. Used Oil Fuel Marketer

If "Yes", mark all that apply.

❑ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner

❑ b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Eligible Academic Entities with Laboratories - Notification for opting into or witdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K.

♦ You can **ONLY** Opt into Subpart K if:

- you are at least one of the following: a college or university; a teaching hospital that is owned by or has a formal affiliation agreement with a college or university; or a non-profit research institute that is owned by or has a formal affiliation agreement with a college or university; AND
- you have checked with your State to determine if 40 CFR Part 262 Subpart K is effective in your state

Y☐ N☒ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:

☐a. College or University

☐b. Teaching Hospital that is owned by or has a formal written affilation agreement with a college or university

☐c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university

Y☐ N☐- 2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

11. Description of Hazardous Wastes

A. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

See Attached Form OMB#: 2050-0024, Item 9 pageS 5(IAA-1) through 5(IAA-4) of 6

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please List the waste codes of the State-Regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

12. Notification of Hazardous Secondary Material (HSM) Activity

Y☐ N ☒ Are you notifying under 40 CFR 260.42 that you will begin managing, are managing or will stop managing hazardous secondary material under 40 CFR 261.2(a)(2)(ii), 40 CFR 261.4(a)(23), (24), or (25)?

If "Yes", you must fill out the Addendum to the Site Identification Form: Notification for Managing Hazardous Secondary Material.

13. Comments

14. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. For the RCRA Hazardous Waste Part A Permit Application, all owner(s) and operator(s) must sign (se 40 CFR 270.10(b) and 270.11).

Signature of legal owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
	K. W. Daniels, Vice President, CH2M-WG, Idaho, LLC.	10/8/2012
	R. B. Provencher, Manager, Department of Energy Idaho Operations Office	10/10/12

EPA ID NO: ID4890008952 OMB#: 2050-0024; Expires 12/31/2014

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact	First Name: TERESA	MI: L	Last Name: PERKINS
	Contact Title: DIRECTOR, ENVIRONMENT & SUSTAINABILITY DIVISION		
	Phone: (208) 526-1483	Ext.: N/A	Email: PERKINTL@ID.DOE.GOV
2. Facility Permit Contact Mailing Address	Street or P.O. Box: 1955 FREMONT AVENUE		
	City, Town, or Village: IDAHO FALLS		
	State: ID		
	Country: USA		Zip Code: 83415
3. Operator Mailing Address and Telephone Number	Street or P.O. Box: P.O. BOX 2010		
	City, Town, or Village: IDAHO FALLS		
	State: ID		Phone: (208) 533-3475
	Country: USA		Zip Code: 83403-2010
4. Facility Existence Date	Facility Existence Date (mm/dd/yyyy): 06/01/1949		

5. Other Environmental Permits

A. Facility Type *(Enter code)*	B. Permit Number												C. Description
R	I	D	4	8	9	0	0	0	8	9	5	2	Final HWMA Storage & Treatment Permit for the INTEC on the INL (Volumes 14 and 18)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part B Permit Application for the INL (Volume 3)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Post-Closure Permit for the INL - Waste Calcining Facility (Volume 21)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Storage Permit for the CSSF at the INTEC on the INL (Volume 22)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Storage and Treatment Permit for the EBR-II located at the MFC on the INL (PER-120)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Storage and Treatment Permit for the Sodium Process Facility (SPF) located at the MFC on the INL (PER-140)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part A Permit Application for the INL (Volume 1)
P, E, U													See Additional Information Supplement to Item 5 - Other Permits List

6. Nature of Business

The Idaho National Laboratory (INL) was established in 1949, as a center where nuclear power reactors and support facilities could be built, tested, and operated. The INL site covers approximately 890 square miles and is 25 miles west of Idaho Falls, ID. For many years the INL was the site of the largest nuclear power research & development effort in the world. During the 1970's the INL's mission broadened to include such areas as biotechnology, energy and materials research, and conservation and renewable energy. At the end of the Cold War, waste treatment and cleanup of previously contaminated sites became a priority. Today the INL is a science-based, applied engineering national laboratory dedicated to completing its waste cleanup mission and meeting the nation's environmental, energy, nuclear science and technology, and national security needs. Additionally, in 2002, it was announced that the INL will serve as the nation's leading nuclear technology center.

Additional Information
Supplement to Item 5.
Other Environmental Permits

AIR PERMITS

(Permit Type P)

Idaho National Laboratory (INL)

- **Title V Operating Permit -** Permit Number T1-030520

Idaho Nuclear Technology and Engineering Center (INTEC)

PTC (Permit Number PTC-023-00001)
- New Waste Calcining Facility/Decontamination Area, CPP-659

PTC (Permit Number P-030505)
- CPP-606 Distillate Oil-Fired Boilers

PTC (Permit Number 060520)
- Integrated Waste Treatment Unit at the INL - Idaho Nuclear Technology and Engineering Center

PTC (Permit Number P-2007.0076)
- INL, INTEC Initial PTC for Standby Compressor (COM-UTI-606)

Critical Infrastructure Test Range Center (CITRC)

PTC (Permit Number P-020521)
- WROC/PBF boiler permitted under the INTEC Site-wide NOx permit - PER-620-023

WATER PERMITS

State of Idaho Monitoring Well Permit (IDWR)

(Permit Type U)

INL monitoring well permit applications are sent annually to the IDWR for wells (greater than 18 feet deep) to be constructed in the current calendar year. Permits are authorized by agreement between the DOE-ID and the IDWR.

State of Idaho Water Reuse Permit (WRP)

(Permit Type E)
- INTEC Service Waste System and Sewage Treatment Plant - Permit Number LA-000130-04

Ground Water Rights

(Permit Type E)

INL operations use water guaranteed by both a Federal Reserved Water Right and a water rights agreement with the State of Idaho

7. Process Codes and Design Capacities - Enter information in the Sections on Form Page 3.

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space proveded in Item 8.

B. PROCESS DESIGN CAPACITY - For each code entered in Item 7.A; enter the capacity of the process, enter the capacity of the process.

1. AMOUNT - Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.

2. UNIT OF MEASURE - For each amount entered in Section 7.B(1), enter the code in Section 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.

C. PROCESS TOTAL NUMBER OF UNITS - Enter the total number of units for each corresponding process code.

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
	Disposal	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment	
T01	Tank Treatment	Gallons Per Day; Liters Per Day
T02	Surface Impoundment	Gallons Per Day; Liters Per Day
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Metric Tons Per Hour; or Million BTU Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Short Tons Per Day; BTUs Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; BTUs Per Hour; or Million BTU Per Hour

Process Code	PROCESS	APPROPIRATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Treatment (continued)	**(for T81 - T94)**
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In the Recovery Of Sulfur Values From Spent Sulfuric Acid	
T-92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed In 40 CFR §260.10	
T94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
	Miscellaneous (Subpart X)	
X01	Open Burning/Open Detonation	Any Unit of Measure in Code Table Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour;Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour, or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; or Million BTU Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code
Gallons	**G**	**Short Tons Per Hour**	**D**	**Cubic Yards**	**Y**
Gallons Per Hour	**E**	**Short Tons Per Day**	**N**	**Cubic Meters**	**C**
Gallons Per Day	**U**	**Metric Tons Per Hour**	**W**	**Acres**	**B**
Liters	**L**	**Metric Tons Per Day**	**S**	**Acre-feet**	**A**
Liters Per Hour	**H**	**Pounds Per Hour**	**J**	**Hectares**	**Q**
Liters Per Day	**V**	**Kilograms Per Hour**	**X**	**Hectare-meter**	**F**
		Million BTU Per Hour	**X**	**BTU Per Hour**	**I**

7. Process Codes and Design Capacities (Continued)

EXAMPLE FOR COMPLETING Item 7 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. PROCESS DESIGN CAPACITY (2) Unit of Measure	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	533.788	G	001	
	1	S	0	1	138,187	G	008	
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
1	0							
1	1							
1	2							
1	3							

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in Item 8.

8. Other Processes (Follow instructions from Item 7 for D99, S99, T04 and X99 process codes)

Line Number (Enter #s in sequence with item 7)		A. Process Code (from list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. PROCESS DESIGN CAPACITY (2) Unit of Measure	C. Process Total Number of Units	For Official Use Only
X	2	T	0	4	100.00	U	001	
0	2	X	9	9	13,760	U	003	
0	3	X	0	2	5,500	U	001	

ITEMS 7 & 8. PROCESS CODES AND DESIGN CAPACITIES SUPPLEMENT

and OTHER PROCESSES

LINE NUMBER	PROCESS TYPE UNIT NAME		PROCESS DESIGN CAPACITY
1	**S01 - CONTAINER STORAGE includes:** • WMF-698 Storage Enclosure @ 1,728 drum equivalents • WMF-1617 Room 104 - Equipment Airlock @ 128 drums Room 105 - Drum Packaging Station (DPS) Area @ 4 drums Room 106 - Utility Area @ 384 drums Room 103 - Drum Compactor Area @ 2 standard waste boxes and 4 drum equivalents • Trailer Storage Areas (TSA) TSA near WMF-1617 @ 80 drums ARP VII area (South of WMF-1619) @ 80 drums ARP VIII area (West of WMF-621) @ 80 drums		95,040 gallons 7,040 gallons 220 gallons 21,120 gallons 1,567 gallons 4,400 gallons 4,400 gallons 4,400 gallons
		Line 1 Total:	**138,187 gallons**
2	**X99 - MISCELLANEOUS TREATMENT includes:** • WMF-1617 Retrieval Area @ 200 drum equivalents total within the Retrieval Area (drum/tray staging and sorting table treatment @ 50 drums treated/day • WMF-1617, Room 105 - Drum Packaging Stations (DPS) (55 gallon drum x 50 drums throughput/day) • WMF-1617, Room 103 - Drum Compactor (absorbent addition)		11,000 gallons/day 2,750 gallons/day 10 gallons/day
		Line 2 Total:	**13,760 gallons/day**
3	**X02 - MECHANICAL PROCESSING TREATMENT includes:** • WMF-1617, Room 103 - Drum Compactor (crushing) @ 100 drums/day		5,500 gallons/day
		Line 3 Total:	**5,500 gallons/day**

9. Description of Hazardous Wastes - Enter information in the Sections on Form Page 5.

A. EPA HAZARDOUS WASTE NUMBER - Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY - For each listed waste entered in Item 9.A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Item 9.A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE - For each quantity entered in Item 9.B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the listed hazardous wastes.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. Enter the first two as described above.
2. Enter "000" in the extreme right box of Item 9.D(1).
3. Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 9.E.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in Item 9.D(2) or in Item 9.E(2).

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.

2. In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter "included with above" and make no other entries on that line.

3. Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING Item 9 (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
X	3	D	0	0	1	100	P	T	0	3	D	8	0				
X	4	D	0	0	2												Included With Above

9. Description of Hazardous Wastes ***(Continued. Use the additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in 9.D(1))
	1	D	0	0	4	5,200,000	P	S	0	1	X	9	9	X	0	2	WMF-698, WMF-1617, and Trailer Storage Areas (NOTE: X02 and X99 Process Codes are for WMF-1617 only - not WMF-698 or Trailer Storage Areas)
	2	D	0	0	5												INCLUDED WITH ABOVE
	3	D	0	0	6												INCLUDED WITH ABOVE
	4	D	0	0	7												INCLUDED WITH ABOVE
	5	D	0	0	8												INCLUDED WITH ABOVE
	6	D	0	0	9												INCLUDED WITH ABOVE
	7	D	0	1	0												INCLUDED WITH ABOVE
	8	D	0	1	1												INCLUDED WITH ABOVE
	9	D	0	1	2												INCLUDED WITH ABOVE
1	0	D	0	2	2												INCLUDED WITH ABOVE
1	1	D	0	2	6												INCLUDED WITH ABOVE
1	2	D	0	2	7												INCLUDED WITH ABOVE
1	3	D	0	2	8												INCLUDED WITH ABOVE
1	4	D	0	2	9												INCLUDED WITH ABOVE
1	5	D	0	3	0												INCLUDED WITH ABOVE
1	6	D	0	3	2												INCLUDED WITH ABOVE
1	7	D	0	3	4												INCLUDED WITH ABOVE
1	8	D	0	3	6												INCLUDED WITH ABOVE
1	9	D	0	3	7												INCLUDED WITH ABOVE
2	0	D	0	4	3												INCLUDED WITH ABOVE
2	1	F	0	0	1												INCLUDED WITH ABOVE
2	2	F	0	0	2												INCLUDED WITH ABOVE
2	3	F	0	0	3												INCLUDED WITH ABOVE
2	4	F	0	0	5												INCLUDED WITH ABOVE
2	5	F	0	0	6												INCLUDED WITH ABOVE
2	6	F	0	0	7												INCLUDED WITH ABOVE
2	7	F	0	0	9												INCLUDED WITH ABOVE
2	8																
2	9																
3	0																
3	1																
3	2																
3	3																
3	4																
3	5																
3	6																

10. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

NOTE: For the RWMC/ARP Topographic Map, please see the Attachment 1 - Section B and D, Book 3 Volume 18 HWMA/RCRA Storage and Treatment Permit

11. Facility Drawing

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

NOTE: For the RWMC/ARP Facility Drawings, please see the Attachment 1 - Section B and D, Book 3 Volume 18 HWMA/RCRA Storage and Treatment Permit

12. Photographs

All exiting facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures, existing storage, treatment, and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

NOTE: For the RWMC/ARP Facility Photographs, please see the Part A Permit - Book 3, pages 6b through 6m

13. Comments

For a description of hazardous debris categories treated, stored, or disposed of at the facility, as required by IDAPA 58.01.05.012 [40 CFR 270.13(n)], please see attached information titled: "ITEM 13. ADDITIONAL INFORMATION HAZARDOUS WASTE DEBRIS CATEGORIES"

ITEM 13. ADDITIONAL INFORMATION
HAZARDOUS WASTE DEBRIS CATEGORIES

IDAPA 58.01.05.012 [40 CFR 270.13 (n)] requires a description of the debris categories treated, stored, or disposed of at a facility to be submitted in the Part A Permit Application. Debris defined by 40 CFR 268.2 means a solid material exceeding a 60mm

Category I - Manufactured Objects

Glass
Concrete
Masonry and refractory bricks
Paper
Plastic
Rubber
Cloth
Pavement
Metal Debris
- Pipes
- Valves
- Scrap Metal

Other Heterogeneous Debris
- Non-intact containers
- Tanks
- Appliances
- Industrial Equipment

Category II - Plant and Animal Matter

Biological Debris
- Plant Matter

Wood Debris
- Wood
- Plant Stumps

Category III - Natural Geologic Material

Rock
Cobbles
Boulders

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Exterior of WMF-698 Storage Enclosure (S02)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Exterior of WMF-698 Storage Enclosure (S02)

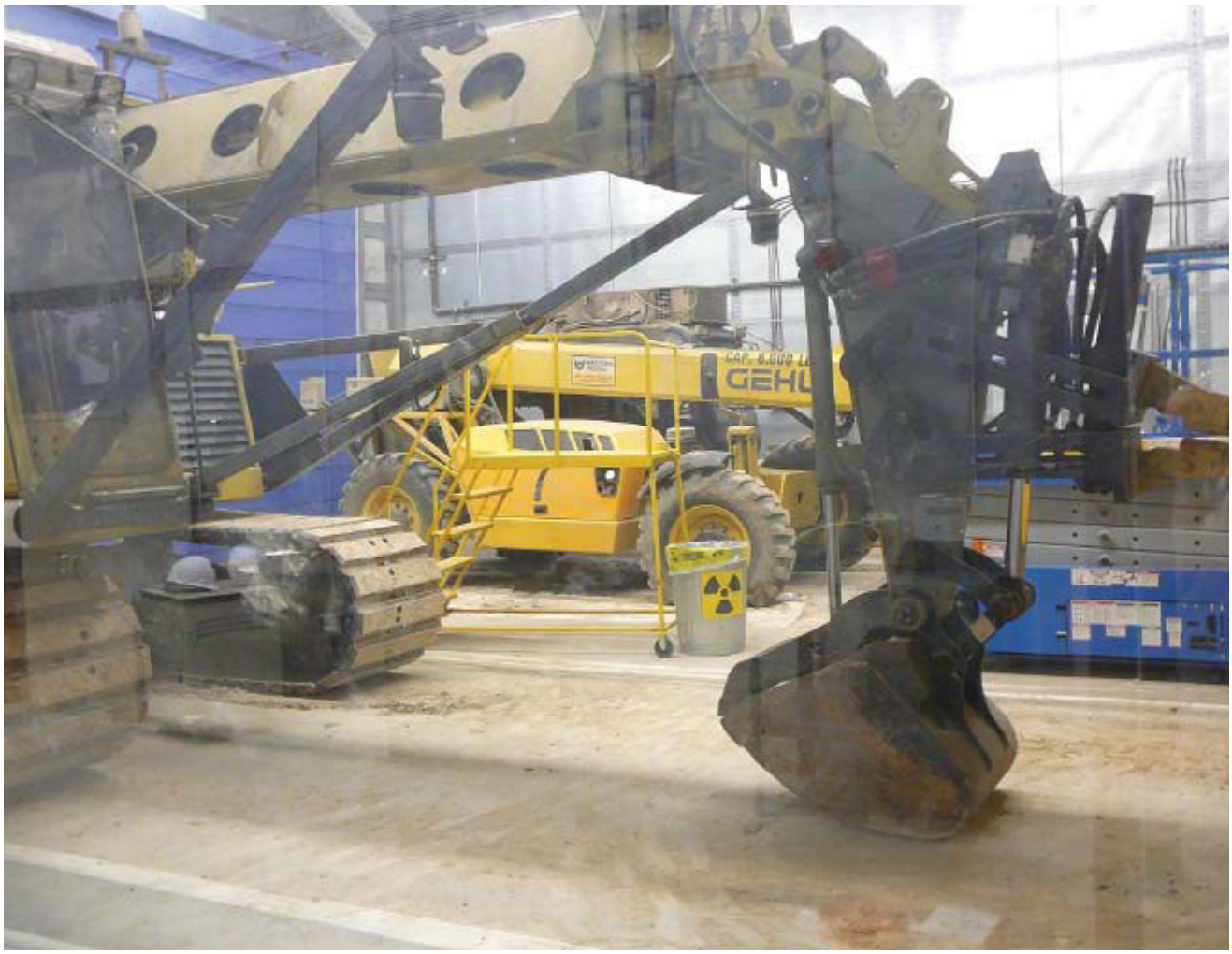
ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior of WMF-698 Storage Enclosure (S09)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Exterior View of WMF-1617 ARP V (S02, X99, X02)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX



Interior View of WMF-1617 Room 103 (S01, X99, X02)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior View of WMF-1617 Room 103 Drum Compactor Area (S01, X99, X02)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior View of WMF-1617 Room 104 Equipment Airlock (S01)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior View of WMF-1617 Room 105 Drum Packaging Stations (S01, X99)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior View of WMF-1617 Room 105 Drum Packaging Stations (S01, X99)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior View of WMF-1617 Room 106 Utility Area (S01)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior View of WMF-1617 Retrieval Area (S01, X99)

ITEM 12. PHOTOGRAPHS
RADIOACTIVE WASTE MANAGEMENT COMPLEX

Interior View of WMF-1617 Retrieval Area (S01, X99)

HWMA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

BOOK 3
Volume 18 –Radioactive Waste Management Complex

ATTACHMENT 1

SUBSURFACE DISPOSAL AREA (SDA)
WMF-698
WMF-1617

Section B – Facility Description
And
Section D – Process Description

Revision Date: October 18, 2012

TABLE OF CONTENTS

B. FACILITY DESCRIPTION 1

B-1. Facility Description [IDAPA 58.01.05.012; 40 CFR 270.14(b)(1)] 1

D. PROCESS INFORMATION 23

D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173] 33

D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.15(a) and (b), 264.175(a) through 264.175(d)] 34

D-1b. Containers without Free Liquids 35

D-1b(1) Test for Free Liquids [IDAPA 58.01.05.012; 40 CFR 270.15(b)(1) 35

D-1b(2) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172 35

D-8. Miscellaneous Units [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.23 and 264.601] 35

D-8a. Description of Miscellaneous Units [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1) and (2)] 36

D-8b. Environmental Performance Standards for Miscellaneous Units [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23(c)] 36

D-8b(1) Miscellaneous Unit Wastes [IDAPA 58.01.05.008; 40 CFR 264.601(a)(1), 264.601(b)(1), and 264.601(c)(1)] 37

D-8b(2) Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(b)(2) and 270.23(a)(2)] 37

D-8b(3) Site Air Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(4) and (5), and 270.23(b)] 37

D-8b(4) Prevention of Air Emissions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(2) and 270.23(a)(2)] 38

D-8b(5) Operating Standards [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(3) and 270.23(a)(2)] 38

D-8b(6) Site Hydrogeologic Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(a)(2), (3), and (4), 264.601(b)(3) and (5), and 270.23(b)] 38

D-8b(7) Site Precipitation [IDAPA 58.01.05.008; 40 CFR 264.601(b)(4)] 39

D-8b(8) Groundwater Usage [IDAPA 58.01.05.008; 40 CFR 264.601(a)(5)] 39

D-8b(9) Surface Waters and Surface Soils [IDAPA 58.01.05.008; 40 CFR 264.601 (b)(6), (7), and (8)] 39

D-8b(10) Area Land Use [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(a)(6)31 and (b)(9), and 270.23(b)] 39

D-8b(11) Migration of Waste Constituents [IDAPA 58.01.05.008; 40 CFR 264.601(a)(7)] 39

D-8b(12) Evaluation of Risk to Human Health and the Environment [IDAPA 58.01.05.008; 40 CFR 264.601(a)(8) and (9), 264.601(b)(10) and (11), and 264.601(c)(6) and (7)]..... 40

EXHIBITS

EXHIBIT B-1. Map of the INL Showing Major Facility Areas..... 2
EXHIBIT B-2. RWMC Area Map..... 5
EXHIBIT B-3. Topographical map of the RWMC 6
EXHIBIT B-4. RWMC Surface Water Drainage 7
EXHIBIT B-5. Building WMF-698 Storage Enclosure Plan 10
EXHIBIT B-6. Schematic of WMF-1617..... 18
EXHIBIT B-7. Schematic of Airlock 5 Plan 19
EXHIBIT B-8 Traffic Sign Plan..... 22

EXHIBIT D-1 Sorting Table Schematic..... 27
EXHIBIT D-2 Retrieval Enclosure Camera Plan 28
EXHIBIT D-3 Drum Compactor 30

B. FACILITY DESCRIPTION

B-1 Facility Description [IDAPA 58.01.05.012; 40 CFR 270.14(b)(1)]

The Idaho National Laboratory (INL) is owned by the U.S. Department of Energy (DOE). The DOE facilities located at the INL are operated by multiple contractors designated by the DOE. Exhibit B-1 is a map of the INL that identifies the locations of the major facility areas.

The Radioactive Waste Management Complex (RWMC) is a restricted area of 166 acres located in the southwestern corner of the INL. Exhibit B-1 of this Attachment shows the location of the RWMC at the INL. The RWMC provides facilities for the management of radioactive only wastes, mixed wastes (MW), and Comprehensive Environmental Response Compensation and Liability Act (CERCLA) waste. Radioactive only wastes contain radioactive materials as defined by the Atomic Energy Act (AEA). Radioactive only wastes are not regulated as hazardous or mixed waste by the Idaho Hazardous Waste Management Act (HWMA) or by the Resource Conservation and Recovery Act (RCRA). MW is waste that is radioactive as defined by the AEA and hazardous as defined by IDAPA 58.01.05.005 (40 CFR 261). MW stored in the RWMC permitted units is not regulated under the HWMA/RCRA, Subpart CC – Air Emission Standards for Tanks, Surface Impoundments, and Containers, as MW is exempted in 40 CFR 264.1080(b)(6) because it is stored in compliance with all applicable regulations under the authority of the Atomic Energy Act and the Nuclear Waste Policy Act. Some wastes stored at the RWMC are also regulated by the Toxic Substances Control Act (TSCA). CERCLA wastes may be handled in the units regulated under this permit but are not subject to the conditions of the permit, and will be segregated from RCRA waste. Disposition of CERCLA waste will be controlled through the CERCLA process.

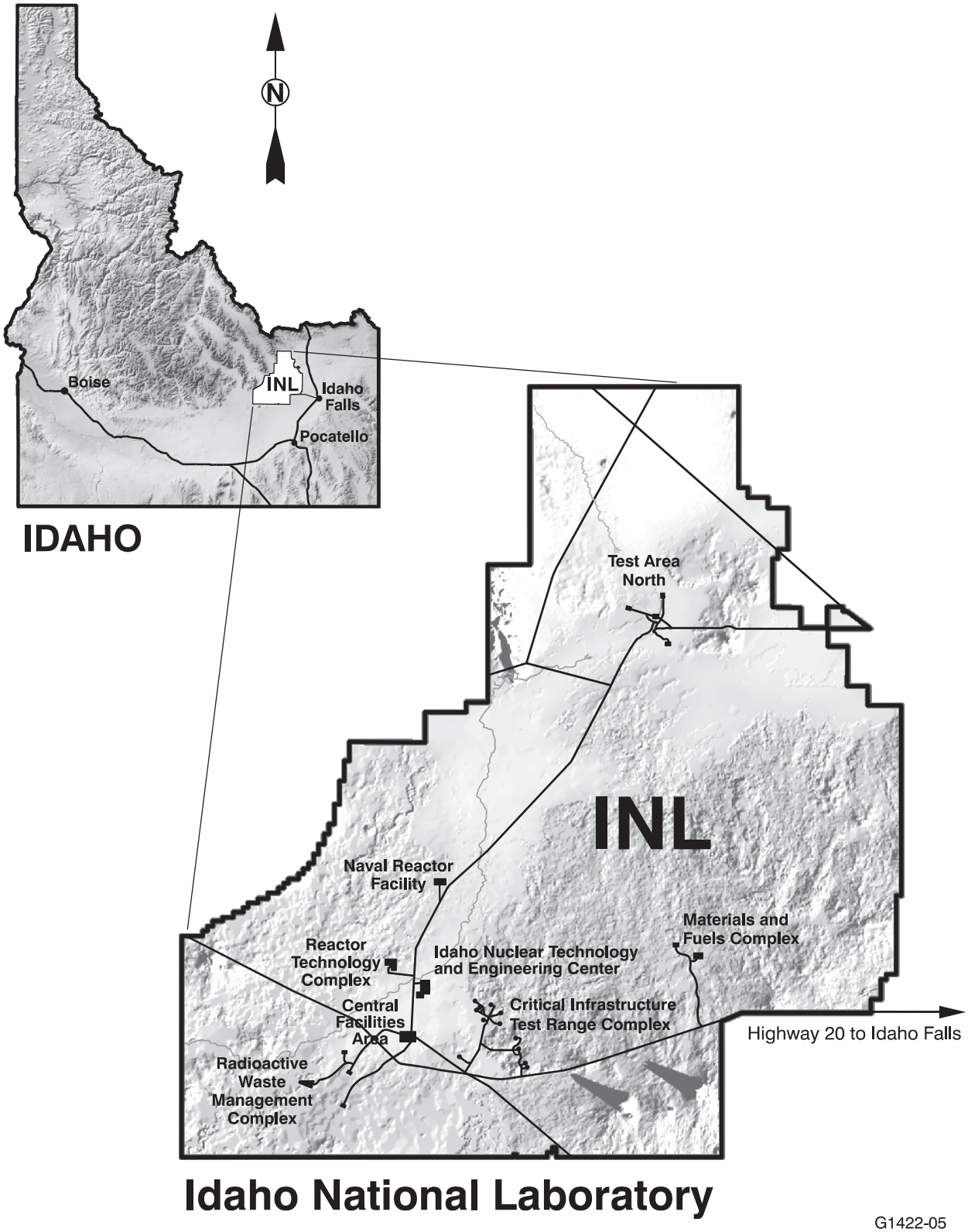


EXHIBIT B-1. Map of the INL Showing Major Facility Areas.

The RWMC comprises four major areas: the Administrative Area, the Operations Area, the Subsurface Disposal Area (SDA), and the Transuranic Storage Area (TSA). These areas are described below and illustrated in Exhibit B-2 of this Attachment. This Permit addresses waste management units located at the SDA. Multiple DOE contractors operate within the RWMC area.

The Administrative Area is located in the northeast section of the RWMC and consists of buildings and structures supporting administrative operations. These include office space and change rooms for workers and the security gate. It occupies approximately 3 acres of the RWMC and contains no waste management units.

The Operations Area is located in the northeast section of the RWMC adjacent to the Administrative Area and consists of buildings and structures supporting operations. These include office space, the fire and domestic water supply, and equipment storage and maintenance areas. It occupies approximately 8 acres of the RWMC, and contains a waste storage area within and adjacent to WMF-602 that is under operational control of the Idaho Treatment Group (ITG). The Operations Area also contains Satellite Accumulation Areas (SAAs) and less than 90 day storage areas (TAAs) which are under operational control of CH2M WG Idaho, LLC. (CWI).

The TSA is a fenced, 58-acre storage area located in the southeastern section of the RWMC. This area is presently operated by the ITG, and is the location of the Advanced Mixed Waste Treatment Project (AMWTP). The major functions of the TSA are storage, examination, certification, transuranic package transporter (TRUPACT) assembly, and TRUPACT cask loading of waste which is destined for shipment to the Waste Isolation Pilot Plant (WIPP) or for treatment at an on- or off-Site facility.

The SDA is a fenced, 97-acre, shallow-land subsurface disposal site located in the western section of the RWMC. It was dedicated to the disposal of solid, low-level beta-gamma radioactive waste. The SDA contains pits, trenches, soil vaults, and an asphalt pad (Pad A). TRU waste disposal was discontinued in 1970. Pad A ceased operation in 1978. The SDA is identified as a solid waste management unit (SWMU) under the FFA/CO for the INL.

The primary work being conducted at the SDA consists of buried waste retrieval. This effort known as the Accelerated Retrieval Project (ARP), includes retrieval, identification, repackaging, and disposition of targeted transuranic waste. The waste targeted for retrieval includes plutonium-contaminated filters, graphite and process sludge, oxidized (depleted) uranium, and solvent wastes. The material originated at the Rocky Flats Plant near Denver, Colorado, during nuclear weapons production in the 1950s and 1960s.

In addition, the SDA is being used to repackage drummed waste from AMWTP for absorbtion of liquids, removal/treatment of prohibited items, and visual verification to meet acceptance criteria at the WIPP.

HWMA/RCRA regulated units at the SDA consist of Building WMF-698 which is regulated under HWMA/RCRA as a container storage unit, and Building WMF-1617 which is regulated under HWMA/RCRA for container storage and miscellaneous treatment. In addition, three outdoor trailer container storage areas are located near the treatment units for storage of waste pending return to AMWTP.

The physical conditions around these buildings are typical for the INL Site, approximately 5,000 ft above mean sea level, as shown on the topographical map, Exhibit B-3. The area is relatively flat and receives little rainfall. However, poor drainage patterns can produce localized flooding that consists of shallow puddles that form near buildings during periods of rapid snowmelt or heavy rainfall. Due to the lack of rainfall and the poor quality of the surface soils, the site has little agricultural value. Wind patterns are generally in a northeast/southwest axis, with some seasonal variability.

Exhibit B-4 shows the surface water drainage at the RWMC. There is no sanitary waste system piping within the SDA. Comfort stations are provided for personnel working in that area. There are no recreational areas present on or adjacent to the RWMC.

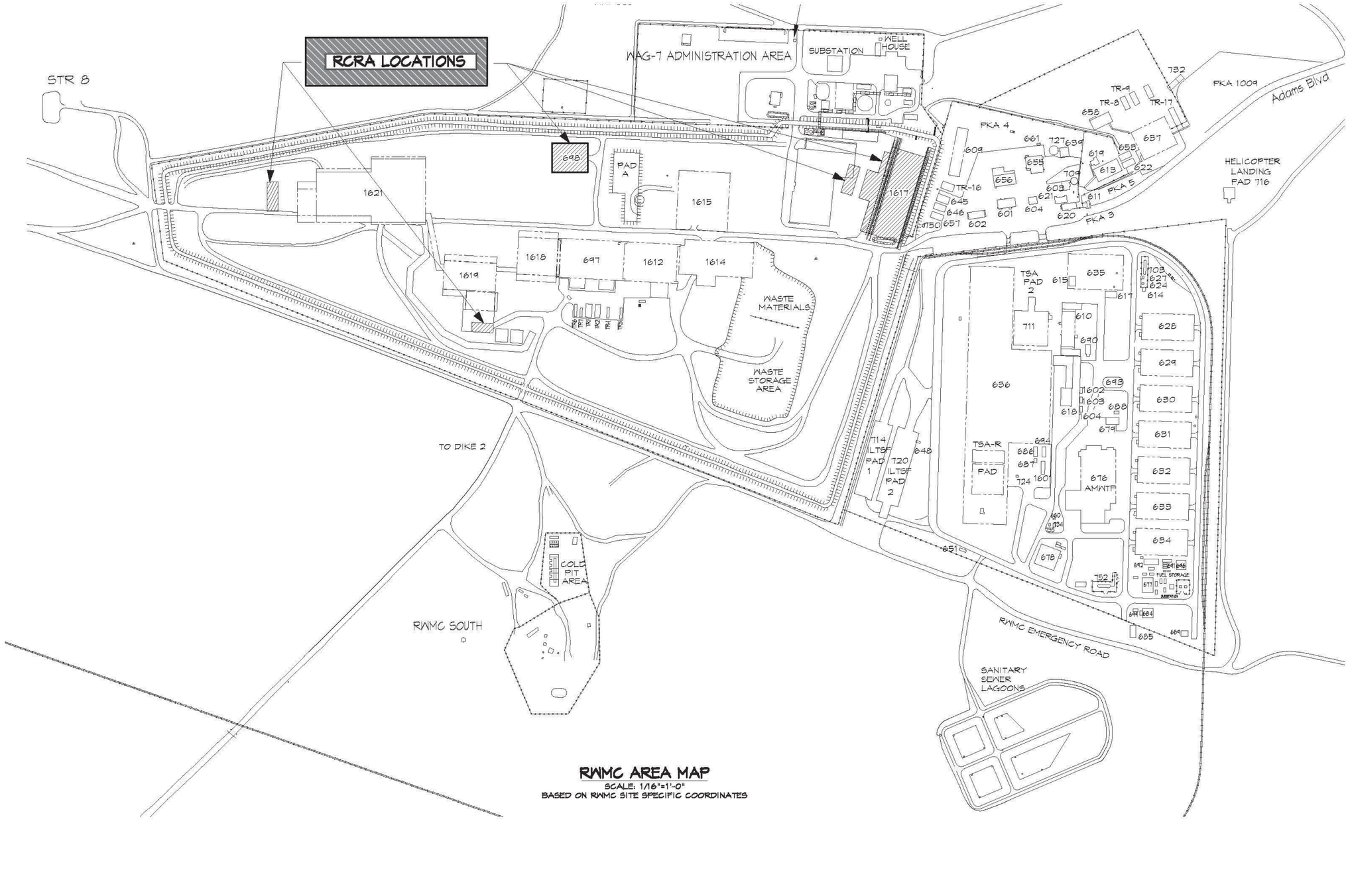


EXHIBIT B-2. RWMC Area Map

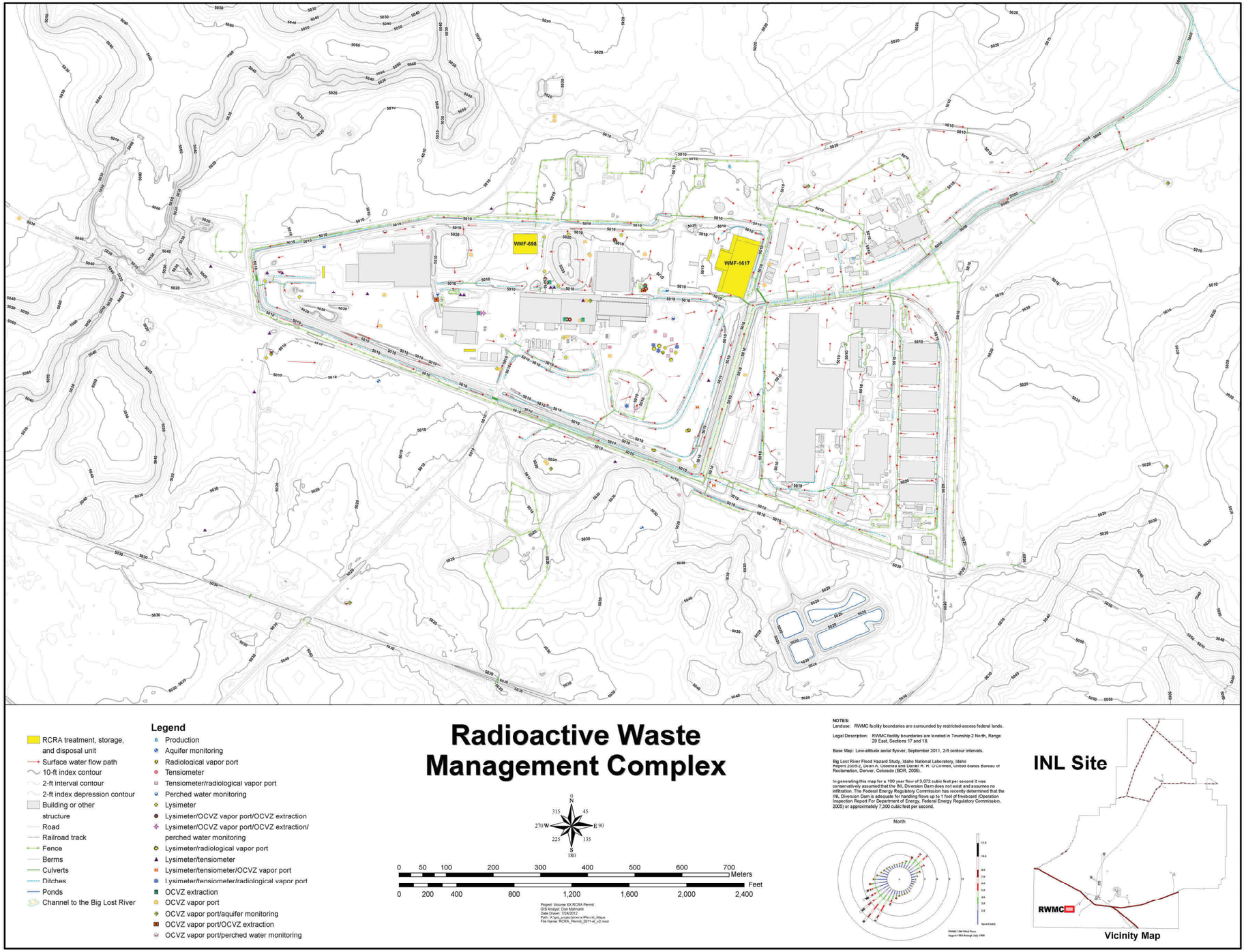


EXHIBIT B-3. Topographical map of the RWMC

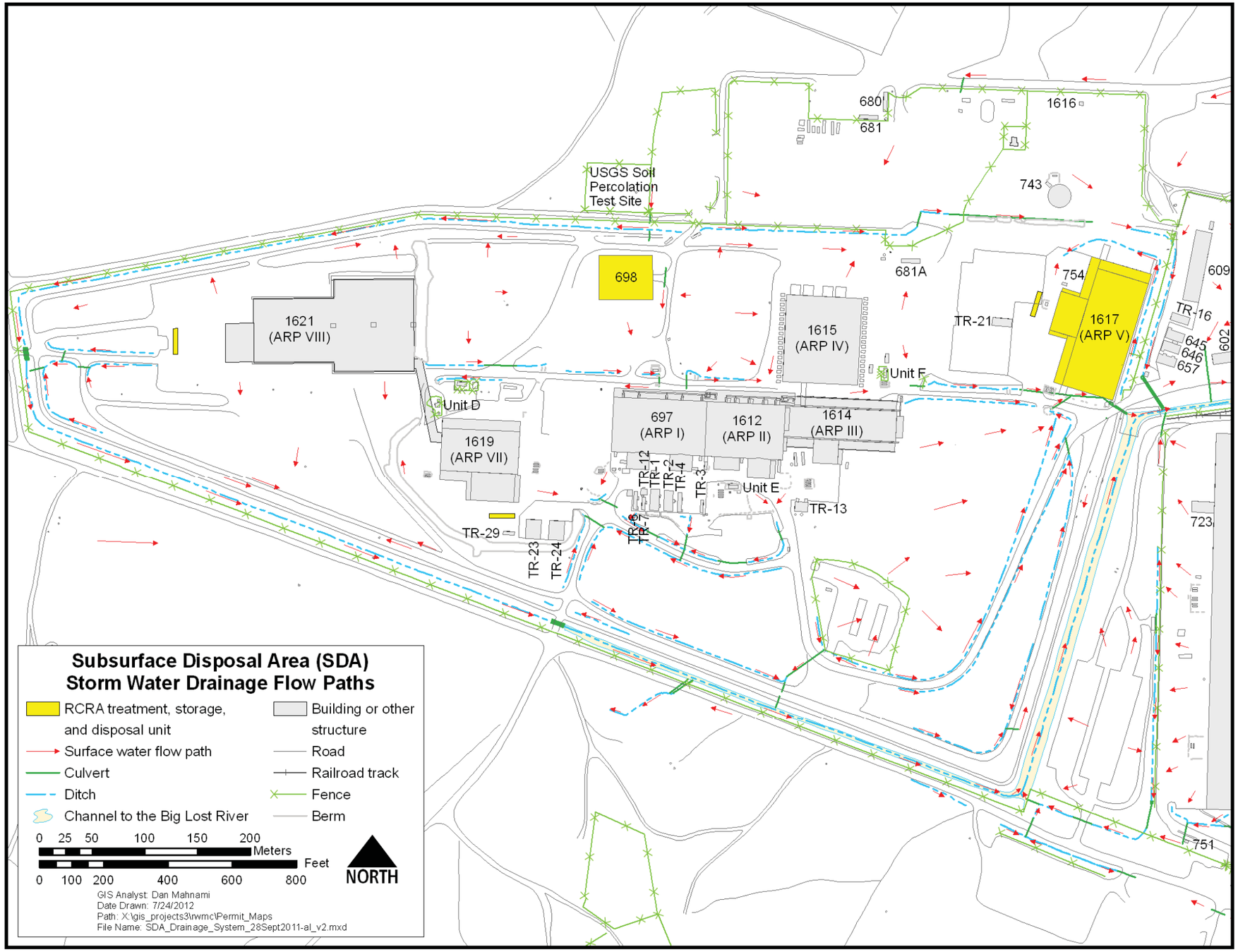


EXHIBIT B-4. RWMC Surface Water Drainage

RWMC Waste Handling Operations

Waste is received at the RWMC SDA from the AMWTP. Shipment of the waste to the RWMC SDA is the responsibility of the AMWTP. All waste must be packaged by the generator according to INL waste packaging requirements. Shipments must be approved by the RWMC prior to shipment to the RWMC SDA. All waste received at the RWMC must meet the applicable waste acceptance criteria contained in Attachment 1, Section D-1a(2).

Waste is received from the AMWTP and transferred to appropriate storage at either WMF-698 or WMF-1617. WMF-1617 provides areas for sorting and segregating waste, repackaging waste, and performing absorbent addition. Trailer loading and unloading operations will be completed at both WMF-698 and WMF-1617. Containers will remain on the transport trailers for no more than 24 hours at any given time during unloading operations.

Because the HWMA/RCRA-regulated wastes managed at the SDA are MW, references to radiological and radiochemical data are made throughout this Permit. Information on radiological and radiochemical characteristics is provided for informational purposes only, as HWMA/RCRA applies only to the chemical constituents of the MW. TSCA-regulated wastes and CERCLA waste stored at the TSA are not addressed in this Permit as they are not subject to HWMA/RCRA regulation.

WMF-698

Storage Enclosure Building WMF-698 is an existing building that was established to store CERCLA generated waste from the ongoing Accelerated Retrieval Project operations. WMF-698 is a tension-membrane building, measuring 130 ft x 160 ft with a 20-ft-minimum interior clearance at the eaves. The building is located at the RWMC SDA, north of Pit 4 between Pad A and Pit 3. Exhibit B-5 presents a cutaway view of Building WMF-698.

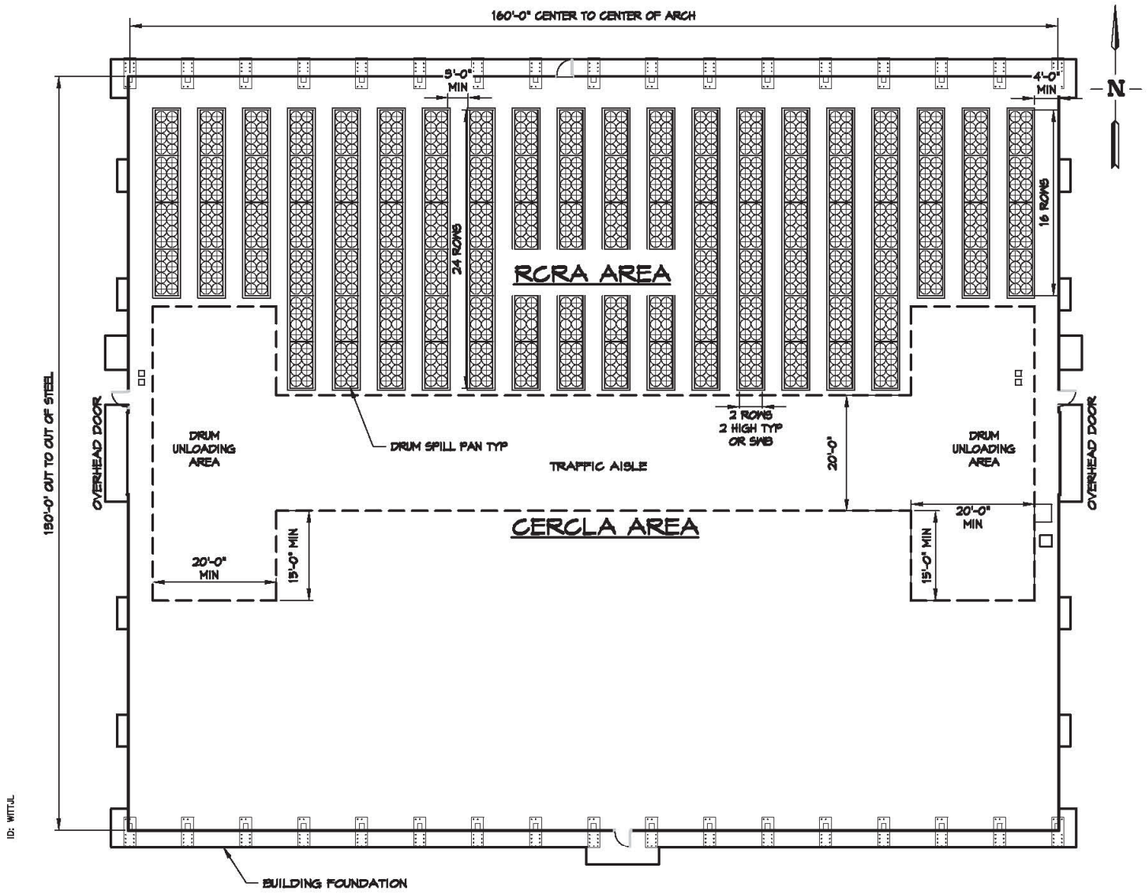
WMF-698 is constructed of a prefabricated steel frame covered with an outer fabric membrane. The fabric membrane meets NFPA 701 standards for fire resistance. The membrane meets the flame-resistant requirements of the IBC. The structural frame is designed to support seismic, snow, and wind loads in accordance with the applicable loading requirements. An anchoring system is provided to resist the horizontal or uplift forces imposed by seismic and

wind loads. The perimeter foundation frame sits on existing grade, leveled to obtain a weather seal. The interior floor consists of a concrete slab. Secondary containment within WMF-698 is provided by drum storage secondary containment pans. The 4'-2" by 8'-2" by 7" pan is constructed of 1/8" carbon steel, all corners and seams are seal welded. A support grate to elevate the drums is also included. The capacity of the drum storage secondary containment pans is 149 gallons, which provides adequate capacity for the storage of sixteen drums (2-wide, 2-high, 4-long. A metal warming hut is located inside the east entrance of WMF-698. The hut contains an electric heater that provides personnel working in the area a location to warm up. Mechanical and electrical equipment supporting WMF-698 may be housed external to the enclosure. Drawings for WMF-698 are located in Book 3, Appendix I of this Permit.

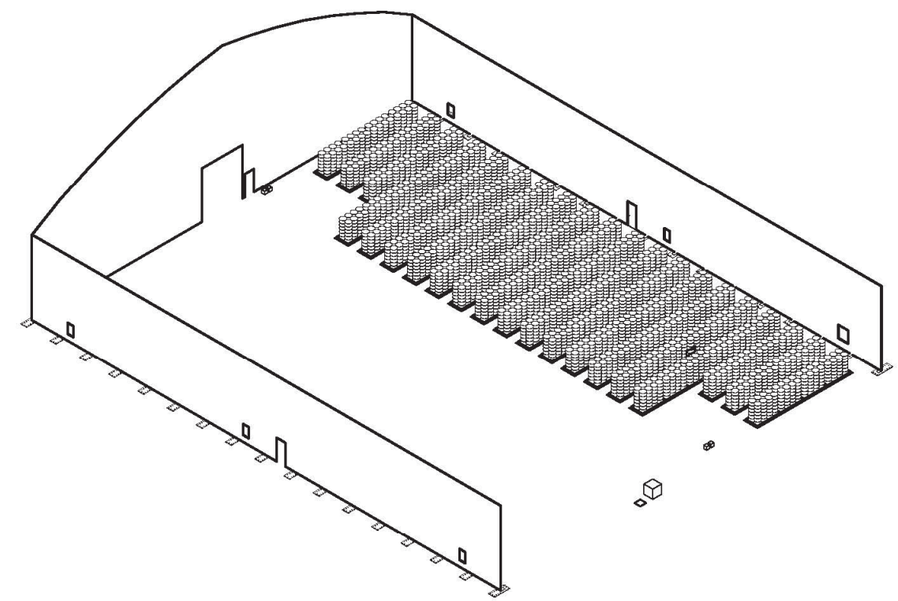
Ventilation for WMF-698 is provided by a draw-through system to prevent the accumulation of volatile organic compounds (VOCs). Dust filters are installed at various locations in the walls to filter the air drawn into the enclosure. The exhaust is not filtered.

Traditional fixed lighting is installed to provide adequate illumination for operations such as waste container transport, storage, and inspection. Emergency lighting is provided as required by NFPA 101. The lighting is fastened to the metal framework or located on stands. The lighting is supplied with flexible cable. A limited number of receptacles are positioned within WMF-698 to support operations and maintenance activities.

Electrical power is supplied from a pad-mounted transformer at the northeast corner of the SDA. This transformer supports lighting, ventilation, and a limited number of receptacles that are positioned within the enclosure to support operations and maintenance. Lightning protection meets the applicable provisions of NFPA 780.



WMF-698 STORAGE ENCLOSURE PLAN
SCALE: 3/32"=1'-0"
1,728 DRUM MAX COUNT IN RCRA STORAGE AREA



3D VIEW

ID: WITJL
Date: 09/25/12 – 4:11 PM Layout Name: S-3
File: WMF-698 Rev3.dwg
Path: J:\RES RCRA

EXHIBIT B-5. Building WMF-698 Storage Enclosure Plan

WMF-1617

Building WMF-1617 is an existing building that was established to excavate and repackage CERCLA generated waste as part of the Accelerated Retrieval Project operations. WMF-1617 is a tension-membrane building (referred to as a Retrieval Enclosure) that covers the exhumation footprint in Pit 9. This enclosure measures approximately 380 ft x 165 ft and 53 ft in height at the tallest point. WMF-1617 housed the excavation, waste retrieval, waste packaging, sampling, decontamination, vehicle service, and personnel ingress/egress for the remediation of Pit 9 under CERCLA. Exhibits B-6 and B-7 provide schematics of WMF-1617. WMF-1617 has an attached air lock used for drum packaging, a service-bay to support equipment maintenance, and radiological control support areas.

The Retrieval Enclosure provides weather protection for year-round operations. The physical boundary of the fabric structure affords a barrier to the spread of radioactive contamination. The Retrieval Enclosures have sufficient space and interior height to house excavator operations and waste container movements.

The Retrieval Enclosure includes the following systems: structure frame; membrane covering (with inner and outer fabric enclosing an insulating layer); exhaust ventilation (including area-based emissions monitoring, high-efficiency particulate air (HEPA) filters, and supporting electrical systems); propane heating system (and associated piping and equipment); and a fire detection and alarm system.

The fabric membrane is insulated and meets National Fire Protection Association (NFPA) 701 standards for fire resistance. The membrane material for the Retrieval Enclosure structure is a polyvinyl chloride (PVC)-impregnated textile. The PVC is formulated with flame-resistant compounds. The fabric material meets applicable International Building Code (IBC) flame-spread performance criteria for a limited combustible material.

WMF-1617 has steel trusses that attach to a cast-in place foundation and utilizes piles driven to bedrock to stabilize the foundation. WMF-1617 is designed to withstand seismic, snow, and wind loads in accordance with the applicable requirements. Drawings for WMF-1617 are located in Book 3, Appendix I of this Permit.

HEPA-filtered exhaust ventilation is provided for ARP V and the negative pressure induces ventilation through the attached Airlock #5. The exhaust ducts and fans are located to draw air from the least contaminated areas into the most potentially contaminated areas. Fixed filter air samplers are located around the perimeter of the building and continuous air monitors (CAMs) with alarms are also provided for each discharge path (local filter/fan exhaust) to monitor for airborne radioactivity. Radiological control technicians (RCTs) routinely count the perimeter sampler filters for radioactive contamination. If airborne radiation above normal background levels is detected, the results will be evaluated and remedial actions are taken as appropriate to minimize the spread of contamination and to ensure operational control, worker protection, and environmental protection.

The Retrieval Enclosure (Retrieval Area and air lock) is provided with direct-fired, draw-through, propane fired gas furnaces. To the extent practical, the heating systems for the retrieval area is designed to maintain 32°F at an ambient temperature of -20°F to limit wear and tear on equipment caused by extreme cold weather, and are not intended for human comfort. The installation of the heating systems is in accordance with the applicable NFPA requlations. These systems are operated independently of the HEPA-filtered exhaust, except for an interlock that shuts the inlet dampers when facility exhaust flow is interrupted (back flow through the outdoor intake is prevented when the system is shut down). Depending on the operating configuration of the system or possible lower ambient temperatures, interior temperatures below freezing can occur. Such conditions are monitored and actions are taken as needed (such as allowing waste to warm in the airlock area prior to visual inspection for free liquids).

ARP V fire protection is provided through an underground fire water distribution system that was installed within the SDA. The system was designed, installed, and tested in accordance with the National Fire Protection Association (NFPA) 20, 22, and 24. The system was designed to supply fire water at a minimum of 1,500 gpm at 20 psi. There are adequate fire hydrants located at ARP V.

ARP V has fire alarm and occupant notification systems to notify occupants and the INL Fire Department in case of emergency. There are traditional smoke and heat detectors installed throughout the airlock. Linear heat sensor cable is installed in the DPS to actuate the dry chemical suppression systems. A listed automatic video fire/smoke detection system is provided

in the Retrieval Enclosure. The system provides primary detection during non-operational periods.

Operations personnel have the primary responsibility for fire detection in the Retrieval Enclosure during operational periods. The video fire/smoke detection system is taken out of service during normal operations as necessary to prevent spurious alarms and placed back in service on the backshift. Other accepted means of fire detection, should the video fire/smoke detection system be impaired, include monitoring of fire watch cameras in the control room, at the INL Fire Alarm Center, and/or a manned two-hour fire watch.

ARP V has no fixed building fire suppression systems. There are automatic dry-chemical fire suppression systems installed within each Drum Packaging Station and in the mobile equipment to include the excavators, telehandlers, and front end loaders.

There are traditional portable fire extinguishers located throughout ARP V as shown on Exhibit G-2 in Attachement 7.

All fire protection systems and equipment are inspected, tested, and maintained in accordance with NFPA codes/standards and the inspection, testing, and maintenance equivalency as approved by the Department of Energy Idaho Falls Field Office.

The Airlock #5 structure is attached to the ARP V Retrieval Area. The airlock is separated from the Retrieval Area and provides a buffer area for workers to package retrieved waste, perform decontamination activities, service vehicles, and provide for personal protective equipment (PPE) change-out. The air lock is an insulated, tensioned-membrane, fabric structure. The air lock meets the same natural phenomena requirements as the main Retrieval Area. The fabric membranes are attached to a steel truss structure which is attached to a concrete slab and foundation. The interior rooms of the air lock are constructed independently of the tensioned-membrane structure. Interior wall and ceiling surfaces are lined with galvanized metal, except in contamination areas where stainless steel is used. The air lock is equipped with supplementary air heating, ventilating, and air conditioning (HVAC) to supply conditioned air for human comfort. Ventilation is drawn from the occupied, uncontaminated area of the air locks, through contaminated areas, into the Retrieval Area, and out through HEPA filters in the Retrieval Area by exhaust fans. This ventilation flow path is designed to minimize the spread of contamination.

Ventilation flow that is adequate for contamination control is maintained in occupied areas during facility operations.

The air lock has a partitioned service bay used for servicing the equipment and a contamination reduction corridor to allow vehicle operators to enter and exit their vehicles in a controlled, low-contamination area. These support structures are included within the descriptive title "air locks" and are considered to be part of the Retrieval Enclosure, but not part of the Retrieval Area. Pass-through boxes are installed in the walls for transferring contamination smears and small equipment and tools between the air locks and the clean area. Overhead equipment doors allow equipment access into the air lock from the Retrieval Area and into the air lock from outside. Dust suppressant storage and fill, diesel fueling, water, electrical cords, breathing-air manifolds, and breathing-air fill systems are installed to support operations. The air lock also has an operation corridor that houses support equipment (tanks, pumps, and other equipment).

Dust suppression liquid is applied on the soil travel paths within the WMF-1617 facility to minimize airborne dust/contamination from previous CERCLA operations. If not controlled, the vehicle traffic creates significant dust and can affect the facility ventilation system and worker safety from airborne contamination. Commercially-available, non-hazardous dust suppression liquid (e.g., water, WetJet, Durasoil) is applied on an as-needed basis. Application of dust suppression liquid may result in minor puddling of the liquid which is allowed to absorb into surface soils.

Room 105 Drum Packaging in WMF-1617

The WMF-1617 airlock contains a drum packaging room (Room 105 which is entered through Room 106 Utility Area), with four drum packaging stations (DPSs) that are used to reduce contamination exposure during drum packaging, weighing, and staging activities. Double doors provide access to drum packaging rooms.

DPSs provide a means for workers to safely package waste materials out of the Retrieval Area and into clean 55-gal drums. The DPSs provide contamination control and serve as radiological workstations.

A structural steel framework anchored to the air lock floor supports each packaging station. The panels, penetrations, interfaces, and ports are sealed and secured to the frame or panels. Each station has multiple glove ports and scratch-resistant Lexan windows. Slides are installed under the trolley rails to funnel materials (predominantly soil) to the side of each DPS entrance to allow mechanical removal of the fallen material. Airflow through each station is induced by the Retrieval Enclosure exhaust ventilation system to ensure contaminated air is drawn away from the packaging station worker.

Room 104 Equipment Airlock in WMF-1617

The room 104 Equipment Airlock, located in WMF-1617 (reference drawing 761194 – see Book 3, Appendix I of this Permit) will be used to transfer drums into the radiologically-controlled Retrieval Area (RA) for processing from storage in WMF-698, or unloaded directly from the transport trailer from AMWTP. The equipment airlock is an area that is approximately 20 ft wide X 40 ft in length. The steel-framed airlock is accessed by 16 ft X 16 ft doors on each end to provide for equipment egress and has a reinforced concrete floor. Drums would normally be introduced into the area using a manual drum hauler or a telehandler (forklift) with extending boom and drum handling attachment.

Typically, the airlock will be used as a transfer bay to support same-day transfer of wastes into the RA; however, drums may be stored in the airlock area for a longer period based on operational need or to accommodate unusual circumstances (e.g., loss of commercial power and operational shutdown). Secondary containment within Room 104 is provided by drum storage secondary containment pans. The 4’-2” by 8’-2” by 7” pan is constructed of 1/8” carbon steel, all corners and seams are seal welded. A support grate to elevate the drums is also included. The capacity of the drum storage secondary containment pans is 149 gallons, which provides adequate capacity for the storage of sixteen drums.

Room 106 Utility Area in WMF-1617

WMF-1617, Room 106 (Utility Area), (reference drawing 761194 – See Book 3, Appendix I of this Permit) will be used to store drums that have been processed out of the drum packaging stations before loading on a trailer for transfer back to the WMF-698 storage building or return to AMWTP. The Utility Area is located in the front (west) portion of the WMF-1617 airlock and encompasses approximately 3,200 square ft. The Utility Area is accessed by a 14 ft X 14 ft metal door, a 16 ft X 16 ft metal door, and two personnel doors to provide for equipment and personnel egress. The area has a reinforced concrete floor. Drums would be removed from the DPS area using hand-operated drum handling equipment and removed from the Utility Area using a forklift with a drum handling attachment.

The airlock will be used to support interim storage of drums from the DPSs until sufficient quantity of drums is accumulated to support shipment to AMWTP or back to WMF-698. Drums processed out of a DPS have had visual examination performed to verify removal of free liquids; consequently, secondary containment will not generally be required. The area will also be used to receive drums directly from AMWTP (i.e., if storage in WMF-698 does not occur). In this case, the drums would require storage on drum storage secondarycontainment pans for secondary containment before entry into the equipment airlock and processing in the retrieval area.

Trailer Storage Areas

Storage of containers that have completed treatment in WMF-1617 and are ready for transfer back to AMWTP, may be stored on trailers located next to the treatment units. This storage will be relatively short-term, as the drums will remain in these locations only until a full trailer of drums is loaded for return to AMWTP. Since these drums have been through visual examination following the treatment process, there is no concern with liquids or prohibited items.

Storage Area for Secondary Wastes

Secondary waste (e.g., drum carcasses/liners, PPE, plastic sheeting, filters, etc.) may be stored in WMF-698, after packaging, and prior to transfer to AMWTP or to an off-site TSDF for

disposal. In addition, temporary accumulation areas (i.e., less than 90 day storage areas) may be established for storage of secondary waste streams.

Storage of Prohibited Items

WIPP prohibited items (e.g., liquids, etc.) will normally be treated on the sorting table as part of the repackaging process. If removal from the waste is required, prohibited items may be staged within the retrieval area in waste trays pending packaging into a new container via the DPS. Once packaged through a DPS, prohibited items will be stored in permitted storage areas, separated by distance or barrier as needed depending upon waste characteristics, before being returned to AMWTP. The discovery of prohibited items that must be removed from the waste stream will be reported to the DEQ, and will be included in the semiannual non-compliance report as required by Permit Condition I.U.

Decontamination of Equipment

It is a recognized situation that within the ARP V waste exhumation facility, contaminated soils are present from previous CERCLA operations. Periodic equipment decontamination may be performed within the retrieval area to achieve acceptable radiological conditions on the equipment for required maintenance. Any portion of the equipment (e.g., excavator, telehandler forklift, loader) that is contaminated with CERCLA materials, such as contaminated soils, may require that the material be removed through spray washing, brushing, or other means, and the associated wastes placed within the CERCLA contaminated area. Equipment surfaces may also come in contact with RCRA waste (e.g., excavator bucket or thumb) and require decontamination. Waste material will be removed through spray washing, brushing, or other means. The waste material will be collected in the excavator secondary containment bucket, or other secondary containment pan described in this permit. The excavator secondary containment bucket is a 4’-6” by 3’ by 2’-6” carbon steel container with a crossbar for the excavator to lift. Waste from decontamination of RCRA contaminated equipment will be contained within the bucket or secondary containment pan, and then packaged out of the facility as RCRA waste, or included in the waste stream destined for WIPP.

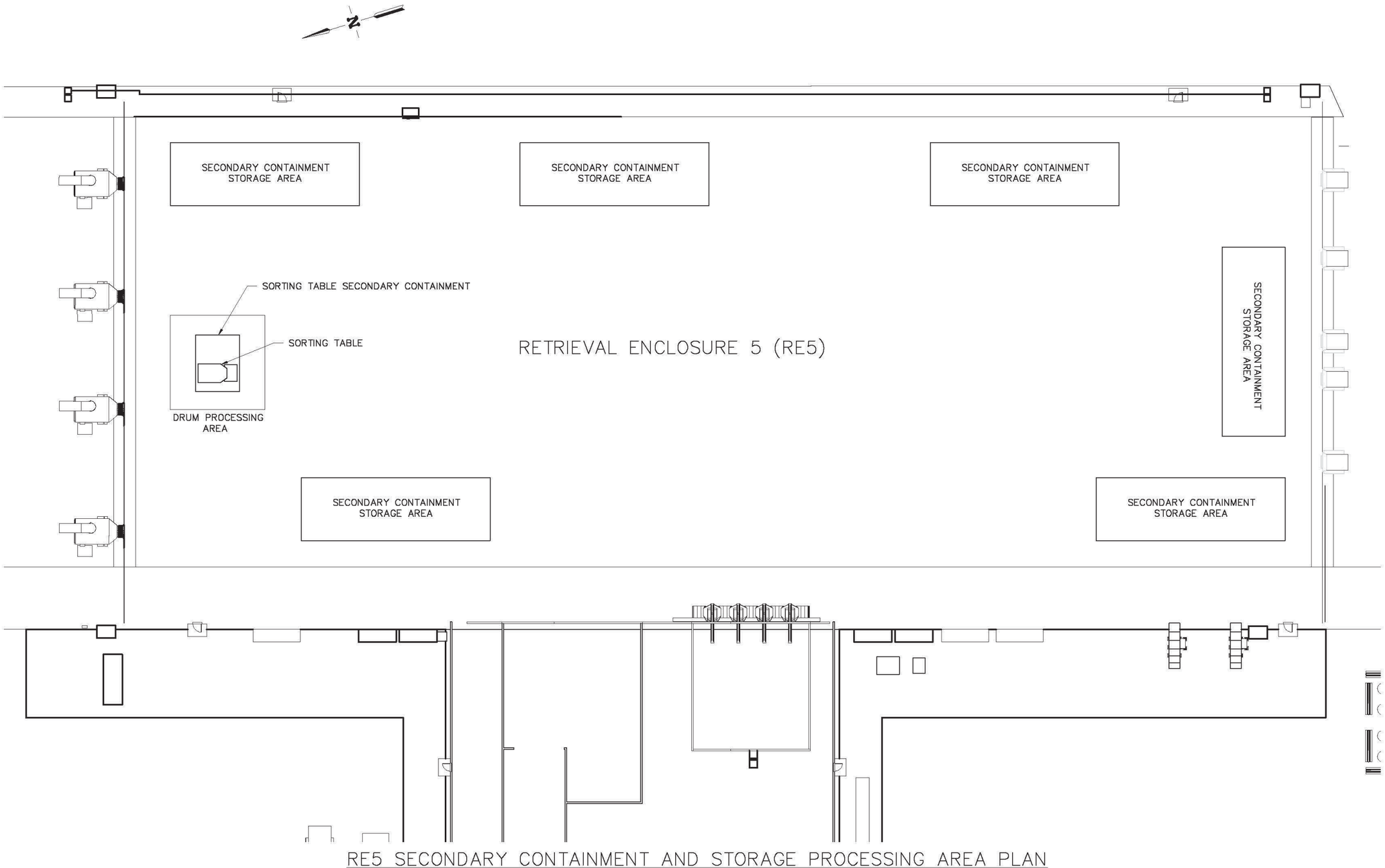


EXHIBIT B-6. Schematic of WMF-1617

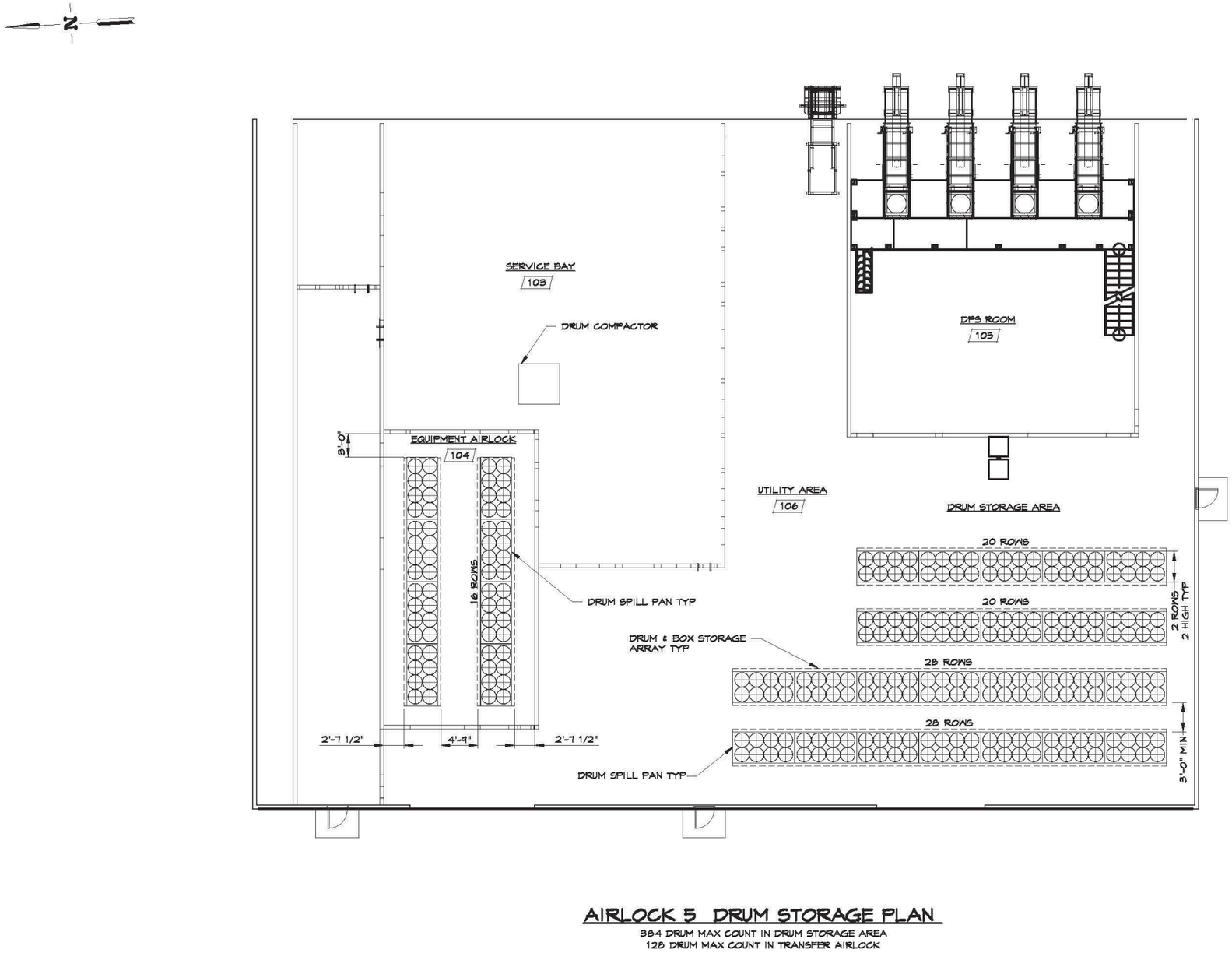


EXHIBIT B-7. Schematic of Airlock 5 Plan

RWMC Location Information

The RWMC occupies approximately 166 acres in the southwestern corner of the INL. The INL is located along the western edge of the eastern Snake River Plain in southeastern Idaho, approximately between latitudes N 43°28' to N 44°02' and longitudes E 112°26' to E 113°15'. The following sections describe how the RWMC complies with the seismic and floodplain standards under 40 CFR 270, 40 CFR 264.18, IDAPA 58.01.05.012, and IDAPA 58.01.05.008.

Seismic Standard [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.18(a) and 40 CFR 270.14(b)(11)(i-ii)]

The RWMC is located in Butte County, Idaho. Butte County is not listed in IDAPA 58.01.05.008 (Appendix VI to 40 CFR 264), and, therefore, does not require demonstration of compliance with the seismic standard.

Floodplain Standard [IDAPA 58.01.05.008; 40 CFR 264.18(b); IDAPA 58.01.05.012; 40 CFR 270.14(b)(11)(iii-iv)]

A 2001 flood evaluation study ("100-Year Floodplain and 25-Year Runoff Analyses for the Radioactive Waste Management Complex Area at the Idaho National Engineering and Environmental Laboratory," T. Mitchell, S. Mitchell, J. Humphrey, D. Kennedy, and T. Funderburg, December 2001), provided in Book 3, Appendix 2 of this Permit, analyzed the extent of a 100-year floodplain. Based on this analysis, there are no mixed waste management areas located within the 100-year floodplain at the RWMC. The requirements of this section are, therefore, not applicable.

Traffic Information [IDAPA 58.01.05.012; 40 CFR 270.14(b)(10)]

U.S. Route 20/26 is the general access route to the RWMC and the SDA. Van Buren Boulevard intersects U.S. 20/26 northeast of the RWMC and is the direct access road leading to the Experimental Breeder Reactor I (EBR-I). Adams Boulevard intersects Van Buren Boulevard just north of EBR-I and is the direct access road leading to the RWMC. Employee-owned vehicles are not allowed to enter the SDA. Personnel travelling in the SDA either walk or are transported by contractor vehicles/equipment, federally owned vehicles, or vendor vehicles.

Waste transfers to/from AMWTP and the SDA are completed via the access gates between the TSA and SDA areas.

Traffic control procedures within the SDA area support facility operations, maintenance, and waste transfers. These traffic procedures are implemented using standard highway traffic control and informational signs. The typical sign types that may be used in the SDA are: Stop signs (at access gates and some road intersections); Clearance signs (where electrical lines pass over the roadway and restrict traffic); Speed Limit signs (various signs on roadways as necessary); Directional signs (various roadways to indicate traffic flow direction); and Informational signs (various roadways to indicate facility locations, loading/unloading areas, etc.). Example locations of stop signs and speed limit signs for the SDA are shown in Exhibit B-8.

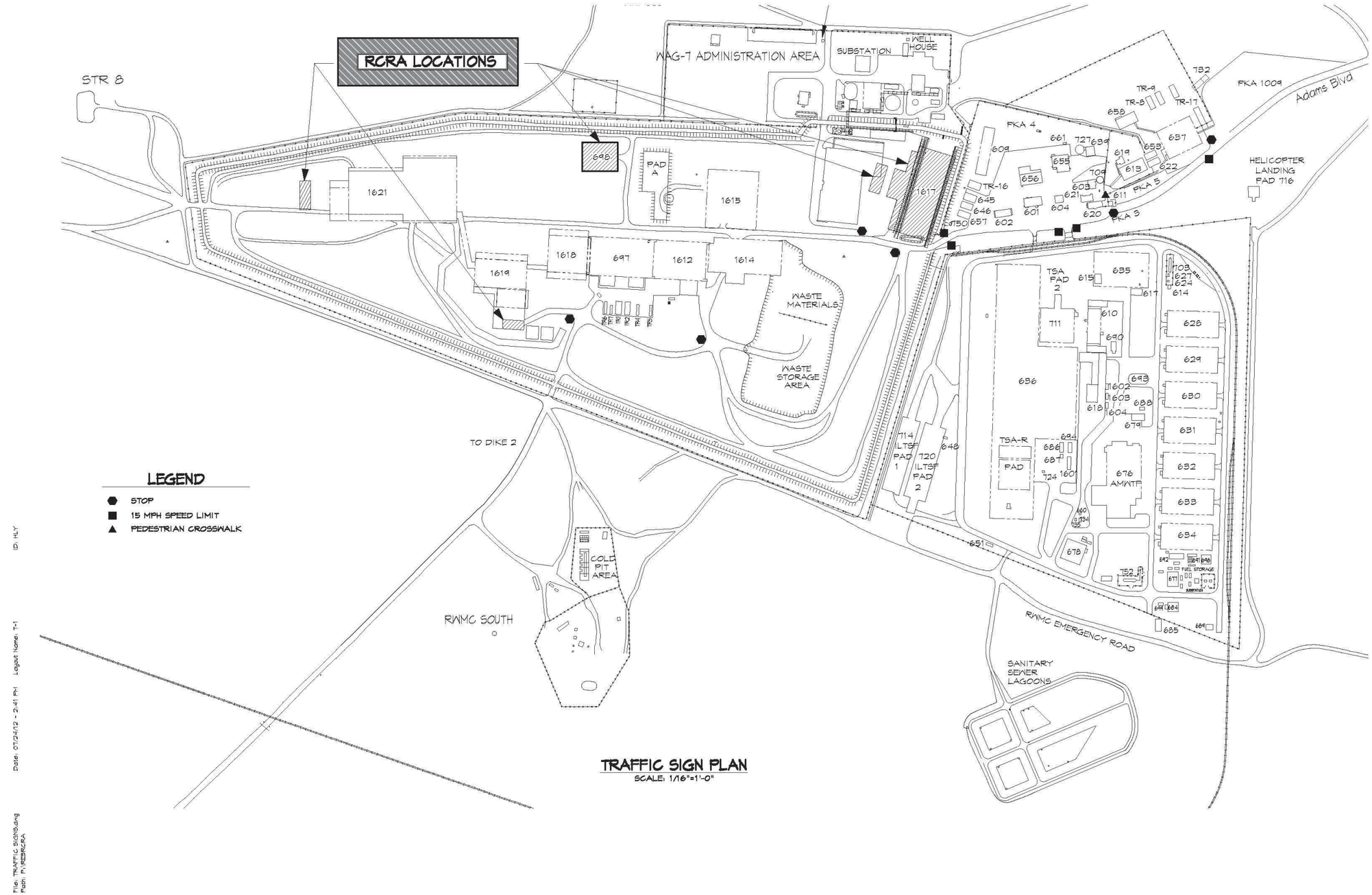


EXHIBIT B-8. Example of Traffic Sign Plan/Location

D. PROCESS INFORMATION

This section provides process information for the Radioactive Waste Management Complex (RWMC) Subsurface Disposal Area (SDA) Accelerated Retrieval Project (ARP) waste management units addressed in this permit: container storage (S01) in buildings WMF-698 and WMF-1617 and at the trailer storage areas, and miscellaneous treatment (X99 and X02) –in Building WMF-1617. Miscellaneous treatment will be conducted in three miscellaneous units; the retrieval area, the DPSs, and the drum compactor. includes any/all of the following, opening waste containers, staging waste in the retrieval area associated with waste processing activities, removing waste from the container, segregating/sorting waste, opening/crushing inner containers with liquid content, absorbent addition for liquids, segregation/ treatment of WIPP prohibited items, sizing waste to fit into containers, and subsequently placing the waste into new containers. Sizing/compaction/crushing of drum carcasses and/or liners may also be performed.

Container Storage in WMF-698

WMF-698 will be used for storing waste drums received from the AMWTP. Waste drums may be stored in WMF-698 until being transferred to WMF-1617 for further processing. Once these drums have been processed at WMF-1617, they may either be returned to WMF-698 for interim storage or returned directly to the AMWTP. WMF-698 is permitted to store up to 1,728 drums (95,040 gallons). The storage configuration consists of storing the drums in a standard RCRA 2-wide by 2-high configuration. Drums with liquids are stored on drum storage secondary containment pans to provide secondary containment for free liquids. Waste boxes may also be used at WMF-698. Aisle space is provided for inspection personnel and emergency equipment (minimum of 3 feet between drum or box rows, and a 20 foot main aisle to allow removal and inspector egress). The drum configuration is shown in Exhibit B-5. Evaluation of the waste to be received from AMWTP shows no compatibility, reactivity, or ignitability concerns. Weekly inspections of the storage area within the building, and daily inspections of the loading/unloading areas (when in use), are performed by trained personnel, as required by RCRA. CERCLA waste stored in WMF-698 will be segregated from the RCRA waste, and is managed in accordance with the CERCLA protocols. CERCLA waste is not subject to the RCRA permit requirements.

Container Storage in WMF-1617

WMF-1617 will be used for storing and processing waste drums received from AMWTP. Container storage areas are located within Room 103 Service Bay (2 solid waste boxes and 4 drums, or1,567 gallons), Room 104 Equipment Airlock (128 drums or 7,040 gallon capacity), Room 105 Drum

Packaging Stations (4 drums or 220 gallons capacity), and Room 106 Utility Area (384 drums or 21,120 gallon capacity). The standard RCRA storage configuration (2-wide by 2-high) will be used. These areas are shown in Exhibits B-6 and B-7. Drums that may contain liquids (i.e., before repackaging and absorbent addition is completed) will be stored on drum storage secondary containment pans to provide secondary containment. Aisle space is maintained for inspection personnel and emergency equipment. Aisle space is not required in Room 105 as the waste is contained in single drums located beneath each of the drum packaging stations. Inspections are completed via visual or camera inspections or viewing areas through windows. If personnel in PPE are required to enter the RA, inspection of the RCRA areas will be completed by direct visual inspection. The RCRA areas within the Retrieval Area are shown on Exhibit B-6.

Miscellaneous Treatment (X99) and Mechanical Processing Treatment (X02) – in WMF-1617

Processing the waste at WMF-1617 is performed in three miscellaneous treatment units: the Retrieval Area (X99), the DPS stations (X99), and the drum compactor (X99 and X02). The Retrieval Area includes the following activities: opening waste containers, staging waste in the retrieval area associated with waste processing activities, removing waste from the container onto the sorting table, segregating/sorting waste, opening/crushing inner containers with liquid content, absorbent addition for liquids, segregation/treatment of WIPP prohibited items, compacting/crushing empty containers with the excavator, and sizing waste to fit into containers. The Drum Packaging Stations activities include segregation of prohibited items, addition of absorbents to the waste in the tray as necessary, visual examination by WIPP-qualified visual examiners to document compliance with the WIPP WAC, and placing the waste into new containers. The Drum Compactor is used to compact drum carcasses and/or liners, and includes absorbent addition for any liquids from the compaction process. These activities will allow the repackaged waste to meet the WIPP WAC.

Drum lids/rings will be loosened and removed in either the equipment airlock (Room 104), the service bay (Room 103) or in the ARP V retrieval area, depending upon operational needs. The lids and drum ancillaries (e.g., rings and bolts) will be staged for separate management as secondary waste.

Drums will be transferred from the service bay into the retrieval area to begin processing. Drums staged in the retrieval area will be placed in waste tray secondary containment pans. The locations of the 20’ by 60’ staging areas within the RA are shown in Exhibit B-6. The waste tray secondary containment pans are 9’-0” by 9’-0” by 6”, made of 1/4” carbon steel, and capable of holding 300 gallons of liquid. The pans have a 6” high frame underneath with forklift pockets to allow for movement within the identified staging areas. The waste tray secondary containment pans also have an 8’-0” by 8’-0” by 12’

support grate made of 1/4" carbon steel. The support grate allows for inspection of the secondary containment, and elevates the drums or waste trays to prevent contact with accumulated liquids. Up to nine waste drums and/or four waste trays may be placed on the waste tray secondary containment pans.

The location of the 30' by 34' drum processing area, including the sorting table, is shown in Exhibit B-6. Exhibit D-1 provides a schematic of the sorting table. The sorting table is made of carbon steel, is 9'-2" by 6'-0" with a 1/2" floor and 1/4" sides. The floor and sides are reinforced to allow safe mixing of the waste and absorbent. The sorting table is capable of holding greater than 130 gallons of liquid. The sorting table is located inside a 14'-0" by 18'-0" by 6" secondary containment, constructed of 1/4" carbon steel, which has a capacity of 500 gallons. The secondary containment also has an 8" high frame with lifting lugs and skid plates for movement within the drum processing area if necessary for operational reasons.

Treatment activities conducted on the sorting table include any/all of the following activities. The excavator will take the sludge drum from the waste tray secondary containment pan and empty the contents onto the sorting table through use of the excavator to empty the contents. The contents of up to 3 drums may be processed on the sorting table at one time. The waste is then segregated/sortedto determine the presence of liquids and identify/remove any prohibited items. Any inner containers that may have liquid content are opened/crushed with the excavator thumb or bucket to allow absorbtion of the liquid to take place. The excavator is used to add absorbent materials (identified in Attachment 2) to the waste on the sorting table. The absorbent material is staged in the RA within a 4'-6" by 3'-0" by 2'-6" bin that has a capacity of 250 gallons. The waste/absorbent is mixed on the sorting table with the excavator bucket to ensure absorbtion of the liquids. Once mixing is completed, the waste is scraped from the sorting table into the lined ARP waste trays that have been placed in front of the sorting table.. Care will be taken not to overfill the ARP waste tray, as additional absorbent may be added in the DPS. The filled ARP waste tray will then be staged on a waste tray secondary containment pan or transported to the DPS for further processing, depending on DPS availability.

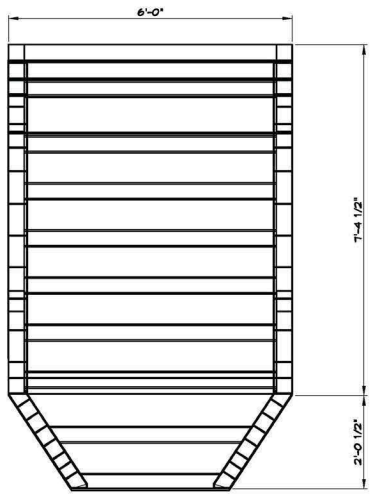
The sorting table activities performed inside the retrieval enclosure are observed through either excavator mounted cameras or cameras located within the facility (see Exhibit D-2 for camera locations) that broadcast a video feed to the operations control room. The operations foreman directs the operation through viewing these camera feeds and communicates by radio with the equipment operator.

WIPP prohibited items will be treated on the sorting table or will be segregated using the excavator at this point and staged in a waste tray located within a waste tray secondary containment pan. If segregation is not practical within the retrieval area via the excavator, segregation of prohibited items

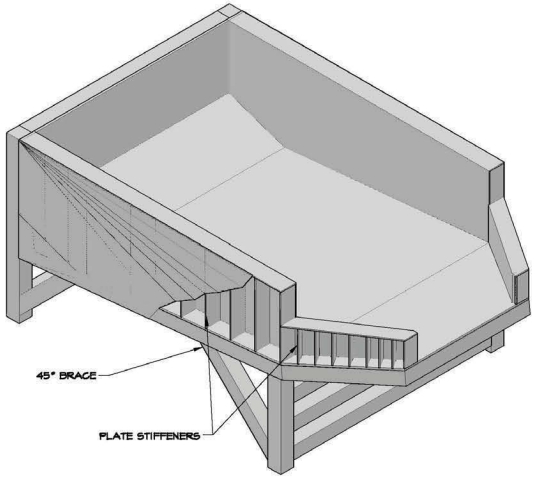
will be performed in the DPS. If consistent with the facility safety basis, prohibited items will be packaged into drums through the DPS and transferred to AMWTP for processing and disposition. In some cases, prohibited items may be staged in waste trays in the retrieval area after segregation in the DPS to provide operational flexibility. Prohibited items staged inside the retrieval area in a waste tray, will be separated from other waste by distance and/or barriers, and handled as appropriate.

Drums (and associated liners, if any) that are emptied will undergo visual verification (via video camera feed described above). Operations personnel will view the inside of a waste container that has been emptied on the video feed or direct visual observation (through the windows) and determine through operational experience and training if the container meets the regulatory definition to be considered RCRA empty. The operational process does not allow a person to be inside the facility during waste handling operations due to the potential for radiological contamination, therefore, the video systems are utilized. The RCRA empty determination will be documented on FRM-1367 which is maintained in the Operating Record. Drums that are verified as empty will be staged for separate management as non-RCRA secondary waste. In instances where the sludge is not readily removed from a container, the excavator will be used to dismantle the drum (sizing) to remove the sludge, or the sludge may be removed in the DPS. In these cases, the drum carcasses will likely not support a RCRA empty determination; consequently, the non-intact drum carcasses may be crushed (sizing) by the excavator in a waste tray secondary containment pan (without grate), or the sorting table secondary containment pan, or in the drum compactor and staged/packaged for management as RCRA secondary waste (i.e., hazardous debris). Secondary wastes will be placed into drums, standard waste boxes, or other waste boxes.

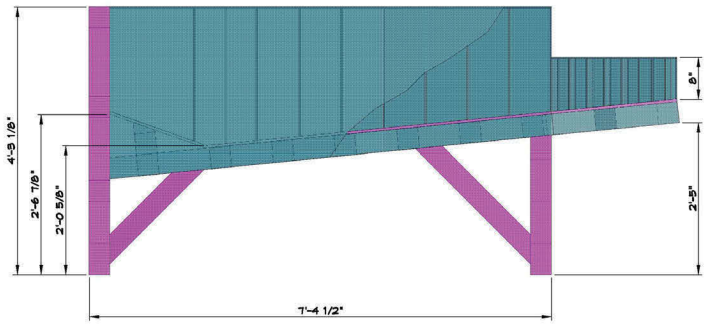
A drum compactor is located in Room 103 to compact empty drums. Exhibit D-3 provides a schematic of the drum compactor. The compacted drums will be direct loaded into a container (drum or standard waste box) in Room 103, or passed through a radiological portal into a container in Room 106 for disposition.



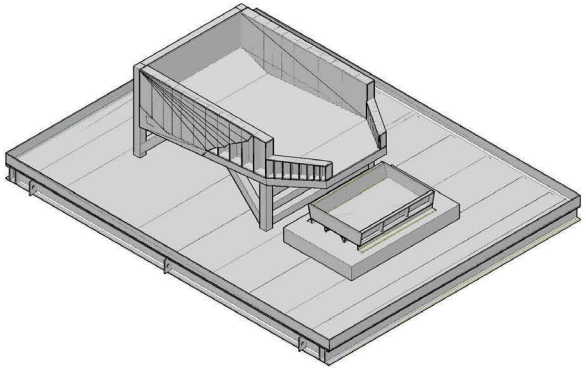
SORTING TABLE TOP VIEW



SORTING TABLE 3D VIEW

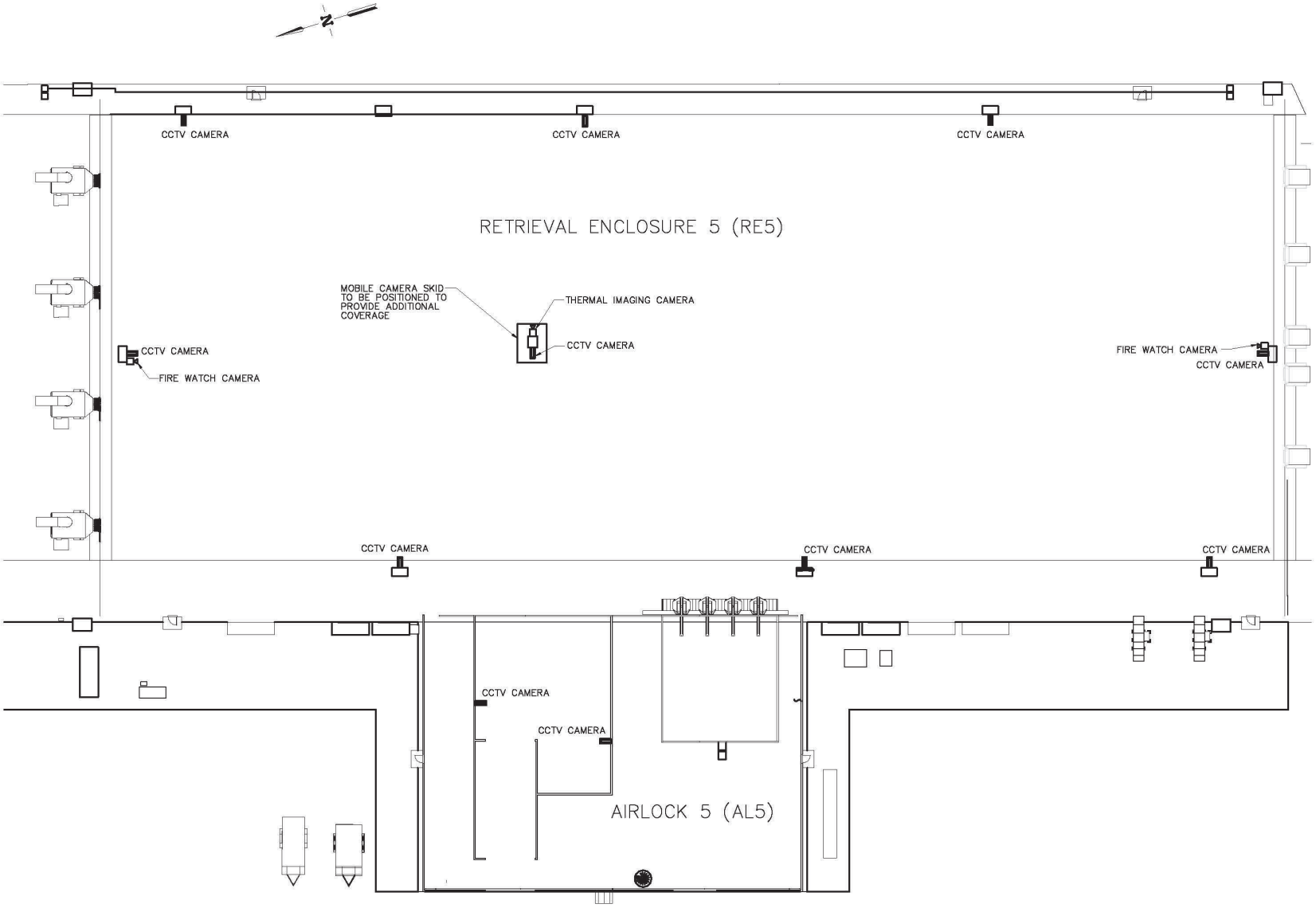


SORTING TABLE SIDE VIEW



SORTING TABLE AND SECONDARY CONTAINMENT 3D VIEW

EXHIBIT D-1. Sorting Table Schematic

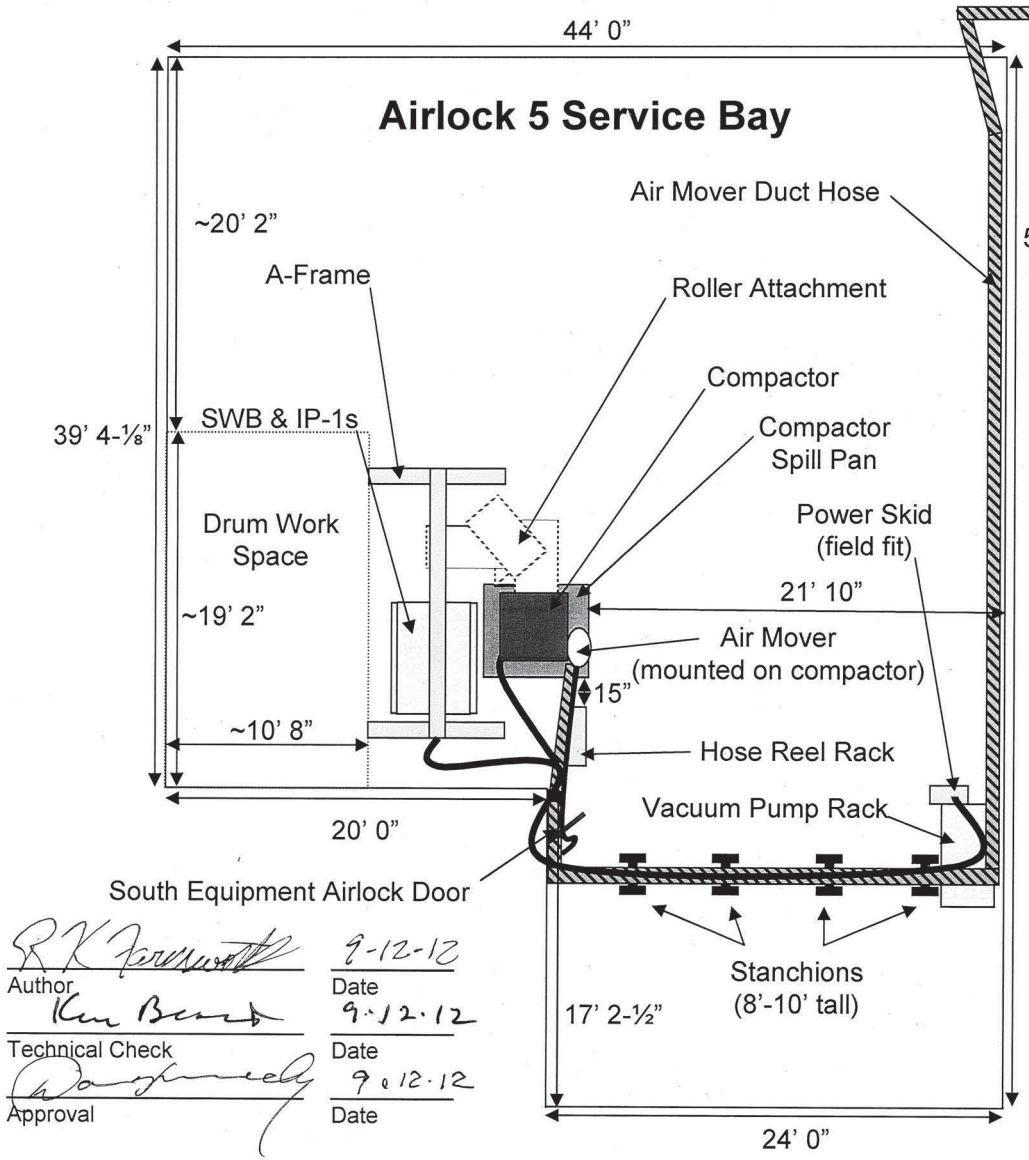


CAMERA PLAN

EXHIBIT D-2. Retrieval Enclosure Camera Plan

The drum compactor (Exhibit D-3) is constructed of carbon steel. The empty drum carcass is placed in the compactor either vertically upright or upside down. During compaction, a large diameter mast head presses down on the drum, causing it to collapse downward as it is compacted. Total time for the compaction cycle on each drum is approximately 55 seconds. Drum compaction will be performed with the door of the compactor closed and latched, for purposes of safety.

Engineering Sketch 1. RCRA Drum Crushing Equipment Arrangement in Airlock 5 Service Bay



Work space area assumes that the East End of the Hose Reel Rack is located 5 ft east of Door 3, and South edge of Hose Reel Rack is 2 ft South of South edge of Door 3.

Installation Instructions

1. Install Compactor Spill Pan such that the South side of the Spill Pan is 21' 10" from the South Service Bay Wall, and the West side of the Spill Pan is 15" from the East end of the Hose Reel Rack.
2. Install the Power Skid on the East side of the Vacuum Pump Rack.
3. Install the Compactor Air Mover vertically on the South side of the Drum Compactor.
4. Install 4 stanchions ~ 5 ft apart across the 24-ft Service Bay span West of the South Equipment Airlock Door.
5. Run 8" Ø Duct Hose from the Air Mover outlet, over the Stanchions, along the South Service Bay wall, out the Service Bay through the highest inlet filter opening Right of Door 2, then 20 ft South in the RE (~ 120 ft).
6. Run 8" Ø Duct Hose from the Compactor vent hole to the Air Mover inlet (~3-4 ft).
7. Run flexible 480 V cables from the Power Skid to the A-Frame Hoist/Trolley and Drum Compactor, using the Stanchions as cable support.
8. Run Power Cable from Air Mover to nearest 120 V receptacle (on South wall of Equipment Airlock), using stanchions as necessary.

Author	Date 9-12-12
Technical Check	Date 9.12.12
Approval	Date 9.12.12

EXHIBIT D-3. Schematic of Drum Compactor

The drum compactor is located in the drum compactor secondary containment tray. The tray is 5'-0" by 5'-6" by 4" carbon steel, and includes a channel to elevate the drum compactor by 6". The tray also has a 4'-0" section of roller table attached to the front to aid in drum handling. The tray provides 60 gallons of capacity for any liquids that are produced during the drum compaction. Absorbent is staged within Room 103, and is applied to the liquids within the containment tray with hand tools (scoops, shovels, etc.). The absorbed material is then removed for the tray, bagged, and returned to the RA for inclusion in the waste stream.

Once in the DPS, WIPP qualified Visual Examiners (VEs) will thoroughly inspect the waste. Visual Examination (VE) Operators are qualified to the CCP WIPP certified program. VE is conducted at the DPSs in accordance with CCP WIPP certified procedure, CCP-TP-006, CCP Visual Examination Technique for Idaho National Laboratory (INL) Newly Generated TRU Waste. The scope of this procedure is "to document the physical waste form, confirm the Waste Stream description and Waste Matrix Code, document that no prohibited items are present, and estimate the weight of the waste material parameters." Additional characterization will be performed at the AMWTP. The characterization information from these processes will be included in the updated AK package by AMWTP for shipment to WIPP.

Any further WIPP prohibited items identified will be segregated for return to AMWTP separate from the sludge waste being processed, or treated on the sorting table within the retrieval area. Evidence of, or potential for free liquid generation will be mitigated using the addition of absorbent followed by a thorough mix using simple DPS based tools (scoops, small shovels, small rakes, etc.). At this point the waste will be hoisted in its tray liner, moved and then lowered to a new drum attached to the DPS load out port. A radiological transfer sleeve ensures no contamination is spread during the discharge to the drum.

The liner, a bottom discharge type, will be discharged allowing the waste to transfer to the drum. Absorbent will be added in accordance with WIPP requirements. The tray liner will be included in a waste drum. The transfer sleeve is then cut using radiological control protocols, the drum lid is attached, and contamination surveys performed on the outside of the drum. The drum is then moved using a drum hauler within the airlock for staging in the utility room (Room 106) or loaded on a trailer pending transfer to AMWTP.

If waste is spilled outside of containment pans (i.e., into the surrounding soil), operations personnel will immediately use excavation equipment to collect the spilled material and surrounding soil. Hand excavation by personnel in protective equipment may also be used to collect the spilled material and surrounding soil. Inspections of the soil in the immediate vicinity of waste tray secondary containment pans and the drum processing area will be conducted on a daily basis using equipment based cameras or cameras located throughout the RA as shown in Exhibit B-3, to ensure collection of any waste/material that is spilled. Direct visual inspection by personnel in PPE will be completed whenever the RA is entered.

During processing some spillage of waste may occur in the DPS. This may occur when the waste is being inspected, when waste is being mixed with absorbents, and/or when the tray liners are hoisted. This spillage will accumulate at the bottom of the DPS. It will be cleaned out by collecting the spillage and transferring to other waste handling trays, and/or sweeping the material outside of the DPS to collection waste handling trays via the attached debris slides. This waste will be returned to the sorting table for inclusion in repackaged waste.

It is a recognized situation that within the ARP V waste exhumation facility, contaminated soils are present from previous CERCLA operations. Periodic equipment decontamination may be performed within the retrieval area to achieve acceptable radiological conditions on the equipment for required maintenance. Any portion of the equipment (e.g., excavator, telehandler forklift, loader) that is contaminated with CERCLA materials, such as contaminated soils, may require that the material be removed through spray washing, brushing, or other means, and the associated wastes placed within the CERCLA contaminated area. Equipment surfaces may also come in contact with RCRA waste (e.g., excavator bucket or thumb) and require decontamination. Waste material will be removed through spray washing, brushing, or other means. The waste material will be collected in the excavator secondary containment bucket or other secondary containment pan. The excavator secondary containment bucket is a 4’-6” by 3’ by 2’-6” carbon steel container with a crossbar for the excavator to lift. Waste from decontamination of RCRA contaminated equipment will be contained within the bucket, and then packaged out of the facility as RCRA waste.

Once drums have completed processing and have been loaded back onto the transport trailer, staging of a loaded trailer may be required prior to returning the drums to AMWTP. Three locations may be used for the trailer storage areas. The first location is located near WMF-1617. The second location is just south of WMF-1619 (ARP VII). The third location is just west of WMF-1621 (ARP VIII). These locations are shown on Exhibit B-2. 80 drums at a maximum may be staged on the soft-

sided transport trailer which provides weather protection. Trailers will typically be staged for less than 3 days, but may remain for up to 10 days depending on operational needs.

D-1a(2) Container Management Practices [IDAPA 58.01.05.008; 40 CFR 264.173]

All containers will remain closed except for when waste is being added or removed or the drum rings/lids are removed for processing.

Containers will be kept closed during storage. Containers will not be opened, handled, or stored in a manner that may cause them to rupture or to leak. RWMC personnel follow established procedures designed to minimize the probability of waste container accidents.

Waste is generally received at RWMC by flatbed semitrailers or trucks from AMWTP. Waste movement between buildings within RWMC is generally by flatbed semitrailers, truck, or forklift. Waste containers are identified for liquid treatment by the AMWTP after liquid is identified during Real-Time-Radiography scanning. Waste containers are identified by barcode and the data that ensures the container meets the RWMC Waste Acceptance Criteria (vent date, assay value, container size, barcode number, no aerosol cans, no roaster oxides) is electronically transferred from the AMWTP data management system to the ICP data management system. After data is reviewed and the transfer is approved by RWMC, the truck with an attached trailer with waste containers is transported through the gate that separates the two facilities. Radiological surveys are performed and the transfer is received by RWMC, the trailer is then transported to either WMF-698 or WMF-1617.

Since the wastes transferred from AMWTP to RWMC, and RWMC to AMWTP all occur within the RWMC area, the transfers are not subject to Department of Transportation requirements. RWMC requires the containers to be in good condition, labeled in accordance with RCRA regulations, and identified in the transfer paperwork.

Containers of hazardous and/or mixed waste and debris generated within the RWMC perimeter and stored in the container storage areas are labeled with a unique identification number for location tracking. The containers are labeled in accordance with the RCRA regulations.

Container loading and unloading activities are conducted according to established procedures for:

- Work Control
- Receipt, inspection, and documentation of waste

- Operations at WMF-698 and WMF-1617
- Non-destructive assay
- Log keeping practices and checklists
- Radiation and contamination control
- Industrial and fire safety
- As low as reasonably achievable (ALARA) radiation protection program
- Truck waste container unloading
- General waste movement within RWMC.

D-1a(3) Secondary Containment System Design and Operation [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.15(a) and (b), 264.175(a) through 264.175(d)]

Secondary containment for the containers that may contain free liquids (e.g., prior to processing) in WMF-698 storage area is provided by drum storage secondary containment pans described earlier in this section. All containers will be elevated on agrate within the drum storage secondary containment pans so that should a leak/spill occur, the primary container will not be in contact with any released material. The drum storage secondary containment pan capacity is greater than the required 10 percent of the maximum container capacity.

Secondary containment for the container storage areas of WMF-1617 is also provided through the use of drum storage secondary containment pans described earlier in this section for those containers that may contain liquids (e.g., prior to processing). Containers are elevated within the pans, and the pans provide sufficient capacity greater than the required 10 percent of the maximum container capacity. Containers that have completed processing through the drum packaging stations and have been visually verified to not contain liquids, may be stored without secondary containment.

If liquid is observed in the drum storage secondary containment pan, the leaking drum will be identified and either be overpacked into an 83-gallon drum, or transferred into WMF-1617 for immediate processing. Liquids will be removed from the spill containment pans through addition of absorbent and removal of the solidified material in a timely manner.

The storage of waste in drums or waste trays and treatment of the waste on the sorting table, DPSs or drum compactor is conducted inside the WMF-698 and WMF-1617 structures which prevent run-on of precipitation.

D-1b. Containers without Free Liquids

D-1b(1) Test for Free Liquids [IDAPA 58.01.05.012; 40 CFR 270.15(b)(1)]

Wastes without free liquids to be stored in the container storage areas in WMF-1617 Room 106 and WMF-698 will have completed visual verification of the contents through the drum packaging station. Waste in lined ARP waste trays within the RA will have also undergone visual verification on the sorting table to ensure that no free liquids are present in the waste tray. All other wastes will be managed as containing liquids.

D-1b(2) Description of Containers [IDAPA 58.01.05.008; 40 CFR 264.171 and 264.172]

Containers to be used for waste storage include 55-gallon drums, 83-gallon drums, 85-gallon drums, 110-gallon drums, standard waste boxes, or other waste boxes. If a container holding waste or debris is not in good condition, the waste or debris will be either overpacked or taken to the retrieval area for immediate processing.

Operating personnel visually inspect the container storage/staging areas in WMF-698 and WMF-1617 through direct visual examination, or by using cameras within the retrieval area. Inspections are recorded and maintained at the facility for at least three years. Details on inspections are provided in Attachment 4, Section F of this permit.

D-8. Miscellaneous Units [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.23 and 264.601]

Processing the waste at WMF-1617 is performed in three miscellaneous treatment units: the Retrieval Area (X99), the DPS stations (X99), and the drum compactor (X99 and X02). The Retrieval Area includes the following activities: opening waste containers, staging waste in the retrieval area associated with waste processing activities, removing waste from the container onto the sorting table, segregating/sorting waste, opening/crushing inner containers with liquid content, absorbent addition for liquids, segregation/treatment of WIPP prohibited items, compacting/crushing empty containers with the excavator, and sizing waste to fit into containers. The Drum Packaging Stations activities include segregation of prohibitied, addition of absorbents to the waste in the tray as necessary, visual examination by

WIPP-qualified visual examiners to document compliance with the WIPP WAC, and placing the waste into new containers. The Drum Compactor is used to compact drum carcasses and/or liners, and includes absorbent addition for any liquids from the compaction process. These activities will allow the repackaged waste to meet the WIPP WAC.

D-8a. Description of Miscellaneous Units [IDAPA 58.01.05.012; 40 CFR 270.23(a)(1) and (2)]

The description of the WMF-1617 building and miscellaneous unit processes are detailed earlier in this section.

D-8b. Environmental Performance Standards for Miscellaneous Units [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601 and 270.23(c)]

The miscellaneous treatment processes located in WMF-1617 (RA, DPSs, and drum compactor) are located, designed, and operated in a manner to preclude the release of hazardous waste or hazardous constituents that may have adverse effects on human health or the environment. The WMF-1617 structure, and secondary containment pans (waste tray secondary containment pans, sorting table secondary containment pan, drum compactor secondary containment pan, DPSs), are configured, including a ventilation system for confinement of radioactive and hazardous constituents, to prevent particulate releases to the environment. Administrative/engineering controls for WMF-1617 provide additional assurance that hazardous materials are not released to the environment.

No viable pathway exists for migration of hazardous waste or hazardous constituents from the mixed waste treated in the miscellaneous treatment units located in WMF-1617 to ground water, and/or surface water, as all treatment is conducted within areas that have impervious secondary containment. During HWMA/RCRA waste processing, any spilled waste will be cleaned up at the time the spill occurs. Procedural steps mandate removal of all spilled material and any surrounding stained soils. Soils approximately 4” beyond the extent of visible soil staining will be removed in the event of a liquid spill to ensure that all spilled material is removed. The waste/soil will be removed using the excavator equipment, or personnel in PPE with shovels. The collected material is returned to the sorting table or the lined ARP waste tray.

A potential pathway for release of waste constituents is through the exhaust air of the WMF-1617 ventilation system. However, since all the waste to be processed is radioactive mixed waste IDAPA 58.01.05.008 (40 CFR 264 Subpart CC) is not applicable. Any radiological release would be limited to the period during which waste is being actively treated. The minimization of release of

radiological constituents through the HEPA-filtered exhaust air system that potentially could have adverse effects on human health or the environment is accomplished by the following:

(1) The treatment processes are controlled to minimize dust and airborne particles.

(2) As a second stage of entrapment, any escaping waste constituents would then have to pass through banks of HEPA filters. HEPA filters would trap any particulate that may contain hazardous constituents.

(3) The ventilation systems have been proven effective in seven years of ARP operations.

D-8b(1) Miscellaneous Unit Wastes [IDAPA 58.01.05.008; 40 CFR 264.601(a)(1), 264.601(b)(1), and 264.601(c)(1)]

The wastes to be treated in WMF-1617 miscellaneous treatment units are sludge wastes that are currently managed at the AMWTP. The sludge waste may contain free liquids or WIPP-prohibited items. The miscellaneous treatments are designed to make the final waste package acceptable for disposition to WIPP or other acceptable waste disposal sites after return to AMWTP. The chemical characteristics of the wastes are described in Attachment 2, Section C of this permit.

D-8b(2) Containment System [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(b)(2) and 270.23(a)(2)]

The WMF-1617 structure and miscellaneous units (RA, DPSs and drum compactor) are designed and operated to prevent the spread of contamination during treatment activities. The building is designed to operate under negative pressure drawing air from less to more contaminated areas. The ventilation air is filtered through HEPA filters prior to exhaust. Secondary containment (waste tray secondary containment pans, sorting table secondary containment pan, drum compactor secondary containment pan, DPSs) are used to contain any liquids present within the waste during treatment.

D-8b(3) Site Air Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(4) and (5), and 270.23(b)]

The climatology and meteorology at the INL is described in *DOE Programmatic Spent Nuclear Fuel Management and INEEL Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS – 0203F, Volume 1, Appendix B). A copy of this document has already been provided to DEQ.

D-8b(4) Prevention of Air Emissions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(2) and 270.23(a)(2)]

The WMF-1617 miscellaneous units are designed to prevent the spread of radiological contamination during treatment activities, and are located within secondary containment pans. HEPA-filtered exhaust ventilation is provided for ARP V and the negative pressure induces ventilation through the attached Airlock #5. The exhaust ducts and fans are located to draw air from the least contaminated areas into the most potentially contaminated areas. Fixed filter air samplers are located around the perimeter of the building and continuous air monitors (CAMs) with alarms are also provided for each discharge path (local filter/fan exhaust) to monitor for airborne radioactivity. Radiological control technicians (RCTs) routinely count the perimeter sampler filters for radioactive contamination. If airborne radiation above normal background levels is detected, the results will be evaluated and remedial actions are taken as appropriate to minimize the spread of contamination and to ensure operational control, worker protection, and environmental protection.

The HEPA filters remove approximately 99% of the particles in the exhaust air. The differential pressure across the HEPA filters is recorded. The filters are changed due to radiological loading and pressure drop. The filtered exhaust air is then released to the atmosphere.

Since the waste to be treated/stored is a radioactive mixed waste, it is exempt from the requirements of IDAPA 58.01.05.008 (40 CFR 264, Subpart CC).

D-8b(5) Operating Standards [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(c)(3) and 270.23(a)(2)]

For information on the operating characteristics of the retrieval area, drum packaging stations, and drum compactor see Section D above.

D-8b(6) Site Hydrogeologic Conditions [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(a)(2), (3), and (4), 264.601(b)(3) and (5), and 270.23(b)]

The hydrology conditions at the INL are addressed in the *DOE Programmatic Spent Nuclear Fuel Management and INEEL Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS – 0203F, Volume 1, Appendix B). A copy of this document has already been provided to DEQ.

D-8b(7) Site Precipitation [IDAPA 58.01.05.008; 40 CFR 264.601(b)(4)]

Site precipitation is addressed in the *DOE Programmatic Spent Nuclear Fuel Management and INEEL Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS – 0203F, Volume 1, Appendix B). A copy of this document has already been provided to DEQ.

D-8b(8) Groundwater Usage [IDAPA 58.01.05.008; 40 CFR 264.601(a)(5)]

Groundwater usage at the INL is addressed the *DOE Programmatic Spent Nuclear Fuel Management and INEEL Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS – 0203F, Volume 1, Appendix B). A copy of this document has already been provided to DEQ.

D-8b(9) Surface Waters and Surface Soils [IDAPA 58.01.05.008; 40 CFR 264.601(b)(6), (7), and (8)]

Surface water and surface soils at the INL are addressed in the *DOE Programmatic Spent Nuclear Fuel Management and INEEL Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS – 0203DF, Volume 1, Appendix B). A copy of this document has already been provided to DEQ.

D-8b(10) Area Land Use [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.601(a)(6) and (b)(9), and 270.23(b)]

The area land use is addressed in the *DOE Programmatic Spent Nuclear Fuel Management and INEEL Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE/EIS – 0203F, Volume 1, Appendix B). A copy of this document has already been provided to DEQ.

D-8b(11) Migration of Waste Constituents [IDAPA 58.01.05.008; 40 CFR 264.601(a)(7)]

For reasons discussed in Sections D-8b, D-8b(1), D-8b(2), and D-8b(4), the potential is extremely small for deposition or migration of waste constituents into subsurface physical structures and into the root zone of food chain crops and other vegetation.

D-8b(12) Evaluation of Risk to Human Health and the Environment [IDAPA 58.01.05.008; 40 CFR 264.601(a)(8) and (9), 264.601(b)(10) and (11), and 264.601(c)(6) and (7)]

For reasons discussed in Sections D-8b, D-8b(2), and D-8b(4), the potential is extremely small for any of the waste constituents to be a risk to human health or the environment.

HWMA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

BOOK 3

Volume 18 –Radioactive Waste Management Complex

ATTACHMENT 2

SUBSURFACE DISPOSAL AREA (SDA)

WMF-698

WMF-1617

SECTION C - WASTE ANALYSIS PLAN

Revision Date: October 18, 2012

C. WASTE CHARACTERISTICS

The WMF-698 and WMF-1617 storage and treatment areas will follow the requirements of waste characterization found in Attachment 2 in Book 1 of this permit for characterization of any secondary wastes that are generated.

The waste to be accepted from AMWTP has been previously characterized in the "Central Characterization Project Acceptable Knowledge Summary Report for Rocky Flats Immobilized Organic Liquids Stored at the Idaho National Laboratory", CCP-AK-INL-005, Revision 4, dated October 20, 2009. This report is provided in Book 3, Appendix 3 of this Permit. The storage and treatment activities to be performed under this permit will affect the current characterization information (e.g., liquid removal). Once in the DPS, WIPP qualified Visual Examiners (VEs) will thoroughly inspect the waste. Visual Examination (VE) Operators are qualified to the CCP WIPP certified program. VE is conducted at the DPSs in accordance with CCP WIPP certified procedure, CCP-TP-006, CCP Visual Examination Technique for Idaho National Laboratory (INL) Newly Generated TRU Waste. The scope of this procedure is "to document the physical waste form, confirm the Waste Stream description and Waste Matrix Code, document that no prohibited items are present, and estimate the weight of the waste material parameters." Additional characterization will be performed at the AMWTP. The characterization information from these processes will be included in the updated AK package by AMWTP for shipment to WIPP.

In addition, the efficacy of the selected absorbents, Oil-Dri, Aquaset, and Petroset, for the treatment of this waste stream is detailed in "Managing Free Liquid in Newly Generated Waste Drums", RPT-228, Revision 0, dated June 14, 2007. This report is provided in Book 3, Appendix 4 of this Permit.

Furthermore, Appendix 5 and Appendix 6 of Book 3 of this Permit provide acceptable knowledge (AK) summary reports for the sludge waste streams to be received, stored, and treated at the RWMC.

No issues of ignitability, reactivity, or incompatibility have been identified in the characterization of the waste streams to be stored/treated at WMF-698 and WMF-1617. Containers that have identified aerosol cans and roaster oxides wastes will not be accepted for treatment at ARP V.

HWMA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

Volume 18 – Book 3 – Radioactive Waste Management Complex

ATTACHMENT 3

Subsurface Disposal Area WMF-698 and WMF-1617

Section F - Procedures to Prevent Hazards
and
Section F-1 - Security

Revision Date: October 18, 2012

CONTENTS

F. PROCEDURES TO PREVENT HAZARDS. 1
F-1. Security 1
F-1a. Security Procedures and Equipment 1
F-1a(1) 24-Hour Surveillance System 2
F-1a(2) Barrier and Means to Control Entry 2
F-1a(2)(a) Barrier 2
F-1a(2)(b) Means to Control Entry 2
F-1a(3) Warning Signs 3

F. PROCEDURES TO PREVENT HAZARDS

The waste management units addressed in this permit are designed and operated to minimize exposure of hazardous constituents to the general public, operating personnel, and the environment. This section describes the procedures and equipment/structures used at these units to help prevent, mitigate, or respond to environmental or human health hazards. Also described in this section are the inspection plans and schedules at these units to ensure proper maintenance and operation.

The waste management units addressed in this permit are located at the Radioactive Waste Management Complex (RWMC), Subsurface Disposal Area (SDA), Buildings WMF-698 and WMF-1617. Book 3, Attachment 1 of this permit describes the operations of these units.

F-1. Security

Specific security measures taken for the RWMC SDA include fencing, warning signs, keycard access or personnel sign-in, and building locks.

F-1a. Security Procedures and Equipment [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 264.14 and 270.14(b)(4)]

A security system, physical control procedures, and equipment control access to the RWMC SDA. The security system is operated by a security force under a contract with the U. S. Department of Energy, Idaho Operations Office (DOE-ID).

The security force's operations are consistent with DOE-ID directives and orders on access control. DOE operates a personnel security clearance program to ensure that employees that are required to have a clearance to perform their duties are evaluated and cleared consistent with DOE-ID security policies.

Fencing, guarded gates and uniformed guards with communication devices are used at RWMC to provide facility security. There are internal communication devices, such as phones or two-way radios in occupied buildings at the RWMC SDA. The same communication devices are used for communication outside the plant. The RWMC SDA uses radio network announcements for announce critical information regarding security and safety. A siren system is used for evacuation and take cover alerts.

F-1a(1) 24-Hour Surveillance System [IDAPA 58.01.05.008; 40 CFR 264.14(b)(1)]

Security at the RWMC is maintained by a staff of trained security guards, who monitor the entry and egress of people and material from the RWMC facility. The main RWMC guard gate (located at WMF-637) at the RWMC is staffed with guards 24 hours a day, seven days a week. There are other gates into the RWMC, and they are either locked or staffed with guards. The guards also perform other security functions within the plant premises, including patrolling the perimeter fence and areas throughout the RWMC on a 24-hour basis.

F-1a(2) Barrier and Means to Control Entry

The treatment, storage, or disposal facilities (TSDFs) at RWMC SDA are enclosed within a fence. All gates into RWMC are either locked or manned with security guards.

F-1a(2)(a) Barrier [IDAPA 58.01.05.008; 40 CFR 264.14(b)(2)(I)]

The RWMC facility is located approximately 42 air miles west of the largest nearby population area, Idaho Falls, Idaho. The entire RWMC facility area is enclosed within a fence. There are gates in the perimeter fences, and they are either locked or manned. The locked gates can be opened by patrols when requested.

F-1a(2)(b) Means to Control Entry [IDAPA 58.01.05.008; 40 CFR 264.14(b)(2)(ii)]

Employees, sub-contractors, or vendors that have completed required access training and have keycard access are not escorted in the general RWMC interior.

Individuals that have the required access training but do not have key card access, sign an "Employee Log" and are allowed into RWMC without being escorted.

Individuals that do not have the required access training and do not have keycard access are escorted and sign a "Visitor Log" to gain access to RWMC.

These entry procedures into the RWMC prevent access into Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA)-regulated units by the general public and visitors.

For accountability reasons, all persons entering the RWMC must either enter through the card reader turnstile as they enter or sign the RWMC entrance log ("Visitor Log" or "Employee Log" as applicable). When personnel leave the RWMC, they exit through the card reader turnstiles or sign out at the guard gate.

F-1a(3) Warning Signs [IDAPA 58.01.05.008; 40 CFR 264.14(c)]

Warning signs that are visible and legible from at least 25 ft are posted at guard gates and on the fence around the RWMC SDA. Entrances into HWMA/RCRA-regulated storage or treatment areas will have, at a minimum, signs reading "**DANGER--**Unauthorized Personnel Keep Out."

HWMA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

BOOK 3
Volume 18 –Radioactive Waste Management Complex

ATTACHMENT 4

SUBSURFACE DISPOSAL AREA (SDA)
WMF-698
WMF-1617

Section F-2

INSPECTION SCHEDULE

Revision Date: October 18, 2012

TABLE OF CONTENTS

F-2. Inspection Schedule 1

F-2a. General Inspection Requirements [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.14(b)(5), 264.15, 264.33, 264.174, 264.195, and 264.254] 1

F-2a(1) Types of Problems [IDAPA 58.01.05.008; 40 CFR 264.15(b)(3)] 2

F-2a(2) Frequency of Inspection [IDAPA 58.01.05.008; 40 CFR 264.15(b)(4)] 2

F-2b. Specific Process Inspection Requirements 2

F-2b(1) Container Inspection [IDAPA 58.01.05.008; 40 CFR 264.174] . 2

F-2b(8) Miscellaneous Unit Inspections [IDAPA 58.01.05.012; 40 CFR 270.14(b)(5)] 3

APPENDICES

Appendix F-1. Inspection Schedule forWMF-698, WMF-1617, and Trailer Storage and Treatment Areas

Appendix F-2. Examples of Inspection Forms

F-2. Inspection Schedule

F-2a. General Inspection Requirements [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.14(b)(5), 264.15, 264.33, 264.174, 264.195, and 264.254]

The schedules for inspecting equipment vital in preventing, detecting, and responding to environmental or human health hazards are summarized in Appendix F-1. Results of inspections are recorded on forms or operating logs. Examples of inspection forms are found in Appendix F-2.

Inspection records are placed in the appropriate RCRA inspection logs as part of the operating record. The records are stored at RWMC or other INL approved records storage area and are retained for the life of the regulated unit.

Inspection records include the time and date of the inspection, the printed name and signature of the inspector, a notation of observations made, and the date and nature of any repairs or other remedial actions. The inspection forms show the inspections, frequencies, and responsibilities. Examples of the inspection forms are provided in Appendix F-2. Other, similar forms containing the same substantive information may be used to document these inspections.

WMF-1617 Miscellaneous Treatment Processes

For the WMF-1617 miscellaneous treatment processes addressed in this permit, trained personnel inspect and/or monitor the equipment and processing locations as summarized in Appendix F-1. The process areas are visually inspected on a daily basis during operations by the operations personnel.

WMF-698, WMF-1617, and Trailer Areas Container Storage

The WMF-698, WMF-1617, and Trailer Areas container storage areas are visually inspected weekly to ensure the integrity of the containers stored. Cameras may also be used to perform inspections of the container staging areas in the WMF-1617 Retrieval Area. Loading/unloading areas are inspected on a daily basis when in use.

The inspections are intended to detect deterioration or conditions that threaten human health or the environment. The inspection records include conditions noted within the treatment and storage areas as well as the general building. The inspection records list completed inspections and any remedial action status.

F-2a(1) Types of Problems [IDAPA 58.01.05.008; 40 CFR 264.15(b)(3)]

The inspection schedules found in Appendix F-1 list types of problems looked for during inspections.

F-2a(2) Frequency of Inspection [IDAPA 58.01.05.008; 40 CFR 264.15(b)(4)]

The frequency of inspections or observations, and the inspecting organization are listed in the schedules in Appendix F-1.

If a problem is found during an inspection surveillance or performance of a preventive maintenance inspection or action in progress, it is reviewed and confirmed by the applicable supervision or systems engineer. If the deficiency warrants immediate attention, shift supervision will be informed, and if necessary, the affected process will be immediately shut down. All items observed during an inspection that require repair, replacement, corrective action, or other attention are documented on the associated record sheet and tracked until final resolution through the RCRA remedial process. If the responsible supervision determines the need, an engineering evaluation will be conducted to determine whether operations can proceed, repair must be made, or materials must be replaced. Environmental and facility personnel work together to decide whether or not a remedial action is required and to plan the required action. Remedial actions are documented.

In those cases where an off-normal operational event (such as ventilation upset and potential radioactive contamination) prevents access to an area where inspections are performed, a RCRA remedial will be opened and the remedial will be noted in the spaces on the inspection forms where the inspections or readings would normally be recorded. The RCRA remedial will be closed, and inspections resumed, as soon as the upset conditions have been corrected and the area released for re-entry.

F-2b. Specific Process Inspection Requirements

F-2b(1) Container Inspection [IDAPA 58.01.05.008; 40 CFR 264.174]

Facility personnel visually inspect the waste containers and the container storage areas (WMF-698, WMF-1617 Airlock, and Trailer storage areas) addressed in this permit on a weekly basis, when waste is present. During visual inspections, the waste containers are viewed for signs of deterioration.

F-2b(8) Miscellaneous Unit Inspections [IDAPA 58.01.05.012; 40 CFR 270.14(b)(5)]

An inspection program for the miscellaneous treatment processes in WMF-1617 is in place to ensure compliance with the environmental performance standards specified in Section D-8 in Attachment 1 of this permit.

The WMF-1617 process ventilation system is monitored for high differential pressures in the HEPA filters as a part of normal operating procedures.

Appendix F-1. Inspection Schedule for WMF-698, WMF-1617, and Trailer Areas Container Storage and Treatment Areas

Inspection Schedule for WMF-698

Equipment Inspected	Types of Problems or Observations	Frequency	Inspecting Organization
FIRE PROTECTION SYSTEM			
Fire detection and alarm system	Alarm condition	Monthly	Operations
Portable fire extinguishers • Class A-B-C Extinguishers •	Physical damage, charge, accessibility, seals	Monthly	Operations
EMERGENCY EQUIPMENT			
Spill control cabinet	Broken seals, inventory equipment if seal is broken, or annually to replace expired equipment	Monthly	Operations
Evacuation alarm system	Operation, coverage	Monthly	Operations
Communication devices/two-way radios	Operation, coverage	Daily when in use	Operations
OPERATING AND STRUCTURAL EQUIPMENT			
Access warning signs	Warning signs in place	Weekly	Operations
Containment pans	Free of cracks and gaps, no hazardous liquids, no deterioration	Weekly	Operations
Containers	Condition, leaks – visual inspection of storage area	Weekly	Operations
Loading/Unloading	Condition, presence of hazardous solid or liquid waste spills.	Daily when loading/un-loading is occurring	Operations
SECURITY INSPECTIONS			
Doors/Gates and their signs	Missing, damaged or obstructed signs	Weekly	Operations

Inspection Schedule for WMF-1617

Equipment Inspected	Types of Problems or Observations	Frequency	Inspecting Organization
FIRE PROTECTION SYSTEM			
Fire detection and alarm system	Alarm condition	Monthly	Operations
Dry chemical fire suppression system – Drum Repackaging Stations	Physical damage, charge, accessibility	Monthly	Operations
Dry chemical fire suppression system – located on mobile equipment	Physical damage, accessibility, and seals	Monthly	Operations
Portable fire extinguishers • Class A-B-C extinguishers • Class D extinguishers	Physical damage, charge, accessibility, and seals	Monthly	Shift Operations
EMERGENCY EQUIPMENT			
Eyewash stations	Accessibility, check for leaks	Monthly	Operations
Spill control cabinets	Broken seals, inventory equipment if seal is broken, or annually to replace expired equipment	Monthly	Operations
Evacuation alarm system	Operation, coverage	Monthly	Operations
Communication devices/two-way radios	Operation, coverage	Daily	Operations
OPERATING AND STRUCTURAL EQUIPMENT			
Access warning signs	Warning signs in place	Weekly	Operations
Container storage/staging areas	Deterioration, visible leaks, liquids	Weekly	Operations
Containers	Condition, leaks--visual inspection of storage/staging areas	Weekly	Operations
Loading/Unloading areas	Condition, presence of hazardous solid or liquid waste spills	Daily when waste is being loaded or unloaded	Operations
Miscellaneous Treatment Areas (Room 103 Drum Compactor, Room 105 Drum Packaging Stations, and Retrieval Area – drum/tray staging and sorting table)	Equipment condition, deterioration, liquids in secondary containment, non-conforming items	Daily during operations (operations are defined as any time there is waste within the unit)	Operations
SECURITY INSPECTIONS			
Doors/Gates and their signs	Missing, damaged, or obstructed signs	Weekly	Operations

Inspection Schedule for Trailer Container Storage Areas

Equipment Inspected	Types of Problems or Observations	Frequency	Inspecting Organization
OPERATING AND STRUCTURAL EQUIPMENT			
Drums on pallets	Drums not stored on pallets	Weekly	Operations
Containers	Condition, leaks – visual inspection of storage area	Weekly	Operations
Drum covers in place	Missing drum covers	Weekly	Operations
Loading/Unloading areas	Condition, presence of hazardous solid or liquid waste spills	Daily when waste is being loaded or unloaded	Operations

APPENDIX F-2 EXAMPLES OF INSPECTION FORMS

WMF-698

- Form – 1378. WMF-698 LOADING/UNLOADING AREAS RCRA DAILY INSPECTION
- FRM-1379. WMF-698 WEEKLY RCRA INSPECTIONS
- Form – 1380. WMF-698 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

WMF-1617

- Form - 1376. WMF-1617 TRAILER LOADING/UNLOADING AREAS RCRA DAILY INSPECTION
- Form - 1377. WMF-1617 TREATMENT AREA RCRA DAILY INSPECTION
- FRM - 1375. WMF-1617 WEEKLY RCRA INSPECTIONS
- Form - 1374. WMF-1617 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS
- Form – 1367. RCRA EMPTY CONTAINER VERIFICATION

WMF-698 LOADING/UNLOADING AREA RCRA DAILY INSPECTION

This data sheet is the current revision date per EDMS.

_____
Signature/Date

Dates: _____/_____/_____ through _____/_____/_____

Reviewed the last completed form FRM-1378 (Initials): _____

The Open RCRA Remedials Tracking Book Index for this form has been compared to the last completed form FRM-1378, the index has been updated, and the current open RCRA Remedials have been recorded on the tracking table on this form. (initials): _____

WMF-698 Loading/Unloading Area[1]	**Monday (circle one)**	**Tuesday (circle one)**	**Wednesday (circle one)**	**Thursday (circle one)**	**Friday (circle one)**	**Saturday (circle one)**	**Sunday (circle one)**
Record time inspection is started							
Loading and Unloading area is free of hazardous solid or liquid waste spills;	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Physical condition of Loading/Unloading area is satisfactory	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Radio or telephone tested and clear two-way communications were established.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA

[1] Loading and Unloading area must be inspected daily when in use. Enter NA if Loading and Unloading area is not in use (i.e., no containers were moved through the area that day).

Comments: _____

WMF-698—LOADING/UNLOADING AREA RCRA DAILY INSPECTION

Open RCRA Remedials

Footnote Letter	Tracking Number	Date Remedial was Identified	Deficiency Description/Comments

Day	Inspector's Name (Print)	Inspector's Signature	Inspection Completed Date	Nature of Any Repairs or Other Remedial Actions	Repairs / Remedial Actions Complete or Not Required. Shift Supervisor Signature / Date
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

WMF-698 WEEKLY RCRA INSPECTIONS

This data sheet is the current revision date per EDMS.

_____
Signature/Date

Date: _____ Time: _____

Reviewed the last completed form FRM-1379(Initials): _____

The Open RCRA Remedials Tracking Book Index for this form has been compared to the last completed form FRM-1379, the index has been updated, and the current open RCRA Remedials have been recorded on the tracking table on this form. (initials): _____

WMF-698 Storage Area	Condition (circle one)	Comments
Time inspection is started		
Radio or telephone tested and and clear two-way communications were established.	YES/NO	
All four exit doors have signs posted "DANGER Unauthorized Personnel Keep Out" on the outside.	YES/NO	
The "DANGER Unauthorized Personnel Keep Out" signs on the RWMC SDA perimeter fence are in place. [1]	YES/NO/NA	
Spill pans/secondary containment trays are free of deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), visible waste (liquids or solids) or leaks.	YES/NO	
Visible containers show no physical damage or deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with "Hazardous Waste" or "Mixed Hazardous Waste".	YES/NO	
Container arrays, Minimum aisle space of 3 ft between container arrays and between container arrays and exterior walls; Minimum aisle space of 20 ft in center aisle; Drums stacked no more than 2 drums high	YES/NO	

[1] Inspected semiannually in April and October. In other months circle NA.

Comments: _____

WMF-698 WEEKLY RCRA INSPECTIONS

Open RCRA Remedials

Footnote Letter	Tracking Number	Date Remedial was Identified	Deficiency Description/Comments

Inspector's Name (Print)	Inspector's Signature	Inspection Completed Date	Nature of Any Repairs or Other Remedial Actions	Repairs / Remedial Actions Complete or Not Required. Shift Supervisor Signature / Date

WMF-698 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

This data sheet is the current revision date per EDMS.

_____
Signature/Date

Inspection Date:_____/_____/_____ Time Start:_____

Reviewed the last completed form FRM-1380 (Initials): _____

Record spill cabinet tamper seal number from last completed FRM-1380: _____

The Open RCRA Remedials Tracking Book Index for this form has been compared to the last completed form FRM-1380, the index has been updated, and the current open RCRA Remedials have been recorded on the tracking table on this form. (initials): _____

Area	Requirement	Condition (circle one)	Comments
WMF-698 Area	Area Evacuation Siren is audible[1]	YES/NO	
WMF-698 Area	Fire detection and alarm system not in alarm	YES/NO	

[1] Monthly test of the evacuation siren is to be coordinated with Life Safety Systems personnel.

WMF-698 Fire Extinguishers			
Area	**Requirement**	**Condition (circle one)**	**Comments**
WMF-698 Interior North Exit Door	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-698 Interior East Exit Door	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-698 Interior South Exit Door	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-698 Interior West Exit Door	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	

WMF-698 Spill Control Cabinet[2]			
Area	**Requirement**	**Condition (circle one)**	**Comments**
WMF-698	Spill control Cabinet accessible	YES/NO	
WMF-698	Tamper Seal Intact	YES/NO	

[2] If inspecting during the month of October, break the tamper seal and inventory the cabinet using the inventory table on this form. After completing the inventory, place a new tamper seal on the spill cabinet and record the new tamper seal ID in the space provided. In In other months, compare the tamper seal ID with the tamper seal ID recorded on the previous FRM-1380. If the tamper seal IDs are identical, no inventory is needed; circle NA on the inventory inspections. If the tamper seal ID is different, break the seal and inventory the cabinet using the inventory table on this page.

WMF-698 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

WMF-698 Spill Control Cabinet		
Area	**Requirement**	
WMF-698	Existing Tamper Seal ID	

WMF-698 Spill Control Cabinet			
Area	**Spill control Cabinet Inventory**	**Condition (circle one)**	**Comments**
WMF-698	1 each Plastic Bucket	YES/NO/NA	
WMF-698	1 dozen Spill control pillows or absorbent socks	YES/NO/NA	
WMF-698	1 case Radioactive waste bags	YES/NO/NA	
WMF-698	5 Signs (such as CAUTION Acid or CAUTION Chemical Spill)	YES/NO/NA	
WMF-698	1 box pH indicator	YES/NO/NA	
WMF-698	1 each Shovel (flat head)	YES/NO/NA	
WMF-698	1 box Smear paper and envelopes	YES/NO/NA	
WMF-698	2 each Standard pencils and grease pencils	YES/NO/NA	
WMF-698	1 pad Paper	YES/NO/NA	
WMF-698	5 each Radiological tags or signs	YES/NO/NA	
WMF-698	1 spool Radiation rope or ribbon	YES/NO/NA	
WMF-698	Tamper seal indicator installed after inventory	YES/NO/NA	
WMF-698	Newly installed tamper seal indicator ID[2]:		

WMF-698 Spill Control Cabinet			
Area	**Spill control Inventory(next to sealed cabinet)**	**Condition (circle one)**	**Comments**
WMF-698	Spill-X/Oil-Dri ® products (with scoop)	YES/NO	
WMF-698	Solvent cleanup material	YES/NO	

WMF-698 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

Open RCRA Remedials

Footnote Letter	Tracking Number	Date Remedial was Identified	Deficiency Description/Comments

Inspector's Name (Print)	Inspector's Signature	Inspection Completed Date	Nature of Any Repairs or Other Remedial Actions	Repairs / Remedial Actions Complete or Not Required. Shift Supervisor Signature / Date

WMF-1617 TRAILER LOADING/UNLOADING AREA RCRA DAILY INSPECTION

This data sheet is the current revision date per EDMS.

_____
Signature/Date

Dates: _____/_____/_____ through _____/_____/_____

Reviewed the last completed form FRM-1376(Initials): _____

The Open RCRA Remedials Tracking Book Index for this form has been compared to the last completed form FRM-1376, the index has been updated, and the current open RCRA Remedials have been recorded on the tracking table on this form. (initials): _____

WMF-1617 Trailer Loading/unloading Area[1]	Monday (circle one)	Tuesday (circle one)	Wednesday (circle one)	Thursday (circle one)	Friday (circle one)	Saturday (circle one)	Sunday (circle one)
Record time inspection is started							
Loading and Unloading area is free of leaks and spills (solid or liquid).	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Physical condition of Loading/Unloading area is satisfactory	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Radio or telephone tested and clear two way-communications were established.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA

[1]Loading and Unloading area must be inspected daily when in use. Enter NA if Loading and Unloading area is not in use (i.e., no containers are being moved) and no waste was moved through the Loading and Unloading area that day.

Comments: _____

WMF-1617 TRAILER LOADING/UNLOADING AREA RCRA DAILY INSPECTION

Open RCRA Remedials

Footnote Letter	Tracking Number	Date Remedial was Identified	Deficiency Description/Comments

Day	Inspector's Name (Print)	Inspector's Signature	Inspection Completed Date	Nature of Any Repairs or Other Remedial Actions	Repairs / Remedial Actions Complete or Not Required. Shift Supervisor Signature / Date
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

WMF-1617 TREATMENT AREA RCRA DAILY INSPECTION

This data sheet is the current revision date per EDMS.

_____
Signature/Date

Dates: _____/_____/_____ through _____/_____/_____

Reviewed the last completed form FRM-1377(Initials): _____

The Open RCRA Remedials Tracking Book Index for this form has been compared to the last completed form FRM-1377, the index has been updated, and the current open RCRA Remedials have been recorded on the tracking table on this form. (initials): _____

WMF-1617 General Area	Monday (circle one)	Tuesday (circle one)	Wednesday (circle one)	Thursday (circle one)	Friday (circle one)	Saturday (circle one)	Sunday (circle one)
Record time inspection is started							
Radio or telephone tested and clear two-way communications were established.	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO

WMF-1617 Treatment Area(Retrieval Area)[1]	Monday (circle one)	Tuesday (circle one)	Wednesday (circle one)	Thursday (circle one)	Friday (circle one)	Saturday (circle one)	Sunday (circle one)
Record time inspection is started							
Sorting table is free of leaks, spills, deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks).	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Spill pans/secondary containment trays are free of deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), visible waste (liquids or solids) or leaks.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Containers/trays show no signs of physical damage or deterioration (that would prevent it from providing containment and preventing leaks), or leaks.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Containers/trays are located in secondary containment.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA

[1] Retrieval area must be inspected daily when in use. Circle NA if treatment area is not in use (i.e., no containers or waste in trays) and no waste was moved through the RA that day.

WMF-1617 TREATMENT AREA RCRA DAILY INSPECTION

WMF-1617 Treatment Area (DPS Room 105)[2]	Monday (circle one)	Tuesday (circle one)	Wednesday (circle one)	Thursday (circle one)	Friday (circle one)	Saturday (circle one)	Sunday (circle one)
Record time inspection is started							
DPSs are free of leaks, spills, deterioration (that would prevent it from performing its intended purpose).	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA

[2] DPS Room must be inspected daily when in use. Circle NA if treatment area is not in use (i.e., no containers or waste in trays) and no waste was moved through the DPS that day.

WMF-1617 Treatment Area (Service Bay Room 103)[3]	Monday (circle one)	Tuesday (circle one)	Wednesday (circle one)	Thursday (circle one)	Friday (circle one)	Saturday (circle one)	Sunday (circle one)
Record time inspection is started							
Drum compactor is free of leaks, spills, deterioration.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Spill pans/secondary containment trays are free of deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), visible waste (liquids or solids), or leaks	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Containers/trays show no signs of physical damage, or deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), or leaks.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA
Containers/trays are located in secondary containment.	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA	YES/NO/NA

[3] Service Bay must be inspected daily when in use. Circle NA if treatment area is not in use (i.e., no containers or waste in trays) and no waste was moved through the Service Bay on that day.

WMF-1617 TREATMENT AREA RCRA DAILY INSPECTION

Comments:

Open RCRA Remedials

Footnote Letter	Tracking Number	Date Remedial was Identified	Deficiency Description/Comments

WMF-1617 TREATMENT AREA RCRA DAILY INSPECTION

Day	Inspector's Name (Print)	Inspector's Signature	Inspection Completed Date	Nature of Any Repairs or Other Remedial Actions	Repairs / Remedial Actions Complete or Not Required. Shift Supervisor Signature / Date
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					
Saturday					
Sunday					

WMF-1617 WEEKLY RCRA INSPECTIONS

This data sheet is the current revision date per EDMS.

_____
Signature/Date

Date: _____ Reviewed last completed FRM-1375: (Initials): _____

The Open RCRA Remedials Tracking Book Index for this form has been compared to the last completed form FRM-1375, the index has been updated, and the current open RCRA Remedials have been recorded on the tracking table on this form. (initials): _____

WMF-1617 General Area	Condition (circle one)	Comments
Record time inspection is started		
Radio or telephone tested and clear two-way communications were established.	YES/NO	

WMF-1617 Storage Area Room 103	Condition (circle one)	Comments
Record time inspection is started		
Spill pallets/secondary containments are free of deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), visible waste (liquids or solids) or leaks.	YES/NO	
Containers show no physical damage, no deterioration (cracks, gaps, or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with “Hazardous Waste” or “Mixed Hazardous Waste”.	YES/NO	
Minimum aisle space of 3 ft between container rows and a minimum one foot between container and adjacent walls.	YES/NO	

WMF-1617 WEEKLY RCRA INSPECTIONS

WMF-1617 Storage Area Room 104[1]	Condition (circle one)	Comments
Record time inspection is started		
Spill pallets/secondary containments are free of deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), visible waste (liquids or solids) or leaks.	YES/NO/NA	
Containers show no physical damage, no deterioration (cracks, gaps, or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with "Hazardous Waste" or "Mixed Hazardous Waste".	YES/NO/NA	
Minimum aisle space of 3 ft between container rows and a minimum one foot between container and adjacent walls.	YES/NO/NA	

[1]Mark NA if no containers are being stored.

WMF-1617 Storage Area Room 105[1]	Condition (circle one)	Comments
Record time inspection is started		
Containers show no physical damage, no deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with "Hazardous Waste" or "Mixed Hazardous Waste".	YES/NO/NA	

[1]Mark NA if no containers are being stored.

WMF-1617 WEEKLY RCRA INSPECTIONS

WMF-1617 Storage Area Room 106	Condition (circle one)	Comments
Record time inspection is started		
All exit doors have signs posted "DANGER Unauthorized Personnel Keep Out" on the outside.	YES/NO	
Spill pallets/secondary containments are free of deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), visible waste (liquids or solids), or leaks.	YES/NO	
Containers show no physical damage, no deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with "Hazardous Waste" or "Mixed Hazardous Waste".	YES/NO	
Minimum aisle space of 3 ft between container rows and a minimum one foot between container and adjacent walls.	YES/NO	

WMF-1617 Trailer Storage Area[1]	Condition (circle one)	Comments
Record time inspection is started		
Drums are stored on pallets.	YES/NO/NA	
Containers show no physical damage, no deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with "Hazardous Waste" or "Mixed Hazardous Waste".	YES/NO/NA	
Physical condition of Loading/Unloading area is satisfactory	YES/NO/NA	
Drum covers are in place.	YES/NO/NA	

[1]Mark NA if no containers are being stored in a given storage area.

WMF-1617 WEEKLY RCRA INSPECTIONS

WMF-1619 Trailer Storage Area[1]	Condition (circle one)	Comments
Record time inspection is started		
Drums are stored on pallets.	YES/NO/NA	
Containers show no physical damage, no deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with "Hazardous Waste" or "Mixed Hazardous Waste".	YES/NO/NA	
Physical condition of Loading/Unloading area is satisfactory	YES/NO/NA	
Drum covers are in place.	YES/NO/NA	

[1]Mark NA if no containers are being stored in a given storage area.

WMF-1621 Trailer Storage Area[1]	Condition (circle one)	Comments
Record time inspection is started		
Drums are stored on pallets.	YES/NO/NA	
Containers show no physical damage, no deterioration (cracks, gaps or corrosion that would prevent them from providing containment and preventing leaks), no leaks, are closed during storage, and are labeled with "Hazardous Waste" or "Mixed Hazardous Waste".	YES/NO/NA	
Physical condition of Loading/Unloading area is satisfactory	YES/NO/NA	
Drum covers are in place.	YES/NO/NA	

[1]Mark NA if no containers are being stored in a given storage area.

Comments: _____

WMF-1617 WEEKLY RCRA INSPECTIONS

Footnote Letter	Tracking Number	Date Remedial was Identified	Deficiency Description/Comments

Inspector's Name (Print)	Inspector's Signature	Inspection Completed Date	Nature of Any Repairs or Other Remedial Actions	Repairs / Remedial Actions Complete or Not Required. Shift Supervisor Signature / Date

WMF-1617 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

This data sheet is the current revision date per EDMS.

_____
Signature/Date

Inspection Date:_____/_____/_____ Time Start:_____

Reviewed the last completed form FRM-1374(Initials): _____

Record spill cabinet tamper seal number from last completed FRM-1374: _____

The Open RCRA Remedials Tracking Book Index for this form has been compared to the last completed form FRM-1374, the index has been updated, and the current open RCRA Remedials have been recorded on the tracking table on this form. (initials): _____

Area	Requirement	Condition (circle one)	Comments
WMF-1617 Area	Area Evacuation Siren is audible[1]	YES/NO	
	Fire detection and alarm system not in alarm	YES/NO	

[1]Monthly test of the evacuation siren system is to be coordinated with Life Safety Systems personnel.

WMF-1617 Fire Extinguishers			
Area	**Requirement**	**Condition (circle one)**	**Comments**
WMF-1617 Retrieval Area Exterior North East Exit Door (RE501)	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-1617 Retrieval Area Exterior South East Exit Door (RE502)	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-1617 Retrieval Area Exterior North West Exit Door (RE503)	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-1617 Retrieval Area Exterior South West Exit Door (RE505)	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-1617 Airlock 5 Area Interior South Exit Door (RE514)	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-1617 Airlock 5 RBA North Exit Door (RE511)	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-1617 Airlock 5 Area Interior West Exit Door (RE516)	ABC Fire extinguisher is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	

WMF-1617 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

This data sheet is the current revision date per EDMS.

Signature/Date

WMF-1617 Fire Extinguishers (continued)			
Area	**Requirement**	**Condition (circle one)**	**Comments**
WMF-1617 DPS Room North Wall	Class D Fire extinguisher with piercing nozzle is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	
WMF-1617 DPS Room South Wall	Class D Fire extinguisher with piercing nozzle is accessible	YES/NO	
	No physical damage present; seal is intact	YES/NO	
	Gauge is green or red button is not popped	YES/NO	

WMF-1617 Eyewash Station			
Area	**Requirement**	**Condition (circle one)**	**Comments**
WMF-1617	Eyewash station is accessible	YES/NO	
WMF-1617	Eyewash station shows no sign of leaks	YES/NO	

WMF-1617 Spill Control Cabinet[2]			
Area	**Requirement**	**Condition (circle one)**	**Comments**
WMF-1617 Airlock 5	Spill control Cabinet accessible	YES/NO	
WMF-1617 Airlock 5	Tamper Seal Intact	YES/NO	

[2]If inspecting during the month of October, break the tamper seal and inventory the cabinet using the inventory table on this form. After completing the inventory, place a new tamper seal on the spill cabinet and record the new tamper seal ID in the space provided. In other months, compare the tamper seal ID with the tamper seal ID recorded on the previous FRM-1374. If the tamper seal IDs are identical, no inventory is needed; circle NA on the inventory inspections. If the tamper seal ID is different, break the seal and inventory the cabinet using the inventory table on this page.

WMF-1617 Spill Control Cabinet		
Area	**Requirement**	
WMF-1617 Airlock 5	Existing Tamper Seal ID	

WMF-1617 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

This data sheet is the current revision date per EDMS.

Signature/Date

WMF-1617 Spill Control Cabinet			
Area	**Spill control Cabinet Inventory**	**Condition (circle one)**	**Comments**
WMF-1617 Airlock 5	1 each Plastic Bucket	YES/NO/NA	
WMF-1617 Airlock 5	1 dozen Spill control pillows or absorbent socks	YES/NO/NA	
WMF-1617 Airlock 5	1 case Radioactive waste bags	YES/NO/NA	
WMF-1617 Airlock 5	5 Signs (such as CAUTION Acid or CAUTION Chemical Spill)	YES/NO/NA	
WMF-1617 Airlock 5	1 box pH indicator	YES/NO/NA	
WMF-1617 Airlock 5	1 each Shovel (flat head)	YES/NO/NA	
WMF-1617 Airlock 5	1 box Smear paper and envelopes	YES/NO/NA	
WMF-1617 Airlock 5	2 each Standard pencils and grease pencils	YES/NO/NA	
WMF-1617 Airlock 5	1 pad Paper	YES/NO/NA	
WMF-1617 Airlock 5	5 each Radiological tags or signs	YES/NO/NA	
WMF-1617 Airlock 5	1 spool Radiation rope or ribbon	YES/NO/NA	
WMF-1617 Airlock 5	Tamper seal indicator installed after inventory	YES/NO/NA	
WMF-1617 Airlock 5	Newly installed tamper seal indicator ID[2]:		

WMF-1617 Spill Control Cabinet			
Area	**Spill control Inventory(next to sealed cabinet)**	**Condition (circle one)**	**Comments**
WMF-1617 Airlock 5	Spill-X products (with scoop)	YES/NO	
WMF-1617 Airlock 5	Solvent cleanup material	YES/NO	

Comments: _____

WMF-1617 MONTHLY RCRA INSPECTION SPILL CONTROL CABINET AND FIRE EXTINGUISHERS

This data sheet is the current revision date per EDMS.

Signature/Date

Open RCRA Remedials

Footnote Letter	Tracking Number	Date Remedial was Identified	Deficiency Description/Comments

Inspector's Name (Print)	Inspector's Signature	Inspection Completed Date	Nature of Any Repairs or Other Remedial Actions	Repairs / Remedial Actions Complete or Not Required. Shift Supervisor Signature / Date

FRM-1367
10/24/12
Rev. 0
Use with TPR-7418-5

Project No.: 23927
DRF No.: 337357

This data sheet is the current revision date per EDMS.

_____
Signature/Date

RCRA Empty Container Verification

Date _____

Drum Tracking No.	Verify container is intact by checking box and initial	Drum Type	Verified RCRA EMPTY	Comments
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal. ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal. ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	
	Yes ☐ Initial_____	55 gal ☐ 85 gal ☐ other☐	Yes☐ No☐	

WGS Print Name	
WGS Signature/Initials	

HMWA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

Volume 18 – Book 3 – Radioactive Waste Management Complex

ATTACHMENT 5

Subsurface Disposal Area WMF-698 and WMF-1617

Section H

Personnel Training

Revision Date: October 18, 2012

CONTENTS

H. PERSONNEL TRAINING 1

H-1. Outline of Training Program 1

H-1a. Job Tasks 2

H-1b. Training Content, Frequency, and Techniques 3

H-1c. Training Director 4

H-1d. Relevance of Training to Job Tasks 8

H-1e. Training for Emergency Response 8

H-2. Implementation of Training Program 9

H-3. Training Records 9

TABLES

Table H-1. Minimum Training Matrix for TSD Unit Personnel 6

H. PERSONNEL TRAINING

This section outlines and describes the training program for personnel involved in the management of hazardous and mixed waste at treatment, storage, and disposal (TSD) units at the Radioactive Waste Management Complex (RWMC) – Subsurface Disposal Area (SDA) addressed in this permit.

A training program has been implemented to ensure that personnel involved in the management of hazardous and mixed waste at RWMC TSD units receive training consistent with the requirements of the Idaho Administrative Procedures Act (IDAPA) 58.01.05.008 and 58.01.05.012 [Title 40 Code of Federal Regulations (CFR) Part 264.16 and 270.14]. The training program is designed to ensure that personnel are trained to hazardous waste management procedures including, but not limited to, inspections, normal operations, emergency procedures, equipment, systems, and contingency plan implementation. Duties performed at the TSD units will be performed in a safe, disciplined, and professional manner.

H-1. Outline of Training Program [IDAPA 58.01.05.008; 40 CFR 264.16(a)(1)]

Training programs are developed using a systematic approach to training (SAT). The SAT process involves:

- Analyzing tasks to determine the training requirements
- Designing a plan to satisfy the training requirements
- Developing plans and all supporting training materials
- Implementing the training plans
- Evaluating the effectiveness of the training and making recommendations for changes.

The SAT process is used to determine the training requirement for each task listed in Table H-1. The training program for TSD unit personnel involves a combination of formal [classroom, group instruction, on-the-job training (OJT), etc.] and informal training sessions (one-on-one instruction, required reading, etc.). The training requirements for each position are identified in Table H-1. Lesson plans and OJT guides are developed to support tasks identified in Table H-1.

Programs prepared by the TSD training organization provide the requirements to be completed by the individual during training. As the program is satisfactorily completed, it is verified and documented in their training records.

The training program is upgraded as needed in response to changes in job descriptions, job reassignment, process or procedural changes, technological changes, or implementation of new regulatory requirements that affect TSD unit operations. Revisions to the training program are approved by the training manager and the TSD unit manager (training director) for the specific TSD unit and the job analysis data is updated to reflect the changes in the training requirements.

TSD unit management works with subject matter experts to identify personnel training requirements. The TSD unit training organization (1) schedules and/or provides the training, (2) revises and updates training material as needed, and (3) maintains training documentation. The TSD unit training organization maintains individual training records for TSD unit employees.

H-1a. Job Tasks [IDAPA 58.01.05.008; 40 CFR 264.16(d)(1), 264.16(d)(2)]

The job tasks for personnel involved with hazardous waste management at RWMC TSD units are included in Table H-1 "Minimum Training Matrix for TSD unit Personnel" Personnel are trained to those sections of the permit, which are pertinent to their specific job assignments.

Security Guards – The Security personnel are not stationed at the permitted units nor are they involved in the management or handling of the waste. Security personnel receive training from the security organization relative to their positions and the facilities they serve. Therefore, training of security personnel is not discussed further in this section.

On Scene Commander – is the Idaho National Laboratory (INL) Fire Department Chief. The INL Firefighters serve the INL Site in fighting fires and containing major spills, including spills of waste from waste management units. The INL Fire Department conducts a self-contained training program for their personnel, which includes procedures for handling fires and spill emergencies involving hazardous materials and hazardous mixed waste at the INL Site. Therefore, training of fire fighters is not discussed further in this section.

Emergency Director (ED) – is trained on the INL (Site-wide) and Idaho Completion Project (ICP) Emergency Plan (EP)/Resource Conservation and Recovery Act (RCRA) Contingency Plan (CP) or Industrial Safety and Hygiene Program as part of his/her duties. The ED will be informed by the

Emergency Action Manager (EAM) or facility personnel at RWMC. Therefore, training of ED is not discussed further in this section.

H-1b. Training Content, Frequency, and Techniques [IDAPA 58.01.05.008; 40 CFR 264.16 and (d)(3)]

The TSD unit training program consists of a combination of classroom instruction and OJT. Additionally, TSD unit employees receive new employee orientation and training. [All employees working at or assigned as part-time/frequent visitor to Site facilities are required to complete annual facility access training and general employee radiation training (GERT) unless they are currently trained as radiation workers.]

The initial training includes a general orientation of INL and TSD unit procedures including evacuation and alert procedures, training requirements, and emergency equipment locations. The initial training provides TSD unit personnel with training commensurate with their job assignments in the following areas:

- General description of the RWMC SDA
- Job-related procedures, policies, and instructions
- Radiological health and safety program
- Fire protection program
- Hazards associated with the TSD unit.

RCRA training is conducted annually for RWMC TSD unit employees to address changes that have occurred which include such topics as permit status, permit requirements, contingency and inspection plan implementation, and hazardous waste management procedures for the TSD unit(s) to which they are assigned.

The following major knowledge areas are included and evaluated based on job position and formal criteria identified in the job analysis:

- RCRA requirements as they relate to RWMC unit operations
- Hazardous materials

- RWMC TSD unit systems and components (including waste treatment processes and operations)
- Normal operating procedures and shutdown procedures
- Emergency or off-normal operating procedures
- Inspections and equipment maintenance
- Occupational Safety and Health Administration (OSHA) and related health and safety requirements
- RWMC TSD unit and operational/administrative procedures.

TSD unit work and maintenance is performed by appropriate personnel whose qualifications have been verified before beginning work.

Employees may be given written and/or oral examinations, operational evaluations, and reviews to ensure that they are adequately trained relative to their job tasks. Results of examinations, written or oral evaluations, and reviews are documented. All completed qualification standards, checklists, examinations, written evaluations, and documented oral evaluations are maintained in each individual's training record.

Table H-1 shows the task training requirements for TSD unit personnel involved in hazardous/mixed waste operations at RWMC TSD units addressed in this permit. TSD unit personnel may receive additional training beyond that shown in Table H-1. This training is documented and included in employee training records.

Occasionally, TSD unit personnel attend training classes conducted external to the INL or conducted at the INL Site by non-INL subcontract personnel. In order to verify an employee's attendance at these training courses, a copy of the class certification or other documentation is maintained in the individual’s training record.

H-1c. Training Director [IDAPA 58.01.05.008; 40 CFR 264.16(a)(2)]

For all TSD units, the facility manager (training director) functions in conjunction with his/her designee(s) to insure that all segments and responsibilities associated with the training program are accomplished. The training director provides overall leadership and management direction to the TSD unit training organization. The director's duties include the following:

- Provide direction to the TSD unit training organization
- Ensure that performance of training personnel is evaluated
- Approve TSD unit training program
- Ensure that all program objectives and requirements are satisfied and that the training program meets the requirements of IDAPA 58.01.05.008 (40 CFR 264.16) and 29 CFR 1910.120.

The training director or his/her designee(s) is responsible for ensuring that TSD unit personnel are trained in waste management and contingency plan implementation, including emergency procedures, and for ensuring that TSD unit personnel receive training appropriate to their tasks. The training director also reviews documentation, including feedback from audits, operating logs, emergency exercise critiques, and employee recommendations, for possible inclusion into the TSD unit training programs.

Table H-1. Minimum Training Matrix for TSD Unit Personnel.

TASK	AUDIENCE	INITIAL EMPLOYEE TRAINING	RAD TRAINING[1]	24-HOUR OSHA[1]	ANNUAL TRAINING	APPLICABLE SECTIONS OF RCRA PERMIT[2]
RWMC SDA operations personnel that perform treatment, storage, and disposal facility (TSDF) operations, or supervise those operations, and are exposed to the hazards of the TSDF. These employees have duties that may bring them into contact with hazardous/ mixed waste. These employees are required to obtain 24-hr HAZWOPER TSDF Qualification. (40-hr HAZWOPER may also be used to fulfill this requirement.)	RWMC SDA RCRA Worker	X	X	X	X	C, D, F, G
Personnel who enter TSDF areas unescorted and provide support functions that may require them to interface with systems, structures, or components referenced within the facility RCRA Permit, or may bring them into contact with hazards of the facility to include the potential for exposure to hazardous/mixed waste at the TSDF. These employees are required to obtain 24-hour HAZWOPER TSDF Qualification. Examples of work activities include radiological surveys, inspections, waste characterization, performing waste shipments or waste movement, repairing or replacing facility emergency/monitoring equipment, life safety systems support, equipment calibrations, and surveillance. Examples of work that may be included are Quality Inspectors, Quality Engineers, System Engineers (assigned to TSDFs), Life Safety System Engineers, Environmental Engineers, Industrial Hygienists, Safety Engineers, Packaging and Transportation representatives, Waste Technical Specialists, Crafts (instrument technician, pipefitter, mechanic, welder, painter, etc.) and Radiological Control Technicians.	RWMC RCRA Technical Support Worker-HAZWOPER	X	X	X	X	F, G

Table H-1. (continued)

TASK	AUDIENCE	INITIAL EMPLOYEE TRAINING	RAD TRAINING[1]	24-HOUR OSHA[1]	ANNUAL TRAINING	APPLICABLE SECTIONS OF RCRA PERMIT[2]
Personnel who enter TSDF areas unescorted and provide support functions that may require the individual to interface with systems, structures, or components referenced within the facility RCRA Permit. Personnel in this category generally do not have the potential to for exposure to the hazardous or mixed waste (for instance, these employees are not required to wear PPE and are not required to complete 24-hour HAZWOPER training). Examples of workers that may be included are System Engineers (not assigned to TSDFs), and other personnel who perform the activities listed above.	RWMC SDA RCRA Technical Support Worker	X	X		X	F, G
Personnel who enter TSDF areas unescorted and provide only incidental support to facility operations. These individuals are not directly exposed to the hazards of the TSDF but must be cognizant of the RCRA-related requirements for access. Additionally, these personnel are not required to complete 24-hour HAZWOPER training. Examples of positions within this level include Maintenance Planners, Radiological Engineers, RCT Supervision, personnel assigned as Senior Supervisory Watch, Training Specialists, Waste Disposition Specialists, D&D Workers and administrative support personnel.	RWMC SDA RCRA General Employee	X			X	F, G
RWMC EAM conducts operations-related response; coordinates protective actions or protective action recommendations; authorizes response resources; satisfies federal, state, and local requirements and declares the RWMC Emergency Control Center operational.	RWMC Emergency Action Managers	X	X	X	X	G

[1]. Personnel who are not exposed to the hazards of the regulated units may not require this training.
[2].Personnel receive training related to the permit section as appropriate to their job function.

Section C – Waste Characterization
Section D – Process Information
Section F – Procedures to Prevent Hazards
Section G – Preparedness, Prevention, and Contingency Plan

H-1d. Relevance of Training to Job Tasks [IDAPA 58.01.05.008; 40 CFR 264.16(a)(2)]

Individual training program profiles are prepared for each TSD unit position that requires a formal training program.

At a minimum, each individual training program profile identifies the following:

- Job description
- Qualifications
- Training requirements.

Profiles typically identify qualification requirements. Occasionally, a position may require specialized training. Special-case training is documented in individual training records. Profiles include requirements for hazardous/mixed waste management or handling and emergency response training.

Supervisors have the responsibility for evaluating training requirements for TSD employees. These supervisors receive additional training in how to conduct and evaluate OJT.

Individuals who demonstrate an equivalency for specific requirements or prerequisites identified in the training profile may be exempted from requirements in accordance with established procedures. Exemptions/equivalencies must be approved by the training director. Each exemption/equivalency is granted in writing and documented in the individual's training record.

H-1e. Training for Emergency Response [IDAPA 58.01.05.008; 40 CFR 264.16(a)(3)]

Emergency response training is provided to all personnel assigned to or associated with TSD units, including specialized training for employees with specific emergency action responsibilities, such as the EAM and Emergency Response Organization (ERO) personnel. The following presents an overview of the emergency response training.

General emergency response training of TSD unit ERO personnel includes training on the ICP EP/RCRA CP which covers the following topics:

- Spill Control Plan
- Evacuation/accountability

- Emergency drill/exercise
- RCRA
- Emergency Plan Implementing Procedures
- Emergency preparedness
- Incident command system
- Inspection and repair of facility emergency monitoring equipment.

ERO members respond to emergency events. ERO members receive initial training and annual requalification training, in addition to training provided to general employees. Training of ERO members is outlined by position in company procedures. All RWMC SDA employees receive general employee emergency response action training.

H-2. Implementation of Training Program [IDAPA 58.01.05.008; 40 CFR 264.16(b), 264.16(d)(4), 264.16(e)]

After completion of new employee orientation, designated employees enter a training program specific to their job assignment. Persons holding qualifications are retrained and reevaluated as mandated by procedures. Job assignments which are required for the completion of a training program have time and performance limitations that must be satisfied to meet program qualification criteria.

RCRA training is completed within the first six months of the individual's employment or assignment, and at least annually thereafter, for positions involving TSD unit operations. Throughout the training program and until completion, employees do not perform their job duties unsupervised.

H-3. Training Records [IDAPA 58.01.05.008; 40 CFR 264.16(d)(4) and (e)]

Individual training records are maintained for personnel assigned to TSD units. Training records include documentation of completed training, such as class rosters, signed checklists, completed exams, data base printouts from additional training classes attended, and other documents verifying training. The original training records are maintained by the presenting organizations, which enter course completion information into a database. A hard copy of this information is also entered into the individual's training record.

The training records include the names of employees filling each TSD unit position. Job tasks and associated training requirements for each TSD unit are found in Table H-1.

Individual training records include, as a minimum, the following:

- Initial training and retraining programs
- Attendance records of training received
- Results of exams, walk through, and job performance assessments related to certification.

Training records for current employees at each TSD unit are maintained until closure of the unit or the employee terminates or transfers to a non-TSD unit position. The training records of terminating employees are maintained at the TSD unit for a minimum of three years from the date the employee last worked at a TSD unit. The training records for TSD unit employees who transfer to a non-TSD unit position within the company are forwarded to the employee's new organization where they continue to be available for at least three years.

HWMA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

Volume 18 –Book 3 – Radioactive Waste Management Complex (RWMC)

ATTACHMENT 6

Subsurface Disposal Area (SDA) Buildings WMF-698 and WMF-1617

Sections F-3 through F-5

Procedures to Prevent Hazards

Revision Date: October 18, 2012

CONTENTS

F-3. Waiver or Documentation of Preparedness and Prevention Requirements 1

F-3a. Equipment Requirements 1

F-3a(1) Internal Communications 1

F-3a(2) External Communications 1

F-3a(3) Emergency Equipment 1

F-3a(4) Water For Fire Control 2

F-3b. Aisle Space Requirement 3

F-4. Preventive Procedures, Structures, and Equipment 3

F-4a. Unloading Operations 4

F-4b. Run-off 4

F-4c. Water Supplies 4

F-4d. Equipment and Power Failure 4

F-4e. Personnel Protection Equipment 5

F-4f. Releases to the Atmosphere 5

F-5. Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes 6

F-5a. Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste 6

F-3. Waiver or Documentation of Preparedness and Prevention Requirements

F-3a. Equipment Requirements [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.14(b) and 264.32]

F-3a(1) Internal Communications [IDAPA 58.01.05.008; 40 CFR 264.32(a)]

Buildings WMF-698 and WMF-1617 are equipped with communication devices (e.g., phones, alarm systems, etc.) capable of summoning emergency assistance. The personnel involved in the operation have immediate access to emergency communication devices. If the work requires restricted entry, a second person is stationed outside the restricted area to summon emergency personnel and provide assistance as required. If there is ever just one employee at the TSD while the unit is operating, that employee will be provided immediate access to a communication device for summoning emergency assistance.

F-3a(2) External Communications [IDAPA 58.01.05.008; 40 CFR 264.32(b)]

RWMC communication devices are capable of summoning emergency assistance. The RWMC EAM and the WCC use communication devices that provide direct access to external emergency response agencies.

F-3a(3) Emergency Equipment [IDAPA 58.01.05.008; 40 CFR 264.32(c)]

Exhibits G-1 and G-2 in the contingency plan, Attachment 7 Section G, Book 3 of this permit, identify the evacuation routes and locations of safety equipment for the RWMC SDA. Examples of safety equipment available for spill control at the RWMC SDA may include the following:

- Plastic buckets
- Spill control pillows
- Safety rope
- pH indicator
- Shovel
- Chemical spill warning/danger signs
- Radioactive waste bags
- Spill Signs
- Acid/caustic neutralizers
- Smear paper and envelopes

- Pencils, grease pencils
- Radiological tags/signs
- Hazardous material pigs
- Hazardous material bags
- Safety showers
- Eye wash stations

During monthly inspections any missing equipment is replaced and eye wash preventive maintenance status is inspected to determine if it is current. The safety and emergency equipment listed below are located in occupied areas at of WMF-698 and WMF-1617.

- Portable fire extinguishers
- Spill control cabinets
- Evacuation alarm system
- Communication devices (two-way radios).

Building WMF-1617 uses smoke/fire detection cameras for fire protection. These cameras display in the facility control room. These systems are connected to alarms at the Fire Alarm Center, located at the Central Facilities Area (CFA). WMF-698 has manual pull boxes, local alarm system, and alarm to the fire station. Additionally, portable fire extinguishers are located throughout the buildings.

F-3a(4) Water For Fire Control [IDAPA 58.01.05.008; 40 CFR 264.32(d)]

The RWMC firewater system includes a 250,000-gallon tank (WMF-727) and a 500,000-gallon tank (FW-TK-4301). Makeup water for firewater storage tank WMF-727 is normally supplied from the potable water well/pump system. Makeup water for FW-TK-4301 is normally supplied from WMF-1616 deep well pump house. If necessary, either firewater tank can be filled from the other firewater tank by using the firewater pumps for the other tank. Normal Static pressure (125–142 psi) is maintained in the firewater system by the jockey pump FW-P-3904 located in WMF-639. If FW-PIV-DM10 is open, then the two primary 2,000 gpm potable water pumps (PW-P-0302 and PW-P-0303) in WMF-603 can maintain static pressure.

In the event of a pressure drop, two 2,000 gal per minute (gpm) electric and diesel-driven pumps in WMF-639 and a 1,500 gpm diesel pump in WMF-743, provide the required water flow for the firewater system. In the event of a commercial power outage, firewater would be supplied to the system by the diesel-driven pump, 2,000 gpm (FW-P-3902) located in WMF-639 and is backed up by the 1,500

gpm, diesel-driven pump (FW-P-4301) located in WMF-743. The diesel-driven pump in WMF-743 starts when firewater header pressure drops below 85 psi.

Firewater is supplied to the RWMC via a 10-in. diameter main line in the Transuranic Storage Area (TSA) and the Administration and Operation areas, which is reduced to 6 or 8-in. feeder lines. The fire main reduces to 8-in in diameter as it leaves the Operations area, feeding the SDA.

An active fire water line runs adjacent to the designated waste retrieval zone within WMF-1617 (southeast corner of building footprint) and is protected by a concrete cover. Fire water hydrants are available in the SDA.

F-3b. Aisle Space Requirement [IDAPA 58.01.05.008; 40 CFR 264.35]

WMF-698 will use a 2- wide by 2-high configuration in rows that are 24 drums deep. Drum storage secondary containment pans will be located under the drums to provide secondary containment for free liquids. Additional information on the drum storage secondary containment pans is found in Attachment 1, Sections B and D. Aisle space is provided as necessary for egress of inspection personnel and emergency equipment (center aisle will be maintained at 20 feet wide with 3 feet between rows and around the perimeter of the building).

The WMF-1617 service bay room (103), equipment airlock room (104), and utility area room (106) will maintain aisle space as necessary for egress of inspection personnel and emergency equipment (a minimum of 3 feet between drum rows will be maintained to allow for drum removal and inspector egress).

F-4. Preventive Procedures, Structures, and Equipment

WMF-1617 was designed so that process and storage areas are maintained at a negative pressure. The HVAC systems in these buildings were designed for the air flow to originate in the areas with the least negative pressure and flow to the areas with a higher negative pressure. Thus, air flows from areas with less potential for contamination to areas with greater potential for contamination. The designs of the HVAC systems and buildings work together to contain wastes, and prevent the wastes from making contact with the environment.

WMF-698 ventilation is a draw-through system to prevent the accumulation of volatile organic compounds from equipment exhaust. Dust filters are installed at various locations in the walls to filter the air drawn into the enclosure. The exhaust is not filtered.

Storage and treatment areas may have remote capabilities, such as excavators for waste retrieval, operational requirements, and the movement of wastes as necessary. Additionally telescoping forklifts (telehandlers) may be used to transport waste to the drum packaging station (DPS), where waste is visually examined to verify conformance with waste acceptance requirements and then packaged into clean 55-gallon drums, standard waste boxes (SWB), or other waste boxes for interim storage awaiting final waste disposition. WMF-1617 ventilation uses four separate HEPA filtered exhaust fans to provide redundant capability. The fans discharge directly to ambient air (no stack provided). Alpha Constant Air Monitors (CAMs) are provided on each HEPA filter/fan unit discharge.

F-4a. Unloading Operations [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(I)]

Trucks, forklifts, or other equipment are used to deliver mixed waste and debris for storage or treatment in the units addressed in this permit.

F-4b. Run-off [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(ii)]

The units addressed in this permit are located within fully enclosed buildings (WMF-698 and WMF-1617). The area surrounding each building slopes away from the building, carrying any storm water toward the streets, where the water is collected and diverted away from the building. The buildings addressed in this permit are outside of the 100-year flood plain boundary.

F-4c. Water Supplies [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(iii)]

Contamination of water supplies by spills of mixed waste is prevented by storage and treatment being completed within secondary containment pans. See Attachment 1, Sections B and D for additional information on storage and treatment being completed within secondary containment pans.

F-4d. Equipment and Power Failure [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(iv)]

Upon loss of commercial power, activities are stopped. Standby generators are provided to assume the electrical loads of WMF-1617 exhaust system that are maintained as standby circuits.

Emergency lighting and the HVAC systems in the building resume operation to ensure personnel safety. When commercial power is restored, operations may continue.

Upon total loss of power (i.e., the standby generators fail to pick up the load), activities are stopped. Personnel evacuate the building as necessary. When commercial power is restored, operations may continue.

F-4e. Personnel Protection Equipment [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(v)]

Buildings WMF-698 and WMF-1617 are designed with various features that prevent undue exposure of personnel to mixed waste. The HVAC system of WMF-1617 is designed to provide air flow from areas with less potential for contamination to areas with greater contamination potential. WMF-698 operates as a waste storage area with limited air movement for building cooling and equipment exhaust removal. Constant air monitors and remote area monitors (WMF-1617 only), and RCT surveys (both buildings) are used to monitor all areas and aid in the detection of radiological contamination. See Attachment 1, Section D8b(4) for additional WMF-1617 monitoring information. Operations at the building are conducted according to written procedures. Emergency equipment is available at the facilities. See Section F-3a(3) of this permit for a list of equipment available for emergency use, and see Exhibits G-1 through G-2 in the contingency plan for locations of this equipment.

Items with the highest radiation levels are treated remotely. Workers wear personal protective equipment as necessary and dictated by procedure, when handling or treating wastes, including equipment such as respirators, gloves, and boots.

Pre-job briefings are held, as necessary, to ensure understanding of procedures, safety hazards, and radiological concerns. Job safety analyses are completed as necessary.

F-4f. Releases to the Atmosphere [IDAPA 58.01.05.012; 40 CFR 270.14(b)(8)(vi)]

In the event of an airborne release from the WMF-1617 waste management unit addressed in this permit, the ventilation system in the building will direct hazardous constituents to the building's HEPA filtered off-gas system, which minimizes releases to the atmosphere.

At the WMF-1617 air from the storage and treatment units is drawn through HEPA filters that remove particles in the exhaust air. From the exhaust plenums, the filtered exhaust air is released to the atmosphere.

At WMF-698, all wastes to be stored in the container storage areas will be stored in closed containers in order to minimize the release of hazardous constituents.

A container holding hazardous or mixed waste must always be closed during storage. At WMF-1617, opening of containers will only be performed for treatment, to add/remove waste, sort, segregate, or for sampling for verifying waste acceptance criteria. Containers of solid hazardous and/or mixed wastes may be consolidated into other DOT/UN containers for storage. Approved procedures and DOT/UN rules are used in conjunction with guidelines listed in 40 CFR 264, Appendix V, to determine compatibility or incompatibility of materials before consolidation is performed into approved containers for storage.

F-5. Prevention of Reaction of Ignitable, Reactive, and Incompatible Wastes

F-5a. Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste [IDAPA 58.05.01.012 and 58.05.01.008; 40 CFR 270.14(b)(9) and 264.17(a)]

Container storage of wastes will not be limited to non-liquid, physically solid waste forms. Waste matrices will be evaluated by INL facility personnel for free liquids prior to acceptance into the container storage units, and any wastes containing free liquids will be stored within drum storage secondary containment pans. The liquids will treated through absorbent addition on the sorting table in the RA or in the DPSs.

The waste stream to be stored and treated within WMF-698 and WMF-1617 has completed characterization which is detailed in “Central Characterization Project Acceptable Knowledge Summary Report for Rocky Flats Immobilized Organic Liquids Stored at the Idaho National Laboratory”, CCP-AK-INL-005, Revision 4, dated October 20, 2009. This report is included in Attachment 2. The waste stream to be stored and treated was also evaluated in accordance with the “Chemical Compatibility Evaluation of Wastes for the Advanced Mixed Waste Treatment Project” (RPT-ESH-014). No issues of ignitability, reactivity, or incompatibility have been identified. Aerosol cans and roaster oxides are not accepted into the RWMC RCRA units.

HWMA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

BOOK 3
Volume 18 –Radioactive Waste Management Complex

ATTACHMENT 7

SUBSURFACE DISPOSAL AREA (SDA)
WMF-698
WMF-1617

Section G

Preparedness, Prevention, and Contingency Plan

Revision Date: October 18, 2012

CONTENTS

G-1 General Information....1

G-2 Emergency Coordinators....3

G-3 Implementation....4

G-4 Emergency Response Procedures....7

G-4a Notification....7

G-4b Identification of Hazardous Materials....10

G-4c Assessment....11

G-4d Control Procedures....12

G-4e Prevention of Recurrence or Spread of Fires, Explosions, or Releases....15

G-4f Storage and Treatment of Released Materials....19

G-4g Incompatible Waste....20

G-4h Post-Emergency Equipment Maintenance....20

G-4i Container Spills and Leakage....21

G-5 Emergency Equipment....23

G-6 Coordination Agreements....24

G-7 Evacuation Plan....25

G-8 Required Reports....26

TABLES

G-1 Emergency response equipment available at WMF-698 and WMF-1617....28

EXHIBITS

G-1 WMF-698 Evacuation Routes and Emergency Equipment....29

G-2 WMF-1617 Evacuation Routes and Emergency Equipment....30

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
G-1 General Information	**G-1 General Information**
40 CFR 264.51 Purpose and implementation of Contingency Plan. (a) Each owner or operator must have a Contingency Plan for his facility. The Contingency Plan must be designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water.	The Idaho Completion Project (ICP) portion of the Radioactive Waste Management Complex (RWMC) Subsurface Disposal Area (SDA) (hereinafter referred to as the RWMC) is designed, constructed, and operated to exclude or isolate hazardous incidents such as fires, explosions and/or unplanned sudden or non-sudden releases of mixed or hazardous waste or hazardous waste constituents to air, soil, or surface water. The RWMC SDA location, operation, site plan and descriptions/information are presented in detail in Section B, Facility Description, of this permit. This Resource Conservation and Recovery Act (RCRA) contingency plan matrix discusses emergency response at RWMC. This matrix addresses emergency actions to protect human health, the environment, and RWMC facilities and equipment in an event originating from or affecting the permitted units, comprised of the Subsurface Disposal Area (SDA) facilities – WMF-698, WMF-1617, and 2 NDA container storage areas. The Idaho Cleanup Project (ICP) Emergency Plan/RCRA Contingency Plan (ICP EP/RCRA CP) is the implementing document for emergency response across the Idaho National Laboratory (INL) and is written to comply with requirements that are in addition to those of the Idaho Hazardous Waste Management Act (HWMA)/RCRA. This matrix provides the HWMA/RCRA contingency plan requirements that are being implemented through the ICP EP/RCRA CP.
(b) The provisions of the plan must be carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.	The contingency plan is designed to provide the proper preparation and necessary response planning to prevent or minimize hazards to human health and the environment from fires, explosions, or any release of hazardous waste or hazardous waste constituents. The provisions of the contingency plan are carried out immediately whenever a fire, explosion, spill, or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment occurs. Minor incidents (those that can be controlled with on-Site resources and do not threaten human health or the environment) are managed by trained facility personnel according to the provisions of this plan. Such responses are not considered activation of the contingency plan.
40 CFR 264.53 Copies of Contingency Plan A copy of the Contingency Plan and all revisions to the Contingency Plan must be:	
(a) Maintained at the facility; and	The contingency plan, with all subsequent revisions, will be maintained with the RCRA permit at the facility at various locations, including the RWMC Shift Manager's office.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
(b) Submitted to all local police departments, fire departments, hospitals, and State and local emergency response teams that may be called upon to provide emergency services.	Copies of the contingency plan are maintained on-Site, with information provided as necessary (specific to the response action needed) to the following through Memoranda of Understanding (MOUs) and Memoranda of Agreement (MOAs) with the DOE Idaho Operations Office (DOE-ID): • Bingham, Bonneville, Butte, Clark, and Jefferson County Sheriffs' Departments, and City of Idaho Falls Police Department • Rexburg City/Madison County, City of Ammon, City of Chubbuck, and City of Idaho Falls Fire Departments, South Custer Rural, Shelley/Firth Fire Districts, and Central Fire District and Teton County Fire Protection District • Portneuf Medical Center, Eastern Idaho Regional Medical Center, and Bingham County Memorial Hospital • Bingham County Emergency Management Services, Bonneville County Emergency Management Services, Butte County Emergency Services, Clark County Civil Defense, and Jefferson County Emergency Management • Shoshone-Bannock Tribes • Bureau of Land Management, Department of Interior, and Department of Agriculture • State of Idaho and Idaho Transportation Department
40 CFR 264.54 Amendment of the Contingency Plan. The Contingency Plan must be reviewed, and immediately amended, if necessary, whenever:	The contingency plan is reviewed and immediately amended, if necessary, whenever:
(a) The facility permit is revised;	The RCRA permit is modified.
(b) The plan fails in an emergency;	The contingency plan fails in an emergency.
(c) The facility changes-in its design, construction, operation, maintenance, or other circumstances-in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency;	It is determined/known that changes in the permitted units' design, construction, operation, maintenance, or other circumstances have taken place in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents, or changes the response necessary in an emergency.
(d) The list of emergency coordinators changes; or	The list of RWMC emergency action managers (EAMs) changes (refer to Section G-2, Emergency Coordinators).
(e) The list of emergency equipment changes.	The list of emergency equipment changes (refer to Section G-5, Emergency Equipment).

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
G-2 Emergency Coordinators **40 CFR 264.52(d) and 264.55** 40 CFR 264.52(d) The plan must list names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator (see 264.55), and this list must be kept up to date. Where more than one person is listed, one must be named as primary emergency coordinator and the others must be listed in the order in which they will assume responsibility as alternates. For new facilities, this information must be supplied to the Regional Administrator at the time of certification, rather than the time of permit application.	**G-2 Emergency Coordinators** The Emergency Action Managers (EAMs), listed below, are the emergency coordinators (ECs) for purposes of HWMA/RCRA compliance with respect to the contingency plan. Due to the shift-work structure and remoteness of the RWMC, it is not possible or practical for one individual to assume "primary" responsibilities, rather, responsibility is best assigned through "redundant primary" EAMs, without alternates. The RWMC Nuclear Facility Manager (NFM) normally serves as the RWMC EAM. Names, home addresses, and home phone numbers of the RWMC EAMs are as follows: • Lopez, S. L. - Duty cell phone: 521-2397; Duty pager: 7009. • Schnelle, J. A. - Duty cell phone: 569-7544; Duty pager: 6518. • Southwick, J. L. - Duty cell phone: 520-1484; Duty pager: 6807. • Streeper, K. E. - Duty cell phone: 521-3282; Duty pager: 5032. The business address (P.O. Box 2010, Idaho Falls, Idaho 83403-2010), is the same for all the RWMC EAMs. The EAM list above is subject to change due to changes in personnel. The current list of EAMs is maintained in Appendix I of the RWMC Addendum to the ICP EP/RCRA CP.
40 CFR 264.55 Emergency Coordinator. At all times, there must be at least one employee either on the facility premises or on call (i.e., available to respond to an emergency by reaching the facility within a short period of time) with the responsibility for coordinating all emergency response measures. This emergency coordinator must be thoroughly familiar with all aspects of the facility's Contingency Plan, all operations and activities at the facility, the location and characteristics of the waste handled, the location of all records within the facility, and the facility layout. In addition, this person must have the authority to commit the resources needed to carry out the Contingency Plan.	An RWMC EAM is at the RWMC at all times or on call. All of the RWMC EAMs are thoroughly familiar with all aspects of the contingency plan, all RWMC operations/activities (including these units), the location and characteristics of waste handled, volumes of waste, the location of all records within the RWMC and layout. All of the RWMC EAMs have the authority to commit the necessary resources to carry out the contingency plan. The RWMC EAMs are responsible for: • Ensuring that the emergency procedures are implemented and completed when responding to any incident involving the units permitted herein to mitigate or eliminate any immediate or potential hazard to personnel, the public, or the environment • Serving as the primary lead in coordinating with the INL Fire Department, INL Emergency Operations Center (EOC), and the INL Warning Communications Center (WCC) for the proper support from these organizations • Delegating authority to the RWMC Emergency Response Organization (ERO), as well as the On-Scene Commander (OSC), as appropriate. If an incident overlaps more than one shift, the active RWMC EAM shall maintain the command until responsibility is officially passed to the incoming RWMC EAM.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
G-3 Implementation **40 CFR 264.52(a) and 264.56(d)**	**G-3 Implementation**
40 CFR 264.52(a) The Contingency Plan must describe the actions facility personnel must take to comply with 264.51 and 264.56 in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at the facility.	The provisions of the contingency plan will be carried out immediately (activation of the contingency plan) whenever there is a fire, explosion, or unplanned release of hazardous or mixed waste or hazardous waste constituents that threaten human health or the environment. Such an occurrence (incident) may require further classification, as described below, to aid in expediting the appropriate emergency response.
40 CFR 264.51 *[The text of 40 CFR 264.51 is located in Section G-1, General Information.]*	Classification of an occurrence is done in accordance with DOE Orders. Through these orders, the DOE has established definitions for occurrence categories and emergency classes. Occurrences are categorized by severity, in order of increasing severity. Emergency occurrences categorized as operational emergencies may be further classified by severity when events occur that represent a specific threat to workers and the public due to the release or potential release of significant quantities of hazardous materials.
40 CFR 264.56 Emergency procedures. (a) *[The text of 40 CFR 264.56(a) is located in Section G-4a, Notification.]* (b) *[The text of 40 CFR 264.56(b) is located in Section G-4b, Identification of Hazardous Materials.]* (c) *[The text of 40 CFR 264.56(c) is located in Section G-4c, Assessment.]* (d) If the emergency coordinator determines that the facility has had a release, fire, or explosion which could threaten human health, or the environment, outside the facility, he must report his findings as follows:	An operational emergency at the RWMC may require response from the RWMC ERO, or support agencies, because the occurrence involves either an actual or potential fire or explosion involving mixed waste, or an uncontrolled release or threat of an uncontrolled release of mixed waste or constituents.
(1) If his assessment indicates that evacuation of local areas may be advisable, he must immediately notify appropriate local authorities. He must be available to help appropriate officials decide whether local areas should be evacuated; and	Operational emergencies are defined as an unplanned significant event or condition that requires time-urgent response from outside the immediate/affected area of the incident. An operational emergency shall be declared when events have seriously degraded, or have the potential to degrade, the safety or security of the RWMC. Operational emergencies are classified by severity for specifying the appropriate emergency response actions and notifications, which are commensurate with the degree of hazard for the emergency. Classification aids in the rapid communication of critical information and the initiation of appropriate time-urgent emergency response action. The three classes of operational emergencies, in order of increasing severity, are:

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
(2) He must immediately notify either the government official designated as the on-scene coordinator for that geographical area, (in the applicable regional contingency plan under part 1510 of this title) or the National Response Center (using their 24-hour toll free number 800/424-8802). The report must include:	**ALERT.** An alert shall be declared when events are predicted, are in progress, or have occurred that result in either: • An actual or potential substantial degradation in the level of control over hazardous materials (radiological and nonradiological) OR • An actual or potential substantial degradation in the level of safety or security of a facility or process that could, with further degradation, produce a site area emergency or a general emergency. If an actual or potential substantial degradation in the level of control over hazardous materials (radiological or nonradiological) occurs, the radiation dose from any release to the environment or radioactive material or a concentration in air of other hazardous material is expected to exceed either: • The applicable Protective Action Guide (PAG) or Emergency Response Planning Guideline (ERPG) at or beyond 30 m from the point of release to the environment OR • Ten percent of the applicable PAG or ten percent of the ERPG-2 (TEEL-2) value at 100 m AND It is not expected that the applicable PAG or ERPG will be exceeded at or beyond the facility boundary or exclusion zone boundary.
(i) Name and telephone number of reporter; (ii) Name and address of facility; (iii) Time and type of incident (e.g., release, fire); (iv) Name and quantity of material(s) involved, to the extent known; (v) The extent of injuries, if any; and (vi) The possible hazards to human health, or the environment, outside the facility.	
This space was intentionally left blank.	**SITE AREA EMERGENCY.** A site area emergency shall be declared when events are predicted, are in progress, or have occurred that result in either: • An actual or potential major failure of functions necessary for the protection of the worker or the public OR • An actual or potential major degradation in the level of safety or security of a facility or process that could, with further degradation, produce a general emergency AND The radiation dose from any release of radioactive material or concentration in air from any release of other hazardous material is not expected to exceed the applicable PAG or ERPG at or beyond the site boundary.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
This space was intentionally left blank.	**GENERAL EMERGENCY.** A general site emergency shall be declared when events are predicted, are in progress, or have occurred that result in either: • Catastrophic reduction of facility safety or security systems with a potential for the release of large quantities of hazardous materials (radiological or nonradiological) to the environment actually occurring or imminent OR • The radiation dose from any release of radioactive material or a concentration in air from any release of other hazardous material is expected to exceed the applicable PAG or ERPG at or beyond the site boundary. The following is a list of personnel and organization with a general description of their actions/responsibilities in response to fires, explosions, or unplanned sudden or non-sudden releases of hazardous waste or hazardous waste constituents to air, soil, or surface water: • Operations Personnel – Ensure personal safety, inform shift manager of situation/emergency (type of emergency, location, size, material(s) involved, status of other waste materials, equipment, etc.), and, if possible and properly trained, stop waste movements, secure area, and initiate efforts to stabilize the situation • Shift Manager/EAM – Sound appropriate alarms, gather information/documents, • Responsible for conducting emergency response within the RWMC and the immediate implementation of the contingency plan • INL Fire Department – Primary responders to all fires and hazardous incidents, providing fire fighting, hazardous materials (HAZMAT) response, and emergency medical services • RWMC Emergency Response Organization – Trained facility personnel including the RWMC EAM • On-Scene Commander (OSC) – With the assistance of the RWMC EAM, assesses situation from the standpoint of tactical deployment of the INL Fire Department and overall effort to address the situation/emergency • INL Emergency Operations Center (EOC) – Provides support to the RWMC ERO, including dose assessment, off-Site notifications, public information, and other technical/tactical functions that aid in the assessment, control, and return to operations • Emergency Director (ED) – Manages the INL EOC and has jurisdiction over all INL operational emergency response activities • INL Warning Communications Center (WCC) – Serves as the central organization for coordinating efforts between INL EROs and off-Site agencies/support services • Industrial Hygienist – Assists in the assessment of hazards/risk (e.g., monitor areas with known/suspected high concentrations of hazardous vapors/gases) and appropriate response actions • Waste Technical Specialist – Assists in the identification of waste/materials, proper adsorbent/absorbent, and post-emergency collection, storage, treatment and/or disposal Specific actions which further address 40 CFR 264.52(a) and 264.56(d) are described in Section G-4, Emergency Response Procedures.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
G-4 Emergency Response Procedures **G-4a Notification** **40 CFR 264.56(a)** 40 CFR 264.56(a) Whenever there is an imminent or actual emergency situation, the emergency coordinator (or his designee when the emergency coordinator is on call) must immediately: (1) Activate internal facility alarms or communications systems, where applicable, to notify all facility personnel; and (2) Notify appropriate State or local agencies with designated response roles if their help is needed. **NOTE:** Notification shall always be made to the State Communications Center even if help is not needed. This space was intentionally left blank.	**G-4 Emergency Response Procedures** **G-4a Notification** In the event of a fire or explosion, fire detection equipment (smoke detectors, heat detectors, water flow alarms, or water sprinkler alarms) will automatically notify: (1) The RWMC voice paging system, which will (through exterior and interior building speakers) alert, notify and instruct the RWMC facility personnel and RWMC ERO. (2) The Fire Alarm Center (FAC), which will involve the INL Fire Department. (3) The INL WCC, which will alert other INL EROs. In any event (fire, explosion or release), the person involved/discovering can activate the nearest manual alarms and use communication devices (e.g., cell phones, radios) to summon assistance, and make notifications to the shift manager/EAM and/or the INL Fire Department. The RWMC EAM will ensure that all facility personnel are being, or have been, notified of the imminent or actual emergency situation, including a confirmation call to the WCC, to verify the INL Fire Department is responding. All notifications shall include the following information, as appropriate: • Name and telephone number of the caller • Location of the incident and the caller • Time and type of incident • Severity of the incident • Description of the incident • Cause of the incident, if known • Assistance needed to deal with or control the incident • Name and address of the facility • Name and quantity of material(s) involved, to the extent known • Extent of injuries, if any • Possible hazards to human health, or the environment, outside the facility.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
	Once the EAM is notified of a fire, explosion, or uncontrolled release at the RWMC (by either an eyewitness or an alarm), the EAM will activate the contingency plan. If necessary, the EAM will also request assistance from the INL Fire Department. The INL Fire Department is contacted by dialing 777 or 526-7777. In case of fire, the INL Fire Department will respond to the alarms. The nature of any incident potentially involving hazardous waste or hazardous materials will undergo assessment, as described in Section G-4c. The contingency plan will not be activated if the incident is considered minor and does not constitute an emergency requiring notification of regulatory agencies (e.g., a fire, explosion, or natural occurrence that does not involve or threaten hazardous or mixed wastes; a release that does not constitute a potential threat to human health or the environment; a spill contained in secondary containment; and/or a spill or release that is less than a reportable quantity specified in 40 CFR 302.4). Reportable quantities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Emergency Planning and Community Right-to-Know Act (EPCRA) apply to the release of any substance listed in Table 302.4 of 40 CFR Part 302.
This space left intentionally blank.	The RWMC maintains its own emergency response capabilities through the ERO. There are adequate supplies, equipment, and trained personnel available at the RWMC to mitigate expected emergencies. The INL Fire Department and security personnel operate separately, but their activities are coordinated through the EAM. DOE-ID maintains coordination and mutual aid agreements with local outside agencies who make additional emergency personnel and equipment available if outside assistance is required. In addition, as a DOE facility, the staff at the RWMC can call upon the resources of the INL EOC for additional assistance, including, but not limited to, MOU agreements with local agencies (such as outside medical facilities or state and local law enforcement agencies) and other federal agencies. (See Section G-1.) **Communication of Emergency Conditions to Facility Employees** The procedures for notifying facility personnel depend on the type and severity of emergency and may include the following: • Local Fire Alarms - In the event of a fire, these may be activated automatically or manually. • Evacuation - The evacuation signal is an alternating, siren tone, manually activated by the contract security force, or the RWMC Emergency Control Center, at the direction of the EAM. If the primary warning system consisting of alarms and signals fails to operate when activated (as in a total power outage and failure of the backup power systems), security will be directed by the EAM to use voice amplifiers to alert personnel to evacuate the area. • RWMC Voice Paging System - The RWMC voice paging system provides personnel with general and emergency information.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
This space was intentionally left blank.	**Notification of Local, State, and Federal Authorities** If it is determined that the permitted units have had a fire, explosion, spill, or release of hazardous waste or hazardous waste constituents, or an emergency resulting in a release of a hazardous substance included in 40 CFR 302.4, that could threaten human health or the environment inside or outside the RWMC, the contingency plan will be activated. The EAM will ensure that local authorities are notified by phone and/or facsimile. These notifications are made by the INL WCC, based on the initial information provided by the EAM or the ED. The agencies to be contacted include, as appropriate: **NOTE:** Notification shall always be made to the State Communications Center even if help is not needed. State of Idaho Communications Center (800) 632-8000 or (208) 846-7610 Fax Number (208) 846-7620 County Dispatch Centers: Butte County (208) 527-3585 Fax Number (208) 527-3916 Bonneville County (208) 522-1644 or (208) 529-1200 Fax Number (208) 529-1153 Bingham County (208) 785-1234 or 785-7653 Fax Number (208) 785-8067 Clark County (208) 374-5669 Fax Number (208) 374-5614 Fort Hall Police Dispatch (208) 233-7451 Public Safety (208) 237-0137 Fax Number (208) 478-4005 Jefferson County (208) 745-9207 Fax Number (208) 745-9212 DOE-HQ Emergency Operations Center (202) 586-8100 Fax Number (202) 586-8485 National Response Center 1-800-424-8802

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
This space was intentionally left blank.	The first notification of regulatory agencies will include, as appropriate: • Name and address of the facility and the name and phone number of the reporter • Type of incident: fire, explosion, release, etc. • Date and time of the incident • Type and quantity of hazardous material(s) involved • Exact location of the incident • Injuries, if any • Possible hazards to human health and the environment (air, soil, water, wildlife, etc.) outside the facility • Name, address, and telephone number of the party in charge of or responsible for the facility or activity associated with the incident • Steps being taken or proposed to contain and clean up the material involved in the incident. The ED and EAM will also be available to help the appropriate local, state, or federal officials decide whether local areas should be evacuated. **Notification of the General Public** Notification of the general public through the public safety and emergency agencies listed above will be made by the INL Emergency Director or the EAM. DOE policy is to provide accurate and timely information to the public, by the most expeditious means possible, concerning emergency situations that may affect employees, off-Site personnel, public health and safety, and/or the environment.
G-4b Identification of Hazardous Materials **40 CFR 264.56(b)** 40 CFR 264.56(b) Whenever there is a release, fire, or explosion, the emergency coordinator must immediately identify the character, exact source, amount, and areal extent of any released materials. He may do this by observation or review of facility records or manifests, and, if necessary, by chemical analysis.	**G-4b Identification of Hazardous Materials** The identification of hazardous wastes or hazardous waste constituents involved in a fire, explosion, or release to the environment is a necessary part of the assessment of an incident. RCRA-regulated hazardous waste and hazardous substances and materials listed in 40 CFR 302.4 involved in any release at the permitted units will be identified. The wastes normally stored at the permitted units present no unique hazards to the waste operations personnel. The permitted units present common industrial hazards for exposures or injuries.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
This space was intentionally left blank.	The RWMC EAM will determine the identity, exact source, amount, and extent of any released materials. Sources of information include, but may not be limited to: (1) Observations of personnel involved in or discovering the situation. (2) Permitted units operating records. (3) Material Safety Data Sheets (MSDSs). (4) Monitoring performed by an Industrial Hygienist. (5) The INL Fire Department's findings/reports. Released or residual materials (residuals from a fire or explosion) that cannot be identified by labels, records, logbooks, identification numbers, or electronic databases will be sampled in accordance with a waste analysis plan (WAP), and analyzed to determine the chemical properties of the waste. The analytical results will determine the proper disposition of unidentifiable waste materials.
G-4c Assessment **40 CFR 264.56(c) and 264.56(d)**	**G-4c Assessment**
40 CFR 264.56(c) Concurrently, the emergency coordinator must assess possible hazards to human health or the environment that may result from the release, fire, or explosion. This assessment must consider both direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating, or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire and heat-induced explosions).	Once the required notifications have been made, the EAM will ensure the identity, exact source, amount, and extent of released materials spreading from the event location can be determined. Individuals entering the affected area to gather information for the assessment will wear appropriate PPE. The EAM will determine the identity of materials released, based on knowledge of the area and access to the waste identification/characterization information described in Section G-4b.
40 CFR 264.56(d) *[The text of 40 CFR 264.56(d) is located in Section G-3, Implementation.]*	After the materials involved in an emergency are identified, the specific Information on the associated hazards, appropriate PPE, decontamination method, etc., will be obtained from MSDSs or other appropriate chemical reference materials. Based on default conservative estimates of potential source terms, emergency action levels (EALs) have been developed for fires, explosions, radiological releases, and other emergency events. EALs are specific, predetermined, observable criteria used to determine the emergency classification and initial protective actions for operational emergencies. These EALs provide guidance for activating the INL EROs at the appropriate level in response to the incident. These EALs specify the initial protective actions (i.e., evacuation or take cover) to be taken in response to the event.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
This space was intentionally left blank.	The emergency assessment requires determination of hazards involving evaluation of several criteria, including the following: • Nature of the accident - Known or probable cause; current/projected status of the affected area; facility conditions; status of containment boundaries/systems; type(s) and quantities of hazardous waste/material (non-radiological and radiological) involved in the incident • Weather conditions, present and expected - Wind speed and direction; precipitation; time of day; stability class; weather forecast; anticipated dispersion pattern; direction of travel and width of plume; locations affected • Exposure - Magnitude of actual or potential exposure to employees, the general public, and the environment; duration of human and environmental exposure; pathways of exposure • Toxicity - Types of adverse health or environmental effects associated with exposures; the relationship between the magnitude of exposure and adverse effects • Reactivity (if applicable) - Hazardous materials or wastes involved in an incident will be assessed, through accessing the MSDSs for the affected material to determine its reactivity and the recommended method(s) for managing such waste • Effects - Direct and indirect effects of the release, fire, or explosion (e.g., the effects of any toxic, irritating or asphyxiating gases that are generated, or the effects of any hazardous surface water run-off from water or chemical agents used to control fire or explosions) • Uncertainties - Considerations for undeterminable or future exposures; uncertain or unknown health effects including future health effects. If the assessment indicates no real or potential threat to human health or the environment, the occurrence will be considered a minor incident. Minor incidents do not require further activation of the contingency plan. If the assessment indicates that a potential threat exists to off-Site human health or the environment due to airborne contaminants, the EAM or ED will advise the appropriate off-Site response personnel of the nature of the potential threat. Wind data for the RWMC and the nature of the wastes normally stored at the permitted units do not indicate that an airborne release is likely to occur outside the TSDF.
G-4d Control Procedures **40 CFR 264.52(a)** 40 CFR 264.52(a) The Contingency Plan must describe the actions facility personnel must take to comply with 264.51 and 264.56 in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste	**G-4d Control Procedures** **Spills that Occur While Working With a Hazardous Waste** Employees in the permitted units will evacuate the immediate area and notify the EAM. The EAM will notify the spill control team, appropriate facility personnel, and/or the INL Fire Department who will perform the following steps: (1) After donning appropriate PPE (if necessary), secure the source of the release (e.g., tip the container to stop the leak).

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
constituents to air, soil, or surface water at the facility.	(2) Transfer the spill to a new receiving drum, using a suitable pump if the quantity spilled is sufficient to use a pump. (3) After pumping or if the spill is small, spread absorbent over the area of the spill and transfer the contaminated absorbent to an appropriate container. (4) Stabilize flammable solvent spills using an absorbent. (5) Stabilize other chemical spills by using a neutralizing agent or by adding absorbent. (6) Handle the stabilized material as a hazardous or mixed waste. Sweep, shovel, or pump it into an appropriate container. (7) Remove any contamination from floors, walls, and other containers with a decontaminant appropriate to the spilled material, and transfer decontaminant and cleaning materials to an appropriate container. (8) Properly label the container. (9) Handle the original spill container in the same manner as a bulging or leaking drum. (10) Decontaminate all reusable spill cleanup equipment.
This space was intentionally left blank.	After cleanup is complete, appropriate facility personnel will complete a weekly inspection log entry and include the details of the spill and cleanup in the log. **Unattended Spills that are Discovered** Employees in the permitted units will leave the immediate area of the spill and notify the EAM. The EAM will notify the INL Fire Department who will perform the following: (1) Attempt to determine the source of the spill. (2) If the spilled material can be identified from the source container, handle the spill as in the procedure for "Spills that Occur While Working With a Hazardous Waste," above. (3) If the spilled material cannot be identified, a sample will be collected. (4) Obtain a rush analysis from a laboratory. (5) The spilled material will be containerized per the Analytical Data provided. (6) After the waste has been fully characterized, it will be managed appropriately. (7) Once the material has been identified, proceed as in the procedure for "Spills that Occur While Working With a Hazardous Waste," above.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
This space was intentionally left blank.	**Bulging Containers** Employees in the permitted units will notify the EAM. The EAM will notify the INL Fire Department who will: (1) Identify the material inside the container, based on inventory records. (2) Based on the hazardous characteristics of the material in the container, select appropriate PPE and a new receiving container. (3) After donning appropriate PPE (if necessary) and securing emergency equipment, carefully and slowly open a vent valve (if available) to relieve the internal pressure if it is safe to do so, or vent using appropriate equipment and safety measures and overpack the container. (4) Use a portable pump to transfer the material from the bulging container to the new receiving container. Properly mark the new receiving container. (5) Ensure that the contents of the bulging container have been emptied into the new receiving container. (6) If the material is an acutely hazardous waste, crush the container and dispose of it as a hazardous waste. (7) If the material is not an acutely hazardous waste, remove or cover labels and crush the container before disposal at a sanitary landfill. (8) Clean up any material that spilled during the transfer. After cleanup is complete, trained facility personnel will complete a weekly inspection log entry and record the details of transfer in the log. **Natural Phenomena Emergencies** After any natural emergency (earthquake, flood, lightning strike, etc.) that may have affected the permitted units, the EAM shall ensure the following actions are performed: (1) Inspect all containers and containment for signs of leakage or damage. (2) Check to ensure all automatic and manual alarms in the permitted units are working if feasible. (3) Conduct a general survey of the permitted units looking for potential problems. (4) Take any necessary corrective measures, however temporary, to rectify potential or real problems. Record all inspection results.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
	Personnel Contamination In the event of chemical material in the eye or on the skin, personnel will use the following procedure: (1) Wash the eye(s) or skin using the permanent shower/eyewash station for an appropriate time (2) Hold the eyelids open during washing. (3) Notify the EAM. The EAM will notify the appropriate facility personnel, and/or the INL Fire Department who will, if possible, ascertain what chemical material was involved in the injury. (4) Report to the appropriate INL medical facility.
This space was intentionally left blank.	In the event of irritation of the eyes, breathing passages, or skin, difficulty in breathing, and/or nausea, light-headedness, vertigo, or blurred vision, personnel will notify the INL Fire Department. The EAM will evacuate and barricade the area to prevent unauthorized entry and notify the appropriate facility personnel-and/or the INL Fire Department, who will attempt to determine what, if any, chemical exposure occurred and what corrective measures are appropriate. **Power Failure** The permitted units are equipped with a standby power source in the event of utility failure. Should total power failure occur, battery-operated lights will automatically illuminate. In the event of a power failure, personnel will secure any work in progress and leave the area until power is restored. The utilities have backup power replacements as shown: • Lights - Fixed battery-operated lights will operate • Alarms - Emergency communication and fire alarm systems have battery backup • Communication Devices – cell phone and/or radio networks will be used • Fire sprinklers - Portable extinguishers and external hose streams.
G-4e Prevention of Recurrence or Spread of Fires, Explosions, or Releases **40 CFR 264.56(e) and (f)** 40 CFR 264.56(e) During an emergency, the emergency coordinator must take all reasonable measures necessary to ensure that fires, explosions, and releases do not occur, recur, or spread to other hazardous waste at the facility. These measures must include where applicable, stopping processes and operations, collecting and containing release waste, and removing or isolating containers.	**G-4e Prevention of Recurrence or Spread of Fires, Explosions, or Releases** **Equipment Failure** There will be no impact to the permitted units from an equipment failure. Mechanical failures not resulting in spills will be repaired by maintenance personnel.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
40 CFR 264.56(f) If the facility stops operations in response to a fire, explosion, or release, the emergency coordinator must monitor for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, wherever this is appropriate.	During an emergency, the EAM will ensure that reasonable measures are taken so that fires, explosions, and releases do not occur, recur, or spread to mixed waste or other hazardous materials at the facility. These measures include the following: • Stopping processes and operations. • Collecting and containing released wastes and materials. • Removing or isolating containers of waste or hazardous materials. • Ensuring wastes managed during an emergency are handled, stored, or treated with due consideration for compatibility with other wastes and materials onsite and with any containers utilized (see Section G-4g). • Restricting personnel not needed for response activities from the area of the incident. • Evacuating the area if necessary. • Curtailing nonessential activities in the area. • Conducting preliminary inspections of adjacent facilities and equipment to assess damage. • Over-packing and/or removing damaged containers/drums from affected areas. Repairing damaged equipment and facilities, as appropriate. • Constructing, monitoring, and reinforcing temporary dikes, as needed. • Maintaining the INL Fire Department and equipment on standby at the incident site in cases where ignitable liquids have been or may be released and ensuring that all ignition sources are kept out of the area. • Ensuring ignitable liquids are segregated, contained, confined, diluted, or otherwise controlled to preclude inadvertent explosion or detonation.
This space was intentionally left blank.	As described in Section G-4a above, once the EAM is notified (by either an eyewitness or alarm) of a fire, explosion, or release, the EAM will immediately report the situation to the WCC and take action to notify the INL Fire Department and ERO, as necessary. If necessary, the EAM may request other INL support. All personnel not involved in combating the emergency shall evacuate the affected area and assemble in designated locations away from the affected area as informed by the EAM by appropriate means. Emergencies originating at the permitted units will be addressed by activation of the contingency plan under the direction of the EAM. The contingency plan may be activation at any time, at the discretion of the EAM. **Fires** Fires that involve or threaten hazardous or mixed wastes are considered emergencies for the purposes of the contingency ~~p~~lan. Planned actions include: (1) The INL Fire Department will be contacted by pulling the fire-alarm call box or by dialing 777 or 526-7777. (2) Fire fighting personnel will don appropriate PPE. (3) If the fire is small and the fuel source is small, portable fire extinguishers may be used to put out the fire. (4) Whenever possible, flammable material will be removed from the

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
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AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
	for the overall mitigation of the event until the emergency event is terminated. Selections of methods and tactics of responding to an explosion are the responsibility of the On-Scene Commander. An adsorbent/absorbent will be poured over all chemical residues resulting from a hazardous waste explosion. Once the liquid is absorbed, the waste will be swept or shoveled back into the drums, and the surface cleaned using cleaners appropriate to the identified chemicals. The EAM will ensure all operational units (e.g., process equipment, and ventilation equipment) that may be affected directly or indirectly by the explosion, are secured once the areas have been determined safe for reentry.
. This space was intentionally left blank.	**Releases** The EAM will implement the following procedures in the event that: (a) a hazardous or mixed waste or hazardous material spill causes an immediate health hazard; (b) a hazardous or mixed waste or hazardous material spill cannot be contained with secondary containment or application of absorbents; or (c) a threat exists for spilled material to move out of the permitted units: (1) Evacuate the immediate area. (2) Review facility records to determine the identity and chemical nature of released material. (3) Ensure personnel don appropriate PPE to prevent exposure to the material. (4) Ensure that the source of the release is secured, if possible. (5) Ensure that a dike is built to contain run-off. (6) Ensure storm drains do not receive potentially hazardous run-off or spill material. Build dikes around storm drains or close any valves controlling discharge. (7) Ensure that appropriate and trained personnel collect and contain released wastes by stabilizing or neutralizing the spilled material, as appropriate, pouring an absorbent over the spilled material, and sweeping or shoveling the absorbed material into drums or other appropriate containers. (8) Ensure that waste that may be incompatible with the released material will be managed in the affected area until cleanup procedures are complete. After collection of a released material, the incident location will be sampled and evaluated. If contamination is found to exist, contaminated materials may be collected, drummed (if appropriate), and removed from the area for disposal at a permitted disposal facility. Depending on the specific conditions, however, RWMC personnel may choose to implement an alternative decontamination method, such as surface cleaning or in situ neutralization or stabilization. Any such alternative will be discussed with the Director of the Idaho Department of Environmental Quality, before implementation.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
G-4f Storage and Treatment of Released Materials **40 CFR 264.56(g)**	**G-4f Storage and Treatment of Released Materials**
40 CFR 264.56(g) Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility.	Once initial spill containment has been completed, the EAM will ensure that recovered hazardous materials and waste are properly stored, treated, and/or disposed, as required by IDAPA 58.01.05.006; 58.01.05.007; and 58.01.05.008 (40 CFR 262, 263, and 264). For spills of liquid that escaped secondary containment, the perimeter of the spill will be diked with an absorbent material, such as absorbent pillows, that is compatible with the material(s) released. Freestanding liquid will be transferred to a labeled compatible container. The remaining liquid will be absorbed with an absorbent material and swept or scooped into a labeled compatible container. Spill residue will be removed. Spills of dry material will be swept or shoveled into a labeled compatible recovery container. Material recovered from the spill will be transferred to a new or clean-washed container that held a compatible material. All containers will meet Department of Transportation (DOT) specifications for shipping the recovered wastes and materials. Hazardous waste resulting from the cleanup of a fire, explosion, or release will be contained and managed as a hazardous waste until such time that it can be determined that the waste is not hazardous, as defined in IDAPA 58.01.05.005 (40 CFR 261, Subparts C and D). In most cases, the hazardous waste inventory logs completed when containers are placed in storage at the permitted units will allow a determination of the hazardous wastes and hazardous waste constituents present in any cleanup of a release or the residues from an emergency condition. When necessary, however, samples of the waste will be collected and analyzed to determine the presence of any hazardous characteristics and/or hazardous waste constituents; this information is needed to evaluate disposal options. Approved sampling and analytical methods will be used.
This space was intentionally left blank.	If the entire permitted unit has been impacted because of a fire, explosion, or spill, pending decontamination, no hazardous or mixed waste will be accepted for storage or treatment, until it is restored to design status. All cleanup and decontamination residues will be packaged, handled, and stored according to applicable state or federal regulations, DOE orders, and permitted unit procedures. During this period, storage will occur at a less-than-90-day storage site. All liquid wastes will be provided with secondary containment. If unaffected areas of the permitted unit can be used, containers of waste from the affected area(s) will be cleaned, overpacked, placed in spill pans, or transferred to new containers and moved to the unaffected areas. The contaminated area will be decontaminated. If the release results in contamination to a permeable surface, such as soil, asphalt, or other surface, the material will be removed and placed in DOT-approved shipping containers. Contaminated surface materials, as well as materials used in the cleanup (e.g., rags and absorbent material), will be containerized and placed into storage, pending transfer to an on- or off-Site treatment or disposal facility, in accordance with applicable regulations. Clean soil or new asphalt will be placed at the spill location.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
	If the spill was contained within the secondary containment area, other containers within that area will be decontaminated with water and/or a non-hazardous detergent or another appropriate cleaning solution. Contaminated wash water or cleaning solution will be transferred to an appropriate container, labeled, and placed in storage, pending transfer to an on- or off-Site treatment or disposal facility, in accordance with applicable regulations.
G-4g Incompatible Waste **40 CFR 264.56(h)(1)**	**G-4g Incompatible Waste**
40 CFR 264.56(h) The emergency coordinator must ensure that, in the affected area(s) of the facility:	In the event of a hazardous material or hazardous waste release, the EAM will ensure that no wastes will be received, treated, or stored in the affected areas until cleanup operations have been completed. This will ensure that incompatible waste will not be present in the vicinity of the release.
(1) No waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed; and	If waste is generated as the result of a spill or release of hazardous materials or hazardous waste, the waste generated as a result of abatement and cleanup will be evaluated to determine its compatibility with other wastes being managed in temporary storage areas. The evaluation will identify the material or waste that was spilled or released and determine its characteristics (e.g., ignitable, reactive, corrosive, and toxic). The waste generated by the abatement and cleanup activities will be stored in that part of the temporary storage area of the permitted units that has been established to manage wastes with which it is compatible. Administrative controls, such as installing barriers and/or a cordon around the temporary storage area(s), will be implemented to ensure segregation of wastes. The EAM will not allow hazardous or mixed waste operations to resume in a building or area in which incompatible materials have been released before ensuring that necessary post-emergency cleanup operations to remove potentially incompatible materials have been completed.
G-4h Post-Emergency Equipment Maintenance **40 CFR 264.56(h)(2)**	**G-4h Post-emergency Equipment Maintenance**
40 CFR 264.56(h) The emergency coordinator must ensure that, in the affected area(s) of the facility:	The EAM will ensure that emergency equipment is cleaned and ready for its intended use before operations are resumed. Any equipment that cannot be decontaminated may be discarded as waste (i.e., hazardous, mixed, solid, as appropriate). Equipment or supplies that cannot be reused following an emergency will be replaced. After the equipment has been cleaned, repaired, or replaced, a post-emergency facility and equipment inspection will be performed, and the results will be recorded.
(2) All emergency equipment listed in the CP is cleaned and fit for its intended use before operations are resumed.	Cleaning and decontaminating equipment may be accomplished using non-hazardous materials whenever possible, by physically removing gross or solid residue, rinsing with water or another non-hazardous liquid, and/or washing with detergent and water. Decontamination and cleaning will be conducted in a confined area, such as a wash pad or building equipped with a floor drain and sump isolated from the environment. Care will be taken to prevent wind dispersion of particles and spray. Liquid or particulate resulting from cleaning and decontamination of equipment will be placed in clean, compatible containers. Waste resulting from decontamination operations will be analyzed for hazardous waste constituents and/or hazardous waste characteristics to determine proper management.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
	When RWMC facility personnel has completed any post-emergency cleanup of waste and hazardous residues from areas where waste management operations are ready to resume, and the EAM has ensured that all emergency equipment used in managing the emergency has been cleaned or replaced and is fit for service, the following notifications will be made, EPA Region 10 Administrator, the Director of the Department of Environmental Quality, and any relevant local authorities. This post-emergency notification complies with IDAPA 58.01.05.008 [40 CFR 264.56(i)].
G-4i Container Spills and Leakage 40 CFR 264.52, 264.171, and 264.175(b)(5)	**G-4i Container Spills and Leakage**
40 CFR 264.52 Content of contingency plan.	40 CFR 264.52(a) is addressed in Sections G-3 (Implementation), G-4d (Control Procedures), and G-4e (Prevention of Recurrence or Spread of Fires, Explosions, or Releases)
(a) Regulation text is located in Section G-3, Implementation.	
(b) If the owner or operator has already prepared a Spill Prevention, Control, and Countermeasures (SPCC) Plan in accordance with part 112 of this chapter, or part 1510 of chapter V, or some other emergency or CP, he need only amend that plan to incorporate hazardous waste management provisions that are sufficient to comply with the requirements of this part.	Hazardous waste management provisions are included in the contingency plan.
(c) The plan must describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services pursuant to 264.37.	40 CFR 264.52(c) is addressed in Sections G-1 (General Information) and G-6 (Coordination Agreements).
(d) Regulation text is located in Section G-2, Emergency Coordinators.	40 CFR 264.52(d) and 40 CFR 264.55 are addressed in Section G-2, Emergency Coordinator.
(e) The plan must include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.	40 CFR 264.52(e) is addressed in Section G-5, Emergency Equipment.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
(f) The plan must include an evacuation plan for facility personnel where there is a possibility that an evacuation could be necessary. This plan must describe signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires). 40 CFR 264.51 *[The text of 40 CFR 264.51 is located in Section G-1, General Information.]*	40 CFR 264.52(f) is addressed in Section G-7, Evacuation Plan.
40 CFR 264.171 Condition of containers. If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak, the owner or operator must transfer the hazardous waste from this container to a container that is in good condition or manage the waste in some other way that complies with the requirements of this part.	Any/all containers, used for storage or treatment, found through inspection or use, not to be in good condition, will either be overpacked or the waste will be removed and the "empty container" disposed of accordingly. 40 CFR 264.171 is further addressed in Section D-1, Process Information – Containers.
40 CFR 175(b) A containment system must be designed and operated as follows: (5) Spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area in as timely a manner as is necessary to prevent overflow of the collection system.	When a spill or leak from a container is encountered, the shift manager/EAM will be notified and trained RWMC facility personnel and/or the INL Fire Department will don the appropriate PPE, maintain a safe distance, assess the situation, determine the proper and safe response action, gather the necessary equipment from the spill control cabinet, and respond accordingly (e.g., absorb/neutralize, shovel/mop up into a compatible container and decontaminate the area). If the spill or leak is of a nature that is not readily addressed (e.g., an industrial hygienist is required to monitor gases or vapors) the RWMC EAM may get involved and a hazardous work permit may be required before cleanup can commence. The hazardous work permit will specify the necessary PPE and spill response equipment, the roles of the responders, and the cleanup/decontamination procedures to be employed. In all cases: the proper reports will be filed in accordance with Section G-8 (e.g., inspection log sheets); the incident will be documented in the unit's operating record; and the PPE/equipment used in the response will be decontaminated or disposed of and replaced.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
G-5 Emergency Equipment **40 CFR 264.52(e)** 40 CFR 264.52(e) The plan must include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.	**G-5 Emergency Equipment** A variety of equipment is available at the RWMC for emergency response, containment, and cleanup operations. This includes equipment for spill control, fire control, personnel protection, monitoring and medical attention, communications, and alarms. This equipment is immediately available to emergency response personnel. A listing of available emergency equipment is shown in Table G-1. In the event a spill cannot be mitigated with the supplies kept at the permitted units, additional response supplies are available throughout the RWMC, and throughout the INL. Safety and emergency equipment located at the WMF-698 includes: • Underground water supply with Hydrants throughout the SDA • Fire alarm system (manual pull station, horn/strobe devices) • Portable fire extinguishers • Safety showers and eye wash stations • Portable units are available when required • Site-wide evacuation alarm system • Communication devices (two-way radios) Safety and emergency equipment located at the WMF-1617 includes: • Underground water supply with Hydrants throughout the SDA • Dry Chemical Fire Suppression System (Drum Packaging Stations and on mobile equipment) • Smoke/heat detection system (Airlocks) • Video Fire/smoke detection system (Retrieval Area) • Fire Alarm System (manual pull station, horn/strobe devices) • Safety showers and eye wash stations • Portable fire extinguishers • Portable units are available when required • Site-wide evacuation alarm system • Communication devices (two-way radios)

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
	The following is an example list of the safety equipment available for spill control for the permitted units: • Spill control pillows or absorbent socks • Hazardous material pigs • Hazardous material bags • Radioactive waste bags • Plastic buckets • Safety rope • Chemical spill warning/danger signs • Radiation rope/ribbon and radiological tags/signs • pH indicator • Shovel • Smear paper and envelopes • Grease/standard pencils and Paper • Absorbent • Acid/caustic neutralizers • Solvent cleanup material • Safety showers/Eye wash stations Safety and emergency equipment provide adequate capabilities for trained personnel to respond to and control leaks, spills, and emergency situations until assistance arrives. The INL Fire Department has other emergency equipment including, but not limited to, self-contained breathing apparatus (SCBAs), stretchers, and first-aid kits.
G-6 Coordination Agreements **40 CFR 264.52(c) and 264.37** 40 CFR 264.52(c) The plan must describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services pursuant to 264.37. 40 CFR 264.37Arrangements with local authorities. (a) The owner or operator must attempt to make the following arrangements, as appropriate for the type of waste handled at his facility and the potential need for the services of these organizations: (1) Arrangements to familiarize police, fire departments, and emergency response teams with the layout of the facility, properties of hazardous waste handled at the facility and associated hazards, places where facility personnel would normally be working, entrances to and roads inside the facility, and possible evacuation routes. (2) Where more than one police and fire	**G-6 Coordination Agreements** The RWMC EAM will ensure initial responders are dispatched to an emergency event originating at the RWMC. However, the level of response depends on the nature and extent of the incident. If warranted, additional INL resources are obtained, such as on-Site security, medical, and fire assistance, which are available on a 24-hour basis. Section G-1, General Information [40 CFR 264.53 (b)], contains the list of off-Site state, local and tribal agencies that are familiar with the contingency plan and may be called upon through agreements with the DOE-ID.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
department might respond to an emergency, agreements designating primary emergency authority to a specific police and a specific fire department, and agreements with any others to provide support to the primary emergency authority; (3) Agreements with State emergency response teams, emergency response contractors, and equipment suppliers; and (4) Arrangements to familiarize local hospitals with the properties of hazardous waste handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or releases at the facility. (b) Where State or local authorities decline to enter into such arrangements, the owner or operator must document the refusal in the operating record.	
G-7 Evacuation Plan **40 CFR 264.52(f)** 40 CFR 264.52(f) The plan must include an evacuation plan for facility personnel where there is a possibility that an evacuation could be necessary. This plan must describe signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires).	**G-7 Evacuation Plan** The normal actions to protect non-emergency personnel are to minimize their exposure to radiation, airborne radioactivity, hazardous chemicals, and airborne hazardous chemicals, by seeking shelter, avoiding the accident area, or evacuating selected buildings or areas. In the event of an emergency, which results in high radiation, hazardous chemical levels, or a continuing release to the environment, it may become necessary to evacuate the entire RWMC area. Building and Emergency Plan Maps depicting evacuation routes are located throughout the RWMC buildings. Upon exiting a building, personnel proceed to a designated staging area not affected by the emergency. The RWMC evacuation system alerts personnel in case of an evacuation. This system is on backup power; should power fail, it will automatically switch to a battery. Evacuation sirens are strategically located throughout the RWMC to provide coverage for all occupied areas. If the evacuation alarm is out of service or fails to operate, the evacuation will be communicated over the voice paging system, by word of mouth, or by security personnel using sirens or the voice amplifiers in their vehicles. Designated personnel, known as area wardens, are assigned responsibility for ensuring that personnel are evacuated from the area warden's assigned area or building or accounted for during evacuations. The following procedure will allow for a safe, coordinated evacuation: (1) When an evacuation is announced, stop work.

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
	(2) If possible and directed by the EAM, shut down predesignated operations that could contribute to further hazards, unless an "immediate" building evacuation is announced. (3) Follow the voice-paging instruction or proceed to the closest building exit, unless blocked by hazards. (4) Do not remain in the affected area, and assist injured personnel in leaving the area, if possible. (5) Exit the facility through the security access points to the designated assembly area. (6) Report to designated assembly area. (7) Be continually cognizant of wind direction (stay upwind) and emergency equipment. (8) Do not reenter the fenced area of the RWMC, until the EAM authorizes reentry.
This space was intentionally left blank.	During an evacuation, all personnel will remain in the designated assembly area, until given further instructions. The primary evacuation routes for the permitted units are depicted in Exhibits located at the end of this section. Alternative evacuation routes are through the nearest unobstructed emergency exit. **Evacuation Alarm** signal is an alternating tone-generated siren. **Fire Alarm** is announced over the RWMC voice paging system. **Take-Cover Alarm** is a steady tone-generated siren. This signal provides an emergency option to total RWMC evacuation.
G-8 Required Reports **40 CFR 264.56(j) and 40 CFR 264.56(i)** 40 CFR 264.56(j) The owner or operator must note in the operating record the time, date, and details of any incident that requires implementing the CP. Within 15 days after the incident, he must submit a written report on the incident to the Regional Administrator. The report must include:	**G-8 Required Reports** Any fire, explosion, or unplanned release of hazardous or mixed waste or hazardous constituent requiring activation of the contingency plan will be reported by the Permittee in writing within 15 days to the Director of the Department of Environmental Quality. Such reports will include, as a minimum, the following:
(1) Name, address, and telephone number of the owner or operator;	Name, address, and telephone number of the facility owner/operator
(2) Name, address, and telephone number of the facility;	Name, address, and telephone number of the facility
(3) Date, time, and type of incident (e.g., fire, explosion);	Date, time, and type of incident (e.g., fire, explosion, release)

AT KEARNEY FORMAT SECTION REGULATORY REFERENCE/CITATION	COMPLIANCE METHODOLOGY
(4) Name and quantity of material(s) involved;	Name and quantity of the material(s) involved
(5) The extent of injuries, if any;	Extent of any injuries to personnel at the facility
(6) An assessment of actual or potential hazards to human health or the environment, where this is applicable; and	An assessment of any actual or potential hazards to human health or the environment, as applicable
(7) Estimated quantity and disposition of recovered material that resulted from the incident.	Estimated quantity and disposition of material recovered from the incident (includes fire fighting materials, such as water, foam, adsorbents/absorbents, etc.).
40 CFR 264.56(i) The owner or operator must notify the Regional Administrator, and appropriate State and local authorities, that the facility is in compliance with paragraph (h) of this section before operations are resumed in the affected area(s) of the facility.	In accordance with IDAPA 58.01.05.008 [40 CFR 264.56(i)], the Permittee will notify the Director of the Department of Environmental Quality that: • The permitted units are in compliance with requirements for the cleanup of areas affected by the emergency and that the emergency equipment used in the emergency response has been cleaned or replaced and is fit for the intended use, before the resumption of waste management activities. • The permitted units have experienced a fire, explosion, spill, or release of hazardous waste or hazardous waste constituents or an emergency resulting in a release of a hazardous substance included in 40 CFR 302.4 that could threaten human health or the environment outside the RWMC. The contingency plan will be activated, and the EAM will ensure that local authorities are notified in writing.

Table G-1. Emergency response equipment at available at WMF-698 and WMF-1617.

Emergency Equipment	Location	Capabilities
Fire Control		
Underground water supply with hydrants	Throughout the SDA	Fire control / suppression
Dry chemical fire suppression system	Only found at WMF-1617 Drum Packaging Stations and on WMF-1617 mobile equipment	Fire control / suppression
Portable fire extinguisher/media (ABC, CO_2, Met-L-X, as appropriate)	See Exhibits G-1 and G-2	Use during incipient stage of fire (10-60 second discharge time)
Emergency Communication/Alarm System		
Manual fire alarm pull stations	Located throughout	Summon INL Fire Department
Communication Devices (two-way radios)	Located throughout	On-Site / Off-Site communications and emergency communications
Site-wide evacuation alarm	Alarm may be sounded throughout RWMC	Provides immediate notice of evacuation
Fire Alarm System	Located throughout	Fire alarm/summon fire department
Video fire/smoke detection system	WMF-1617 Retrieval Area	Fire/smoke detection
Smoke/heat detection system	WMF-1617 Airlocks	Fire detection
Spill Control, Containment, Cleanup		
Plastic buckets	See Exhibits G-1 and G-2	Clean up small spills
Spill control pillows or absorbent socks	See Exhibits G-1 and G-2	Contain / absorb small spills
Hazardous material pigs	See Exhibits G-1 and G-2	Contain / absorb small spills
Hazardous material bags	See Exhibits G-1 and G-2	Clean up small spills
Absorbent	See Exhibits G-1 and G-2	Contain / absorb small spills
Radioactive waste bags	See Exhibits G-1 and G-2	Contain radioactive waste
Radiation rope/ribbon/and radiological tags/signs	See Exhibits G-1 and G-2	Isolate affected area
Smear paper and envelopes	See Exhibits G-1 and G-2	Characterize spilled material
Safety rope and safety signs	See Exhibits G-1 and G-2	Isolate affected area
Acid / Chemical spill warning (danger) signs	See Exhibits G-1 and G-2	Warn others
pH indicator	See Exhibits G-1 and G-2	Characterize spilled material
Shovel	See Exhibits G-1 and G-2	Clean up small spills
Solvent cleanup materials	See Exhibits G-1 and G-2	Clean up small solvent spills
Acid/caustic spill supplies	See Exhibits G-1 and G-2	Clean up small acid/caustic spills
Safety showers	See Exhibits G-1 and G-2	Remove contamination
Eye wash stations	See Exhibits G-1 and G-2	Flush eyes for chemical and particulate contamination

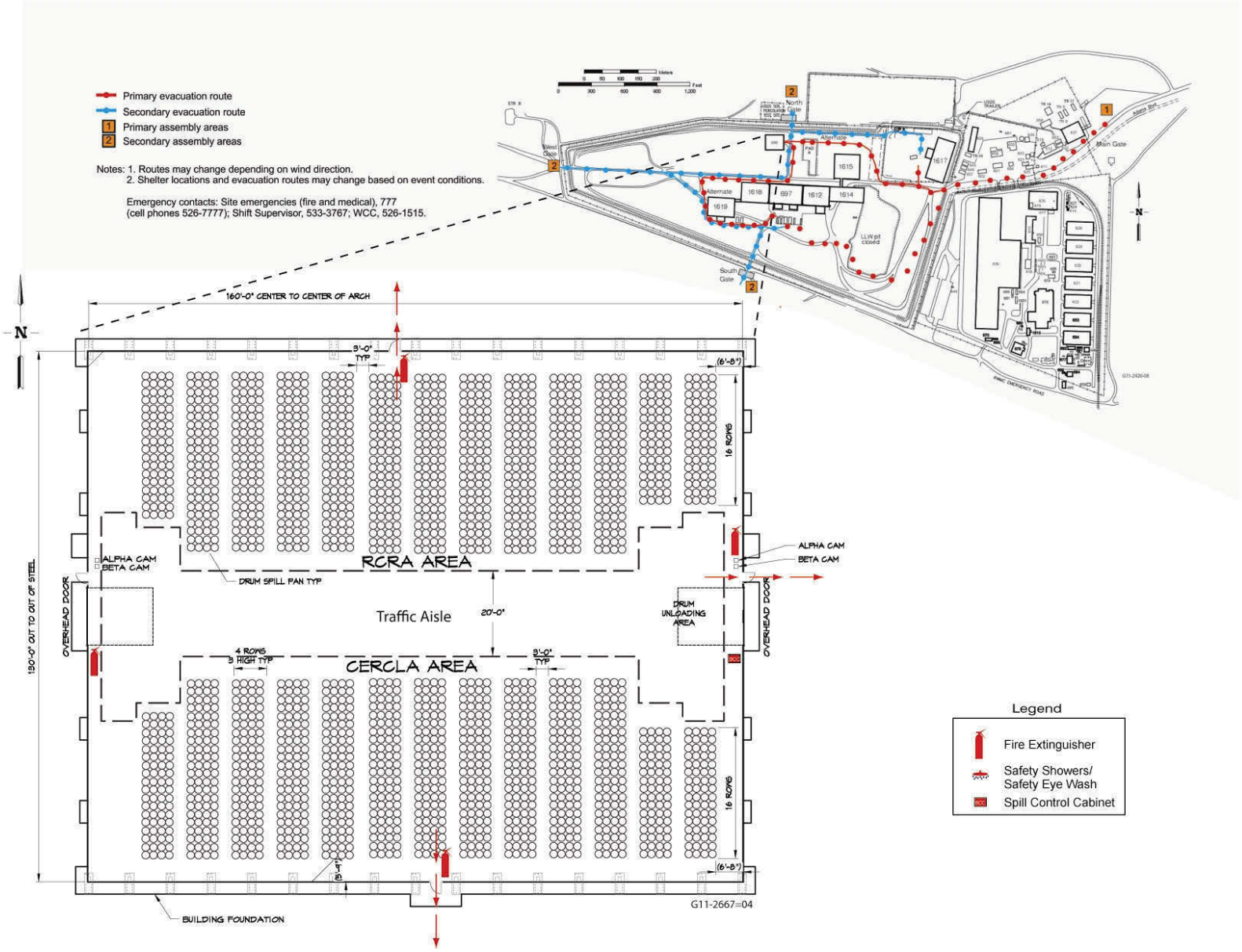

Exhibit G-1. WMF-698 Evacuation Routes and Emergency Equipment.

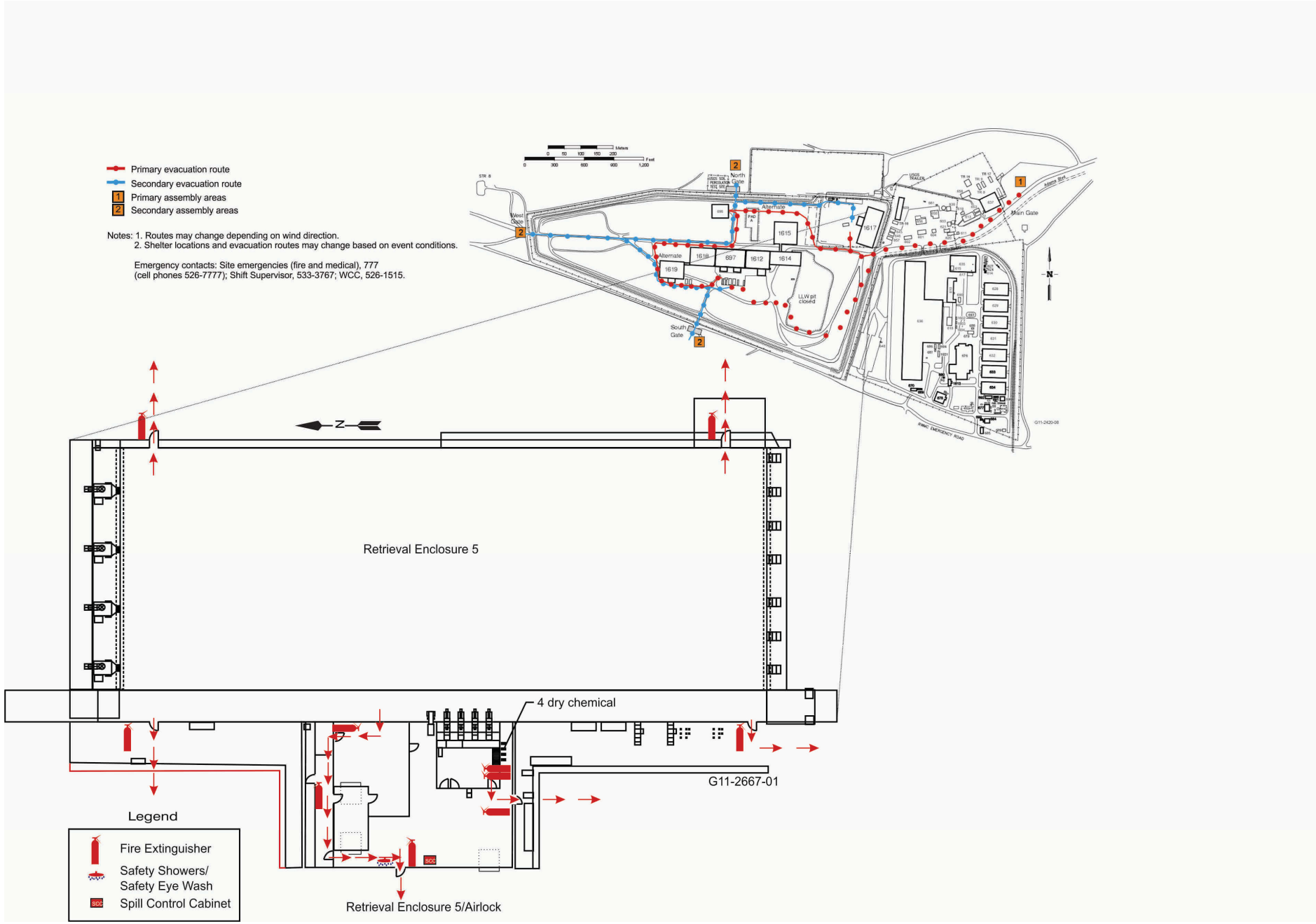

Exhibit G-2. WMF-1617 Evacuation Routes and Emergency Equipment.

HWMA/RCRA PART B PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

BOOK 3

Volume 18 –Radioactive Waste Management Complex

ATTACHMENT 8

SUBSURFACE DISPOSAL AREA (SDA)

WMF-698

WMF-1617

Section I

CLOSURE AND POST CLOSURE REQUIREMENTS

Revision Date: October 18, 2012

CONTENTS

I. CLOSURE AND POST-CLOSURE REQUIREMENTS....1

I-1. Closure and Post-Closure Requirements [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 270.14(b)(13), 264.112(a)(1) and (2)] 1

I-1a. Closure Performance Standards (IDAPA 58.01.05.008; 40 CFR 264.111)....2

I-1b. Partial Closure Activities [IDAPA 58.01.05.008; 40 CFR 264.112(a)(1)]....4

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

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) 4

I-1d(1) Closure of Containers (IDAPA 58.01.05.008; 40 CFR 264.178 4

I-1d(8) Closure of Miscellaneous Units [IDAPA 58.01.05.012, 40 CFR 270.23(a)(2)]....5

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

I-1f. Schedule for Closure [IDAPA 58.01.05.008; 40 CFR 264.112(b)(6)] 5

I-1g. Extension for Closure Time [IDAPA 58.01.05.008; 40 CFR 264.113(a) and 264.113(b)] 5

I-1h. Certification of Closure [IDAPA 58.01.05.012 and 58.01.05.008; 40 CFR 270.11(d) and 264.115] 6

I-2. Postclosure Plan [IDAPA 58.01.05.012; 40 CFR 270.14(b)(13)] 6

I-3. Postclosure Notices [IDAPA 58.01.05.012; 40 CFR 270.14(b)(14)] 6

I-9. State Mechanisms 6

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] 6

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

I. CLOSURE AND POST-CLOSURE REQUIREMENTS

This closure plan specifies performance standards and procedures for the waste management units addressed in this permit: miscellaneous treatment processes in WMF-1617; container storage in WMF-698, WMF-1617; and the three nondestructive assay (NDA) areas. This plan addresses all units, although they may not be closed at the same time. The activities and closure performance standards described in this plan apply only to Resource Conservation and Recovery Act (RCRA)-regulated wastes. Prior to initiation of closure, all containers and gross, visible RCRA waste within the treatment/storage trays and Drum Packaging Stations (DPS), and on equipment used in the repackaging/treatment processes will be removed from the units and transferred to a RCRA treatment, storage, and/or disposal (TSD) unit.

Closure of the subject units may result in process equipment and building components being reused for any number of activities other than RCRA hazardous waste management processes. Conversely, certain process equipment or building components may be declared waste and managed as such. The closure performance standards for the storage and treatment will be the removal of gross, visible RCRA waste from the storage and treatment areas and equipment, followed by transition of the areas and equipment back to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program so final Deactivation and Decommissioning (D&D) can be completed as a Non-Time Critical Removal Action (NTCRA).

I-1. Closure and Post-Closure Requirements [IDAPA 58.01.05.008 and 58.01.05.012; 40 CFR 270.14(b)(13), 264.112(a)(1) and (2)]

Prior to processing HWMA/RCRA waste, WMF-1617 was used to remediate CERCLA waste from Pit 9 under the OU 7-13/14 Record of Decision. Targeted CERCLA waste was excavated with standard excavation equipment and transported to the drum packaging stations for repackaging in new drums. All visible targeted waste was removed from the retrieval area following CERCLA remediation activities. The retrieval area consists of native soils that have been graded. Radiological surveys indicate the area is contaminated with non-uniform levels of transuranic isotopes following the CERCLA remediation activities.

Prior to initiation of processing of HWMA/RCRA waste in WMF-1617, visible soil and waste residues were cleaned out of the drum packaging stations, waste trays, and excavation equipment surfaces used to process CERCLA waste (e.g., excavator bucket). The removal was accomplished by sweeping, wiping with rags, scraping etc., until all visible waste and soil was removed (e.g., clean debris surface).

Video documentation of the initial conditions in the WMF-1617 was recorded (and provided to DEQ) to verify absence of visible waste and stained soils.

During HWMA/RCRA waste processing, any spilled waste will be cleaned up at the time the spill occurs. Procedural steps will mandate removal of all spilled material and any surrounding stained soils. Soils approximately 4" beyond the extent of visible soil staining will be removed in the event of a liquid spill to ensure that all spilled material is removed. Documentation of spill clean up will be included in the operations record, and addressed in the closure certification. CERCLA operational experience supports expectation that spills will be infrequent.

This closure plan describes the procedures to be used to remove visible waste residues from process equipment and building components and return of the equipment and structures to the CERCLA program for the decontamination and decommissioning of the buildings in accordance with the CERCLA NTCRA process. This closure plan does not include contingent plans for closure as a landfill and post-closure maintenance as a disposal unit.

WMF-698 and WMF-1617 Process Information

Section D "Process Information" of this permit presents specific design and process information for the RWMC SDA units.

Significant to closure activities, all containment areas (secondary containment pans and lined waste trays) and equipment surfaces of WMF-698 and WMF-1617 associated with storage and treatment activities are designed such that foreseeable decontamination efforts will be facilitated. Additionally, practices will be followed such that treatment or components not functionally required during a given treatment campaign will be isolated from the potentially contaminated work area.

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

The closure process is designed to remove and manage waste, eliminate the need for postclosure activities, and minimize generation of waste.

1. The closure performance standards for the WMF-698 and WMF-1617 units for RCRA/Hazardous Waste Management Act (HWMA) closure activities are considered precursor efforts to the ultimate facility deactivation and decommissioning (D&D). Technical approaches to this ultimate facility D&D will have practical bearing on the appropriate approach to RCRA/HWMA

closure. This integration of RCRA/HWMA closure activities with subsequent D&D activities is reflected below, as it relates to contaminated process equipment and building components that would remain in place and undergo subsequent facility D&D. All collected dirt and other residuals generated from this closure activity will be managed as hazardous/mixed waste.

2. The performance standard for reusable process equipment and building components will be a degree of decontamination consistent with the intended "postclosure" use of the process equipment or building components as determined by Idaho National Laboratory (INL)-accepted industrial hygiene and health physics protocols and guidelines. The operating record will be reviewed to determine if any waste material contacted the drum storage secondary containment pans or the waste tray secondary containment pans. This operational record review will be supplemented by visual observation, where physical access, radiological conditions, and industrial hygiene concerns permit.

3. The performance standard for contaminated process equipment and building components that would remain in place and undergo subsequent facility D&D, will be removal of all gross visible RCRA waste material. The level of physical decontamination will be that required to render the equipment or structural surfaces "clean," analogous to that specified and identified under IDAPA 58.01.05.011 (40 CFR 268.45.

4. The performance standard for contaminated process equipment and components to be managed as hazardous/mixed debris will be the alternative treatment standards for hazardous waste debris in IDAPA 58.01.05.011 (40 CFR 268.45), <u>or</u> the equipment/components will be managed as hazardous/mixed waste, per IDAPA 58.01.05.006 through .012 (40 CFR 262 through 270). Contaminated process equipment and components will be managed as hazardous/mixed waste debris. This will entail decontamination of the waste until the standard for attaining a "clean debris surface" is achieved, as verified by visual inspection of the contaminated surface. Clean debris surface means that the surface, when viewed without magnification, shall be free of visible contaminated soil and hazardous waste except that residual staining from soil and waste, consisting of light shadows, slight streaks, or minor discoloration. Soil and waste in cracks, crevices, and pits may be present, provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of surface area. All collected dirt and debris will be containerized and managed as hazardous/mixed waste.

5. Video documentation of the final conditions in the WMF-1617 will be recorded and compared to the video documentation of the initial conditions in the WMF-1617 to verify that the condition following HWMA/RCRA waste processing is consistent with the physical state of the facility as turned over from the previous CERCLA remediation activities. The video documentation will be provided to the DEQ with the closure certification.

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

Partial closure activities are not expected to be performed. The permitting of these units is specific to a waste stream and preparation of that waste for disposition at WIPP. Once the waste has been repackaged and removed from the area, the units will be RCRA closed and transitioned to the CERCLA program for D&D.

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

Attachment 1 includes the Part A hazardous waste permit application for WMF-698 and WMF-1617 units. The Part A permit application indicates the maximum potential waste inventory for each unit. In addition, the operating record for each unit will identify the occurrence of waste spills, if any, over the operating life, 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)

I-1d(1) Closure of Containers (IDAPA 58.01.05.008; 40 CFR 264.178)

Prior to closure and decontamination activities, all hazardous/mixed waste managed in containers will be removed, transported to, and managed in an on-Site or off-Site TSD unit. The operating records for the storage areas (WMF-698, Rooms 103, 104, 105, and 106 in WMF-1617, and the three trailer storage areas) will be reviewed to determine if there have been any spills/releases of mixed waste in the secondary containment or the storage areas. The storage areas will also be visually inspected for any signs of release, e.g., waste-related staining. If there is no documentation or visible indication of spills/releases, clean closure of the storage areas will be complete. If there is documentation or visual evidence of spills/releases, the closure performance standards in Section I-1a will be used to facilitate clean closure of the container storage areas.

I-1d(8) Closure of Miscellaneous Units [IDAPA 58.01.05.012, 40 CFR 270.23(a)(2)]

Management of mixed wastes in miscellaneous units is described in Section D-8 of this permit and encompasses the miscellaneous treatment unit activities within the WMF-1617 (Retrieval Area, DPSs, and Drum Compactor). The treatment areas will be visually inspected for any signs of release, e.g., waste-related staining. All gross visible RCRA waste will be removed from equipment and treatment areas, transported to, and managed in an on-Site or off-Site TSD unit.

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

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

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

The Director of the DEQ will be notified in writing at least 45 days prior to the date that closure operations are planned to begin.

The projected schedule for closure of these units is generalized as follows:

Activity	**Day Completed**
Initiate closure activities	Day 0
Complete waste removal	Day 100
Complete removal of gross visible RCRA waste	Day 140
Complete all closure activities	Day 180
Submit closure certification to the State of Idaho	60 days after completion of closure

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

Closure of these units is scheduled for completion within the prescribed 180-day period. No variance is requested at this time.

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

A certification of closure for each unit will be provided in accordance with IDAPA 58.01.05.008 (40 CFR 264.115) by a registered professional engineer (PE), the operating contractor, and DOE-ID. The certification will state that a given unit has been clean closed in accordance with the approved closure plan. Final closure activities will be considered complete upon submittal of the certification of closure to the DEQ and written acceptance issued by the DEQ. These units will not be closed as a land disposal facility; therefore, a "Notice in Deed" and survey plat are not required.

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

Since all hazardous or mixed wastes will be removed prior to closure and any residual RCRA hazardous chemical contamination will be removed during closure, a postclosure plan is not required. However, if the closure performance standards above cannot be met, the RCRA corrective action provisions will be implemented as identified in Module VII of the Volume 18 permit (i.e., by addressing under the current FFA/CO).

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

Since all hazardous and mixed wastes will be removed prior to closure and any residual RCRA 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]

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

RCRA PART B PERMIT

FOR THE IDAHO NATIONAL LABORATORY

BOOK 3

Volume 18 – Radioactive Waste Management Complex

ATTACHMENT 9

SUBSURFACE DISPOSAL AREA
WMF-698
WMF-1617

Permit Revision Log

Revision Date: December 10, 2013

VOLUME 18 PERMIT MODIFICATION TRACKING LOG

SUBMITTED	APPROVED	PMR CLASS	SUMMARY OF CHANGES
May 5, 2009	May 19, 2009	1*	- Delete Permit Condition II.M. Compliance Schedule for CPP-659 Embedded Lines Upgrade Project as this compliance schedule has been completed and approved by the DEQ and is therefore no longer applicable. - Revise Section III.B.5. Sizing and Repackaging Treatment, of the permit, to allow for other treatment processes (sorting, segregating repackaging and sizing) in CPP-666 FDP Cell. - Revise Section III.B.6. Compaction Treatment, of the permit, to allow for other treatment processes (compaction) in CPP-666 FDP Cell. - Revise the Part A Permit to allow for other treatment processes (compaction, sorting, segregating, repackaging, and sizing) in CPP-666 FDP Cell. - Revise the Part A Permit to add EPA Hazardous Waste Numbers D029, F006, F007, and F009 for CPP-659 NWCF Storage, Other Miscellaneous Treatment Processes and Absorbent Addition and for CPP-666 FDP Cell Storage and other Miscellaneous Treatment Processes. - Revise Attachment 1, Section B – Facility Description, to allow for other treatment processes (compaction, sorting, segregating, repackaging, and sizing) in CPP-666 FDP Cell. - Revise Attachment 1, Section D – Process Description, to allow for other treatment processes (compaction, sorting, segregating, repackaging, and sizing) in CPP-666 FDP Cell. - Revise Attachment 1a, Section B – Facility Description, for the RMWSF so that cargo containers may be placed upon elevated support (e.g., timbers) to elevate them above the asphalt to ensure that all doors may be opened for weekly waste inspections or waste transport.

VOLUME 18 PERMIT MODIFICATION TRACKING LOG

SUBMITTED	APPROVED	PMR CLASS	SUMMARY OF CHANGES
May 5, 2009	May 19, 2009	1*	- Revise Attachment 1a, Section D – Process Description, for the RMWSF so that cargo containers may be placed upon elevated support (e.g., timbers) to elevate them above the asphalt to ensure that all doors may be opened for weekly waste inspections or waste transport. - Revise Attachment 2, Section C – Waste Analysis Plan, to allow for other treatment processes (compaction, sorting, segregating, repackaging, and sizing) in CPP-666 FDP Cell. - Revise Attachment 4, Section F – Inspection Schedule, to allow for other treatment processes (compaction, sorting, segregating, repackaging, and sizing) in CPP-666 FDP Cell. - Revise Attachment 7, Section G – Contingency Plan, to update the information for the Emergency Action Managers at the INTEC. - Revise Attachment 8, Section I – Closure and Post-Closure Requirements, to allow for other treatment processes (compaction, sorting, segregating, repackaging, and sizing) in CPP-666 FDP Cell. - Provide editorial changes by deleting redundant information in the Permit Section III.B.6.b. and throughout the permit and its attachments, as applicable/necessary (e.g., removing the word "reapplication"). - Provide editorial changes by revising the List of Attachments information found in the Permit so that Appendix information found in Attachment 1 will now be located in Book 2 to allow for easier use and revision of the document. - Provide editorial changes by revising information related HFEF-5 cans to clarify that HFEF-5 cans are acceptable at CPP-1617. Additionally, the dimensions of ISCs were revised to reflect that ISCs may be used to store HFEF-5 cans.

VOLUME 18 PERMIT MODIFICATION TRACKING LOG

SUBMITTED	APPROVED	PMR CLASS	SUMMARY OF CHANGES
May 5, 2009	May 19, 2009	1*	- Provide editorial changes by updating the Inspection Schedule for the CPP-666 FDP Cell Container Storage Area and for the FDP Cell Slab Tank Storage unit for consistency and to reflect revisions made and approved during the reapplication process that were inadvertently left in the Table found in Appendix F-1. - Provide updated examples of inspection forms found in Attachment 4 for the Permitted units, as applicable. - Add Attachment 10 – Permit Revision Log, to incorporate changes requested in this Class 1* PMR.
February 2010 And May 18, 2010	NOD – May 7, 2010 NOD Response & revised PMR – June 1, 2010	1*	- Allow for additional container storage (S01) in Building CPP-666 outside the FDP cell in the +28' level (in room 301 cell maintenance and loadout area), in the 0'0" level (rooms 114C, 115, and 180), and in the -13'0" level (rooms B-4 and B-5) - Allow for the container storage (S01) of liquid bearing waste at all container storage areas in building CPP-666 - Allow for absorbent addition treatment (T04) in the FDP cell of all liquid bearing wastes - Revise the Part A Permit Application to incorporate additional waste treatment methods and waste storage areas in Building CPP-666 - Describe the fire protection system in the FDP Cell for the RH TRU waste repackaging operations

VOLUME 18 PERMIT MODIFICATION TRACKING LOG

SUBMITTED	APPROVED	PMR CLASS	SUMMARY OF CHANGES
February 2010 and May 18, 2010 (Continued)	June 1, 2010	1*	- Clarify that container storage in the FDP Cell at levels 0'0" level is allowed in non-grated flooring areas - Provide clarification for use of timbers under cargo containers at CPP-1617 and provide corrective action requirements for any settled timbers - Other editorial changes – Permit Conditions II.H.5. implementing vs. activating, Permit Condition V.B. fix numbering, Attachment 2 provide correct IDAPA citation and other minor editorial changes as necessary
November 8, 2010	November 19, 2010	1*	- Allow for the addition of ignitable (D001) and reactive (D003) wastes to be stored (S01) in the container storage units in CPP-666 (FDP Cell, Rooms 301, 114C, 115, 180, B-4 and B-5) and in CPP-659 container storage areas, specifically rooms 308, 417, 418, 428, and CPP-1659 Contaminated Equipment Maintenance Area - Allow for the addition of ignitable (D001) and reactive (D003) wastes to be treated (T04) via repackaging in the CPP-659 Room 308 (Remote Decon Cell) and in the CPP-666 FDP Cell - Revise the Part A Permit Application to incorporate the ignitable (D001) and reactive (D003) EPA Hazardous Waste Numbers for the appropriate container storage/ treatment units (as discussed above) located in CPP-659/-1659 and CPP-666.

VOLUME 18 PERMIT MODIFICATION TRACKING LOG

SUBMITTED	APPROVED	PMR CLASS	SUMMARY OF CHANGES
November 8, 2010 (continued)	November 19, 2010	1*	- Other administrative, informational, and editorial changes, including: removal of the pyrophoric prohibition for waste storage areas found in Attachment 2; addition of appropriate emergency response equipment for those areas where D001/D003 waste will be stored or treated in CPP-659/-1659 and CPP-666; addition of inspection requirements for the additional emergency response equipment to the appropriate inspection checklist for those areas where D001/D003 waste will be stored or treated; the Inspection Schedule, was revised to reflect additional inspections for Met-L-X fire extinguishers/media that are being placed in areas where ignitable or reactive wastes may be stored or repackaged in CPP-659/-1659 and CPP-666; Personnel Training, Table H-1 was revised to reflect CWI's the new RCRA training qualification structure; Attachment 6 was revised to correctly reflect references to Exhibits found in Attachment 7; Tables G-1 and G-2 of Attachment 7 are being revised to include the use of Met-L-X fire extinguishers/media in CPP-659/-1659, CPP-666, and CPP-1617 as necessary when D001 or D003 waste is or may be present.
May 10, 2012	May 25, 2012	1*	- Administrative closure of Soak Tank, TK-NCD-136, container treatment unit (other treatment - T04 process code) - Revision of the Part A Permit Application to incorporate the use of EPA's newly revised forms and to remove the soak tank from the form as a designated/permitted T04 treatment unit - A weekly inspection item is being added, and clarifying language is being provided that addresses the spare equipment which remains in place and/or loose in the lower levels of the Fluorinel Dissolution Process (FDP) Cell to ensure the equipment will be properly disposed of or decontaminated, as determined necessary,

VOLUME 18 PERMIT MODIFICATION TRACKING LOG

SUBMITTED	APPROVED	PMR CLASS	SUMMARY OF CHANGES
May 10, 2012	May 25, 2012	1*	during closure activities and as addressed in the approved closure plan - Information is being provided regarding the processing of Lot 2 containers of remote-handled transuranic (RH-TRU) waste in the FDP cell using argon gas to avoid any potential of reaction of the contents of the containers when opened and to allow for immersion testing of the fuel/fuel-like pieces of waste to evaluate the waste for the characteristic of reactivity, as required by the Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria (WAC) - Other administrative, informational, and editorial changes, as necessary.
August 22, 2012 NOD Response and Revised PMR transmitted to DEQ on October 11, 2012	DEQ issued NOD on September 19, 2012 DEQ approval letter dated October 18, 2012	2	The information contained in this PMR for the Accelerated Retrieval Project (ARP) at the Radioactive Waste Management Complex (RWMC) was submitted as a stand alone Book 3 to the Volume 18 Permit to allow for less confusion regarding the units/facility location, descriptions, etc. The PMR addressed the following modifications: - Allow for the addition of container storage (S01) in WMF-698 - Allow for the addition of container storage (S01), and miscellaneous treatment (X99 and X02) in WMF-1617 - Allow for the addition of trailer storage - container storage (S01) units in three locations (near WMF-1617, ARP VII, and ARP VIII) to allow for storage of processed drums prior to being returned to the AMWTP - Revise the Part A Permit Application to incorporate the container storage/treatment units located at WMF-698 and WMF-1617 and the trailer container storage units and incorporate updated EPA forms. - Other administrative, informational, and editorial changes, changes as necessary to support the addition of these units to the Volume 18 Permit.

VOLUME 18 PERMIT MODIFICATION TRACKING LOG

SUBMITTED	APPROVED	PMR CLASS	SUMMARY OF CHANGES
March 26, 2013 NOD Response and Revised PMR transmitted to DEQ on July 11, 2013	DEQ issued NOD on May 23, 2013 DEQ approval letter dated August 7, 2013	Class 1*	The information in this PMR provides for the following: • to provide additional information regarding the processing of containers of sodium contaminated waste/debris in the FDP cell using deactivation (immersion/misting) treatment (T04); • to allow for the distillation treatment (T04) of sodium contaminated waste within CPP-666 Room SB-8; • to allow for macroencapsulation treatment (T04) of hazardous/mixed waste debris and radioactive lead solids waste types at the RMWSF; • to update the Part A Permit Application to include these treatments; • and to provide other administrative, informational, and editorial changes, changes as necessary.
November 27, 2013	December 10, 2013	1*	The information contained in this PMR provides for the following: • Revision to Book 1 – INTEC Part A Permit Application, to add hazardous waste codes for the CPP-659/CPP-1659 facility. Hazardous waste codes D027, D030, D033, D037, D042, D043, and F004 were added to the container storage and treatment units within CPP-659/CPP-1659 (Rooms 218, 306, 308, 418, 428, and CPP-1659) to allow for the processing of RH TRU waste so that it may be subsequently shipped off-site. (NOTE: These additional waste codes were not added to any of the waste pile storage unit areas located in the CPP-659/CPP-1659 facility.)

APPENDIX 1

DRAWINGS AND EXHIBITS FOR WMF-1617 AND WMF-698

APPENDIX I.

DRAWINGS AND EXHIBITS FOR WMF-1617 AND WMF-698

DRAWING NUMBER	REVISION NUMBER	DRAWING DESCRIPTION
761186	2	Phase V of the Accelerated Retrieval Project WMF-1617 Retrieval Enclosure 5 and Airlock 5 Site Grading Plan
761187	1	Phase V of the Accelerated Retrieval Project WMF-1617 Retrieval Enclosure 5 and Airlock 5 Grading Sections and Details
761193	1	Phase V of the Accelerated Retrieval Project WMF-1617 RE5/AL5 Building Elevations
761194	1	Phase V of the Accelerated Retrieval Project WMF-1617 AL5 Airlock 5 Interior Wall Plan
761195	1	Phase V of the Accelerated Retrieval Project WMF-1617 AL5 Airlock 5 Interior Evelvations
761196	1	Phase V of the Accelerated Retrieval Project WMF-1617 AL5 Airlock 5 Interior Evelvations
761207	1	Phase V of the Accelerated Retrieval Project WMF-1617 Airlock 5 & Retrieval Enclosure 5 Foundation and Legend
761210	1	Phase V of the Accelerated Retrieval Project WMF-1617 Airlock 5 Foundation Slab Pan, Ledend and Sections
762023	1	Phase V of the Accelerated Retrieval Project RE5/AL5 WMF-1617 Equipment Location Plan
762024	1	Phase V of the Accelerated Retrieval Project WMF-1617 AL5 Airlock 5 Equipment Location Plan
762067	2	Phase V of the Accelerated Retrieval Project RE5/AL5 WMF-1617 DPS Fire Protection System Dry Chemical Diagram
762114	3	Phase V of the Accelerated Retrieval Project RE5/AL5 WMF-1617 RE5 Lighting Plan
762115	2	Phase V of the Accelerated Retrieval Project RE5/AL5 WMF-1617 AL5 Lighting Plan

DRAWING NUMBER	REVISION NUMBER	DRAWING DESCRIPTION
762141	2	Phase V of the Accelerated Retrieval Project RE5/AL5 WMF-1617 Fire Alarm Plan
762142	2	Phase V of the Accelerated Retrieval Project RE5/AL5 WMF-1617 Airlock 5 Fire Alarm Plan
762153	2	Phase V of the Accelerated Retrieval Project WMF-1617 Retrieval Enclosure 5 Data/Data CCTV Floor Plan
762154	2	Phase V of the Accelerated Retrieval Project RE5/AL5 WMF-1617 Data/Data CCTV and Intercom Floor Plan
177425	13	RWMC SDA FIREWATER PIPING PLOT PLAN
631228	2	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE VENTILATION PLAN, SECTIONS AND DETAIL
631225	3	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE PLAN
631233	4	RWMC TARGETED WASTE REMOVAL & DISPOSITION PROJECT WMF-698 STORAGE ENCLOSURE NORMAL POWER AND LIGHTING PLAN

DRAWING NUMBER	REVISION NUMBER	DRAWING DESCRIPTION
631234	1	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE STORAGE ENCLOSURE GROUNDING PLAN
631237	1	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE FIRE ALARM PLAN
631238	1	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE FIRE ALARM SECTION AND DETAILS
631130	1	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE FOUNDATION PLAN
627752	1	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE STORAGE ENCLOSURE PLAN AND SECTIONS
627917	1	RWMC TARGETED WASTE REMOVAL AND DISPOSITION PROJECT STORAGE ENCLOSURE PAD PLAN, SECTIONS, AND DETAILS
Exhibit 1	N/A	RWMC WMF-1617 RE5/AL5 AIRLOCK 5 DRUM OUT ENCLOSURE VIEWS
Exhibit 2	N/A	RWMC WMF-1617 RE5/AL5 AIRLOCK 5 SERVICE BAY EQUIPMENT LAYOUT
Exhibit 3	N/A	RWMC WMF-1617 RE5/AL5 AIRLOCK 5 DRUM-OUT ACCESS PLATFORM AND COMPACTOR CONTAINMENT PAN DETAILS
Exhibit 4	N/A	RWMC WMF-1617 RE5/AL5 AIRLOCK 5 DRUM-OUT HOPPER AND DETAILS
Exhibit 5	N/A	DRUM STORAGE SECONDARY CONTAINMENT
Exhibit 6	N/A	TYPICAL WASTE TRAY
Exhibit 7	N/A	WASTE TRAY SECONDARY CONTAINMENT
Exhibit 8	N/A	WASTE TRAY SECONDARY CONTAINMENT GRATE

FMT-D1-REV 2012-02-14

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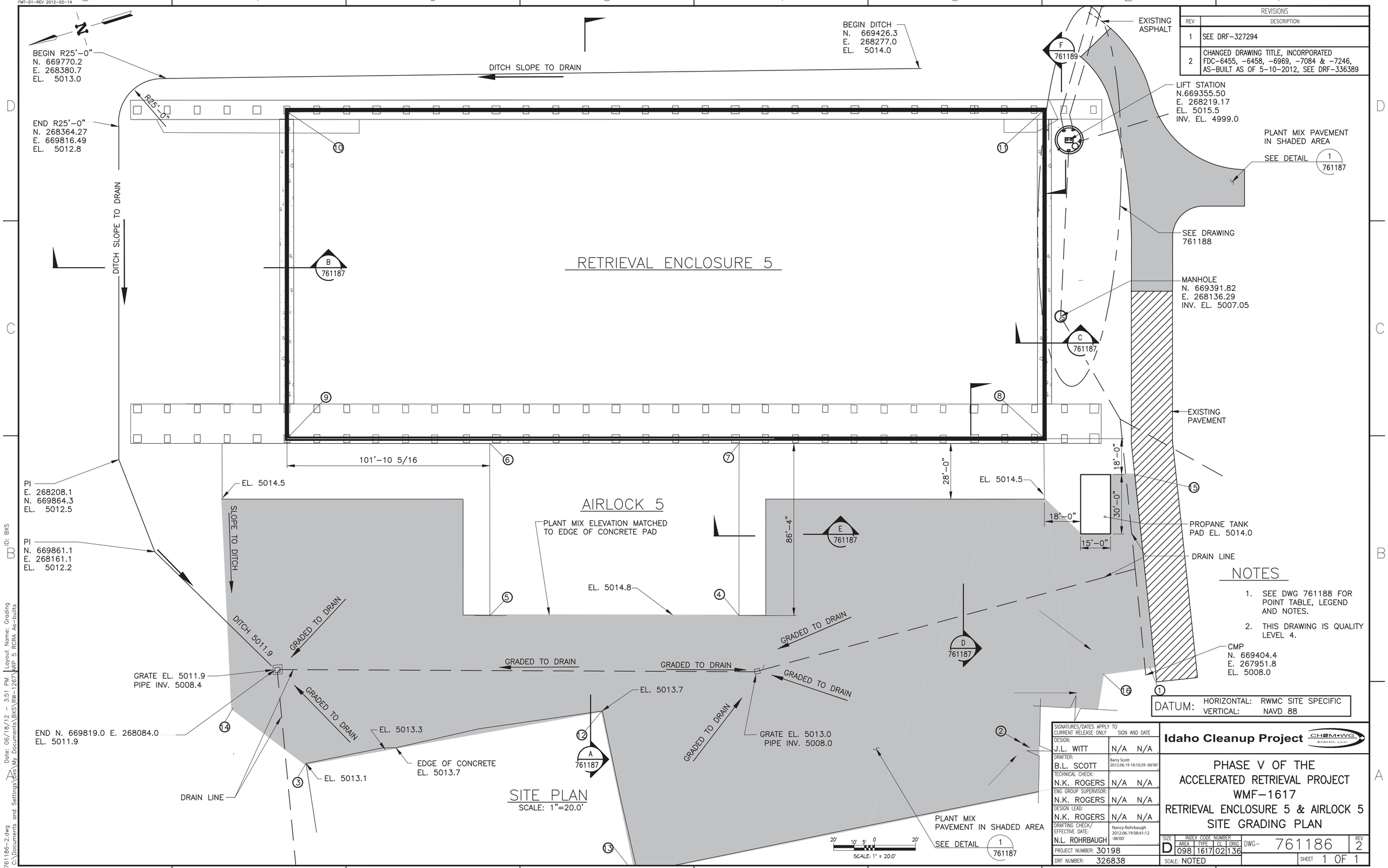

NOTES

1. SEE DWG 761188 FOR POINT TABLE, LEGEND AND NOTES.
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DRAFTING CHECK/ EFFECTIVE DATE: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 08:41:12 -06'00'
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DRF NUMBER: 326838	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
WMF-1617
RETRIEVAL ENCLOSURE 5 & AIRLOCK 5
SITE GRADING PLAN

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RW-1267

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FMT-D1-REV 2012-02-14

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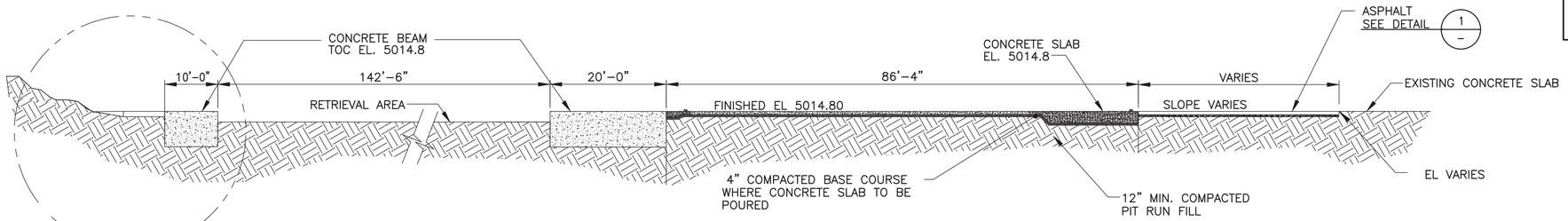

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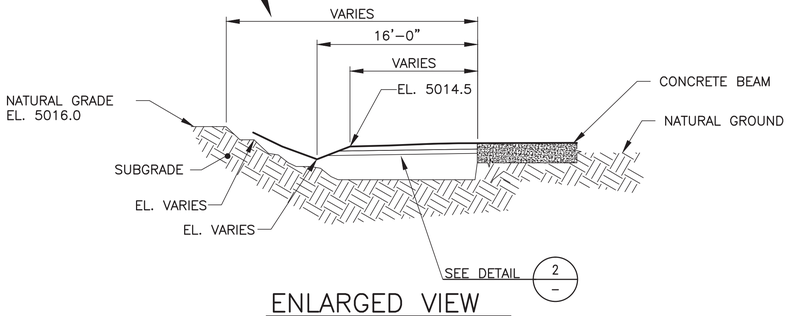

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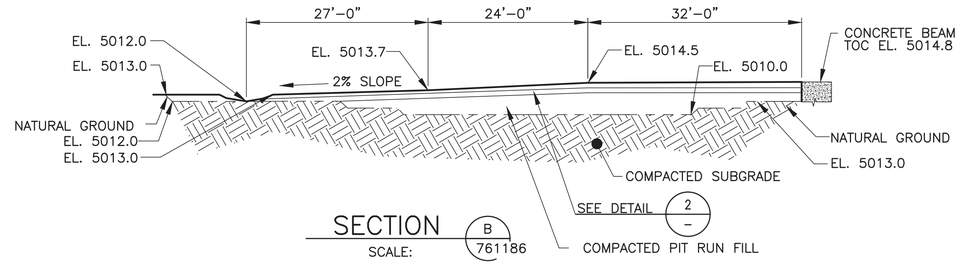

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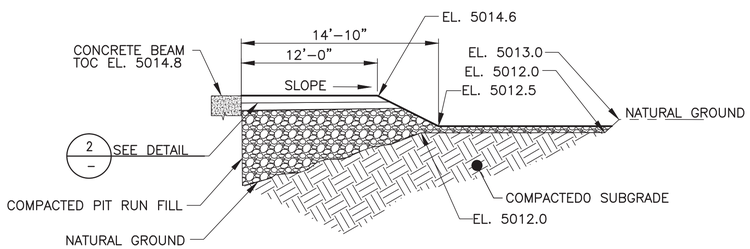

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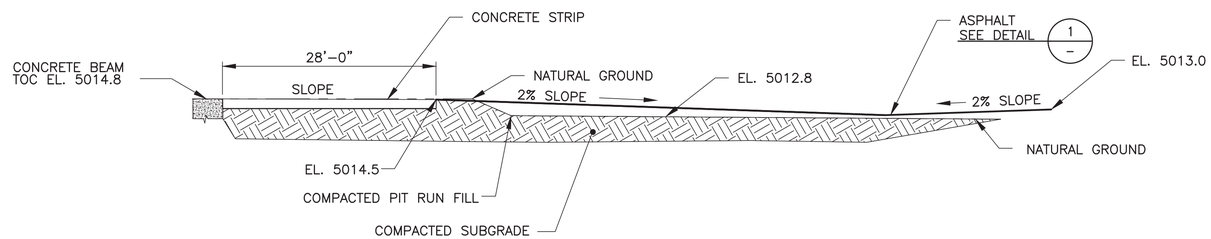

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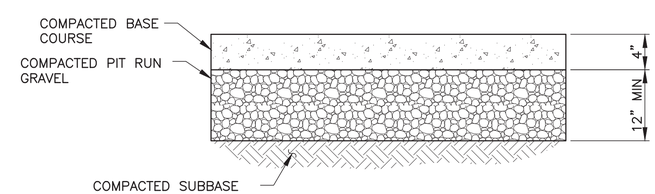

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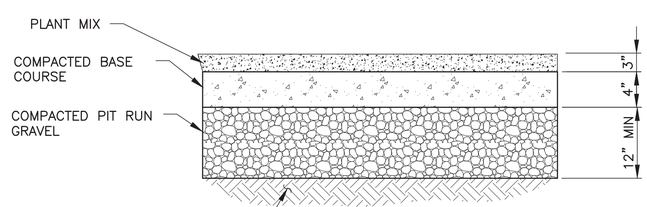

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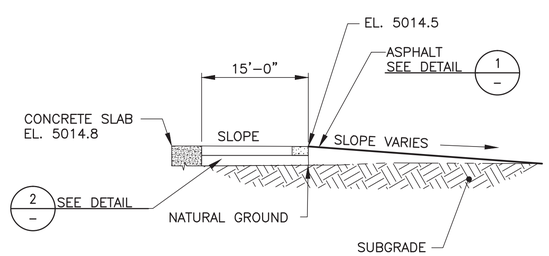

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NOTES

1. THIS DRAWING IS QUALITY LEVEL 4.

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DRAFTER: B.L. SCOTT	Barry Scott 2012.06.19 10:12:10 -06'00'
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ENG GROUP SUPERVISOR: N.K. ROGERS	N/A N/A
DESIGN LEAD: N.K. ROGERS	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 08:43:41 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 326838	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
WMF-1617
RETRIEVAL ENCLOSURE 5 & AIRLOCK 5
GRADING SECTIONS AND DETAILS

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RW-1267

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FMT-D1-REV 2012-02-14

NOTES

1. THIS DRAWING IS A QUALITY LEVEL 3.

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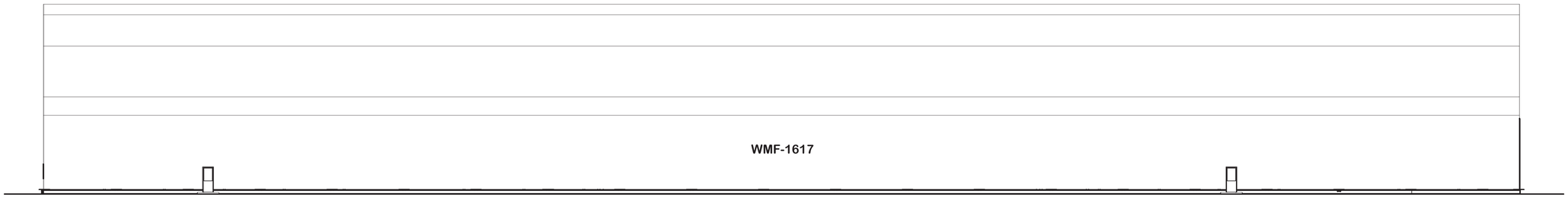
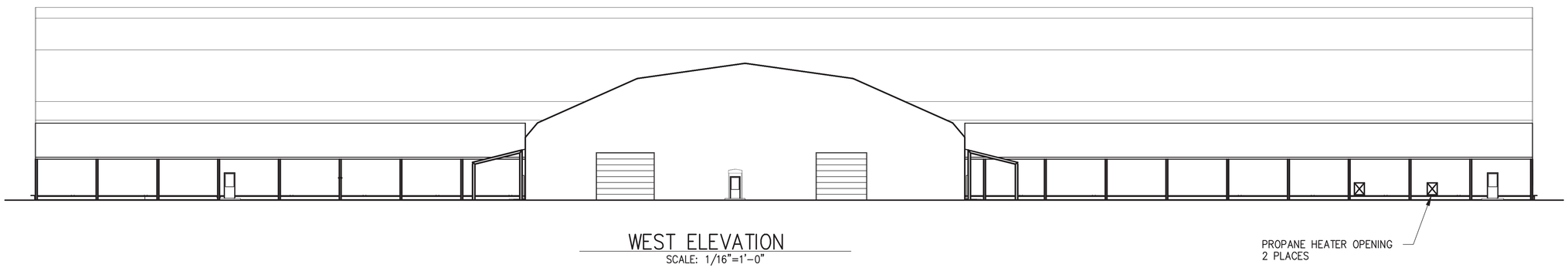
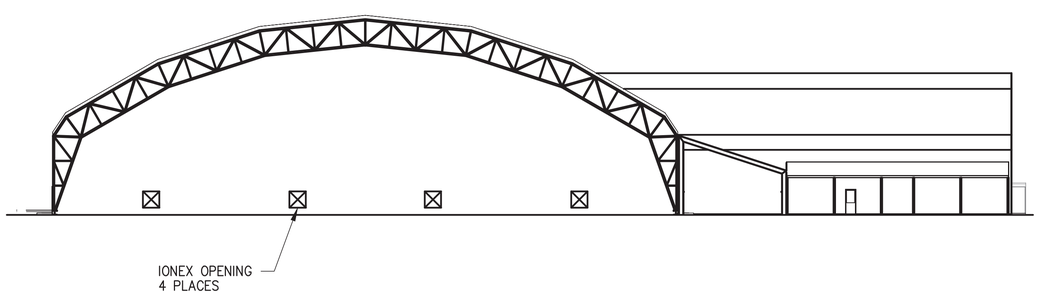


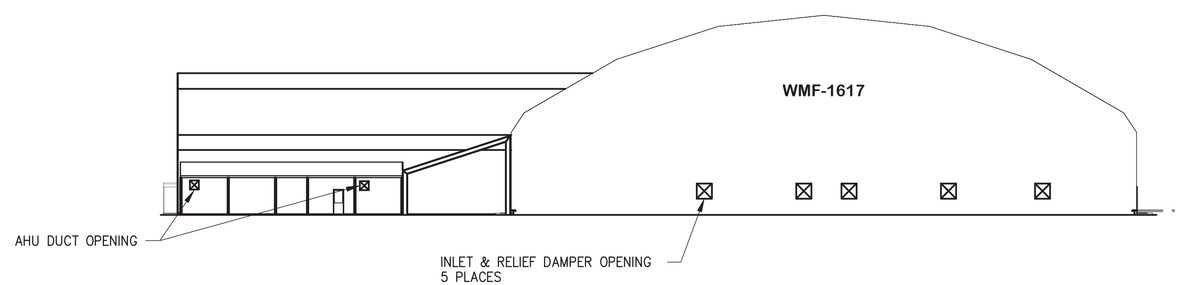
EAST ELEVATION
SCALE: 1/16"=1'-0"



WEST ELEVATION
SCALE: 1/16"=1'-0"



NORTH ELEVATION
SCALE: 1/16"=1'-0"



SOUTH ELEVATION
SCALE: 1/16"=1'-0"

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: J. WITT, P.E.	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:40:38 -06'00'
TECHNICAL CHECK: EGS	NA NA
ENG GROUP SUPERVISOR: N.K. ROGERS, P.E.	NA NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:30:57 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 326838	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETIEVAL PROJECT
WMF-1617 RE5/AL5

BUILDING ELEVATIONS

SIZE	INDEX CODE NUMBER AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	01	136	761193	1

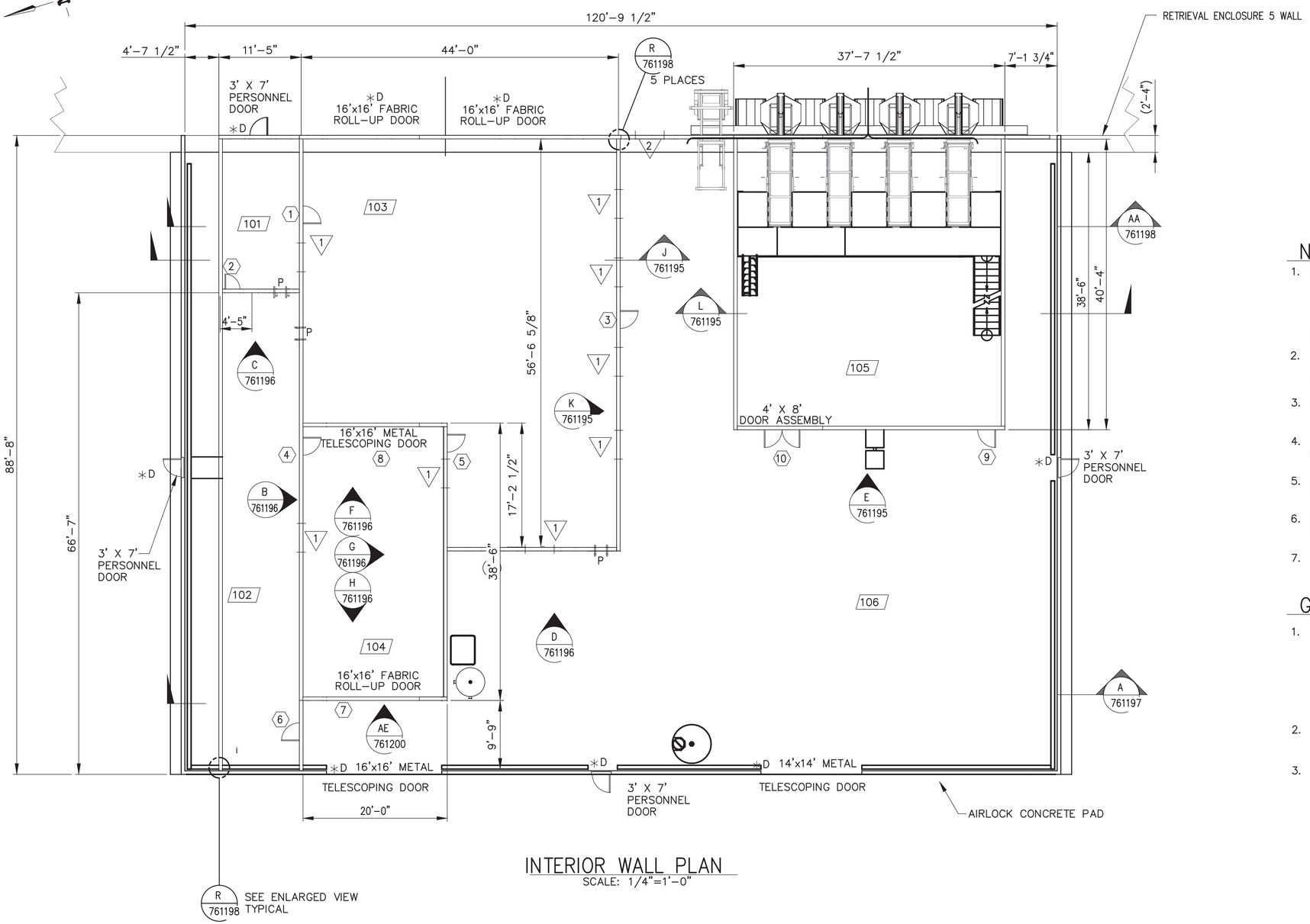
SCALE: NOTED SHEET 1 OF 1

File: 761193-1.dwg
Path: P:\RE5RCRA
Date: 06/19/12 - 10:06 AM | Layout Name: A-2 | ID: HLY

FMT-D1-REV 2012-02-14

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC 6342, 6595, 6622, 6709, 6722, 6806, 6818, 6856, 6879, 6930, 6942, 6970 & 7055 AS-BUILT AS OF 5/10/2012 SEE DRF-336389

RETRIEVAL ENCLOSURE 5



INTERIOR WALL PLAN

SCALE: 1/4"=1'-0"

NOTES

1. METAL STUDS AND TRACKS ARE 20-GAGE OR HEAVIER AT 12" O.C. FOR WALLS OVER 15'-0". SHORTER WALLS ARE SPACED AT 16" O.C. FASTENERS USED TO ASSEMBLE METAL STUD WALLS SHALL BE AT A MINIMUM, NUMBER 8 MODIFIED TRUSS HEAD SCREWS. METAL STUD BASE TRACK FOR THE WALL BETWEEN RE5 AND AL5 IS FASTENED TO THE RE5 BASE BEAM WITH HILTI X-EDNI MX BALLISTIC POINT NAILS.
2. TAPE CONTINUOUSLY ALL METAL WALL PANEL JOINTS AND SCREW HEADS BETWEEN THE RE AND THE AL SEE ROOM FINISH SCHEDULE, DRAWING 761199, FOR APPLICABLE METAL LINER PANEL.
3. SUPPORT LEGS W/BASE PLATES THAT LAND ON EXISTING EMBEDDED PLATES ARE WELDED WITH 1/4" FILLET WELD ALL AROUND BASE PLATE.
4. WELDED IN ACCORDANCE WITH AWS D1.1. VISUALLY INSPECTED WELDED PER REQUIREMENTS OF AWS D1.1. ACCEPTANCE CRITERIA PER TABLE 6.1.
5. LADDERS AND STAIRS ANCHORED WITH 1/2"ø ASTM A-307 MIN. ALL THREAD W/5" MIN. EMBEDMENT.
6. DPS'S AND CATWALK SUPPORTS ANCHORED WITH 5/8"ø ASTM A-307 MIN. ALL THREAD W/5" MIN. EMBEDMENT.
7. THIS DRAWING IS A QUALITY LEVEL 3.

GENERAL DESIGN NOTES

1. GENERAL BUILDING DESIGN:
   AIRLOCK 5 ENCLOSURE INCLUDES FRAMED WALLS:
   a. 88'-0"x120'-0"=10,580 SF (INTERIOR DIMENSIONS)
   b. CU FT=180,000
   RETRIEVAL ENCLOSURE STRUCTURE:
   a. 380'-0" x165'-0"= 62,700 SF
   b. CU FT=1,191,000
2. DESIGN CODES:
   a. GENERAL – INTERNATIONAL BUILDING CODE (IBC) 2006
   b. STEEL/CONCRETE – SEE STRUCTURAL DRAWINGS AND NOTES
3. OCCUPANCY:
   a. OCCUPANCY CLASSIFICATION:
      • FACTORY INDUSTRIAL GROUP F-1, MODERATE HAZARD, INDUSTRIAL
   b. BUILDING TYPE: II-B
   c. NFPA 101, LIFE SAFETY CODE (LATEST EDITION):
      • SPECIAL PURPOSE INDUSTRIAL, ORDINARY HAZARD
4. DESIGN LOADS (FOR INTERIOR WALLS ONLY):
   a. NPH ·····PERFORMANCE CATEGORY 1
   b. SNOW·····NOT APPLICABLE s = 0.328g AND S_1 = 0.13g
   c. WIND ·····NOT APPLICABLE
   d. SEISMIC ·····PER IBC, SITE CLASS C, I=1.0, S

LEGEND

- STRUCTURE PROVIDED BY RUBB BUILDING SYSTEMS
- 6-INCH METAL STUD WALL AND METAL LINER(S)
- ROOM NUMBER. SEE ROOM FINISH SCHEDULE ON DRAWING 761199
- DOOR NUMBER. SEE DOOR SCHEDULE ON DRAWING 761199
- WINDOW NUMBER. SEE WINDOW SCHEDULE ON DRAWING 761199
- *D DOOR, FRAME AND HARDWARE FURNISHED BY BUILDING MANUFACTURER

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: J. WITT, P.E.	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:40:10 -06'00'
TECHNICAL CHECK: EGS	NA NA
ENG GROUP SUPERVISOR: N.K. ROGERS, P.E.	NA NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:33:32 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 326838	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
WMF-1617 AL5
AIRLOCK 5
INTERIOR WALL PLAN

SIZE	INDEX CODE NUMBER (AREA / TYPE / CL / ORIG)	DWG-	REV
D	098 / 1617 / 00 / 136	761194	1
SCALE: NOTED		SHEET 1 OF 1	

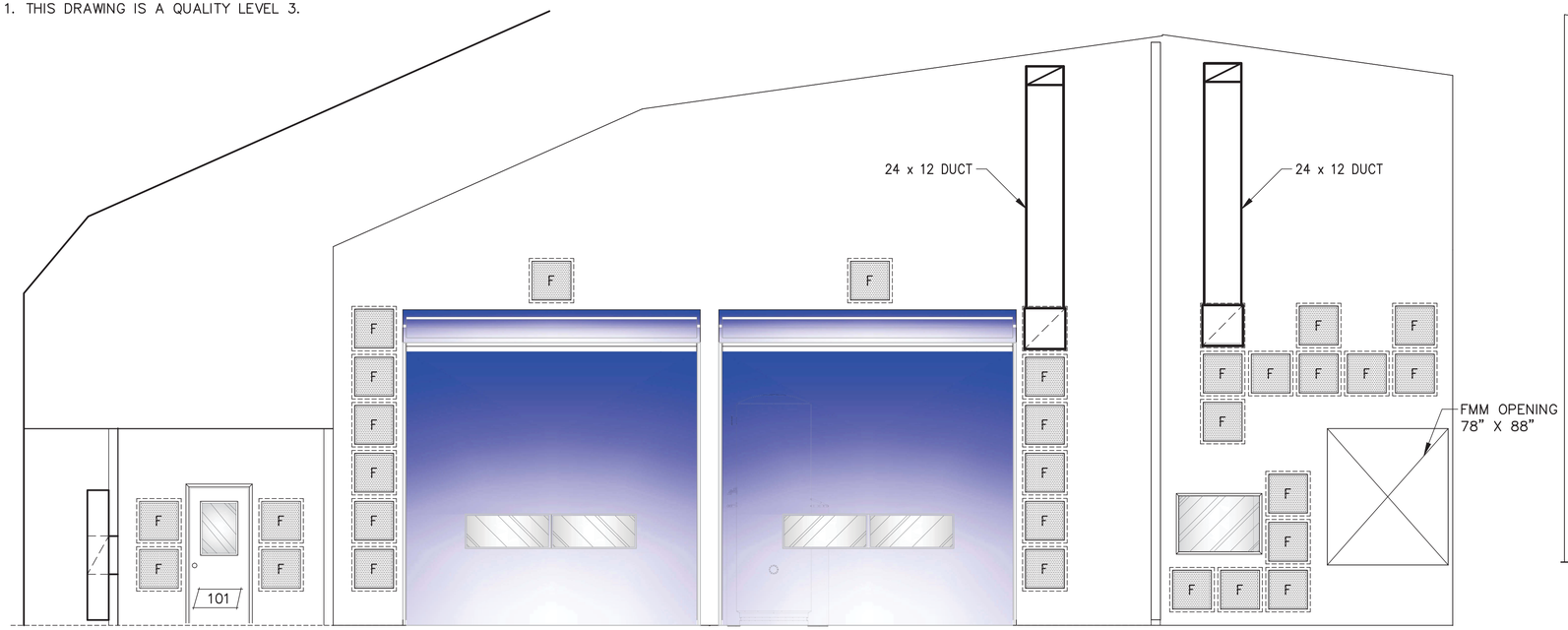
File: 761194-1.dwg Path: P:\RE5RCRA Date: 06/19/12 – 10:11 AM Layout Name: A-3 ID: HLY

FMT-D1-REV 2012-02-14

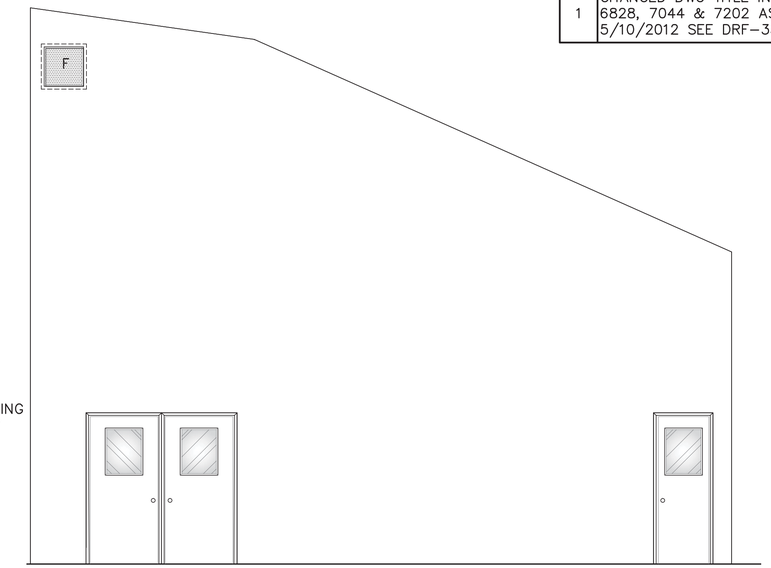
NOTES:

1. THIS DRAWING IS A QUALITY LEVEL 3.

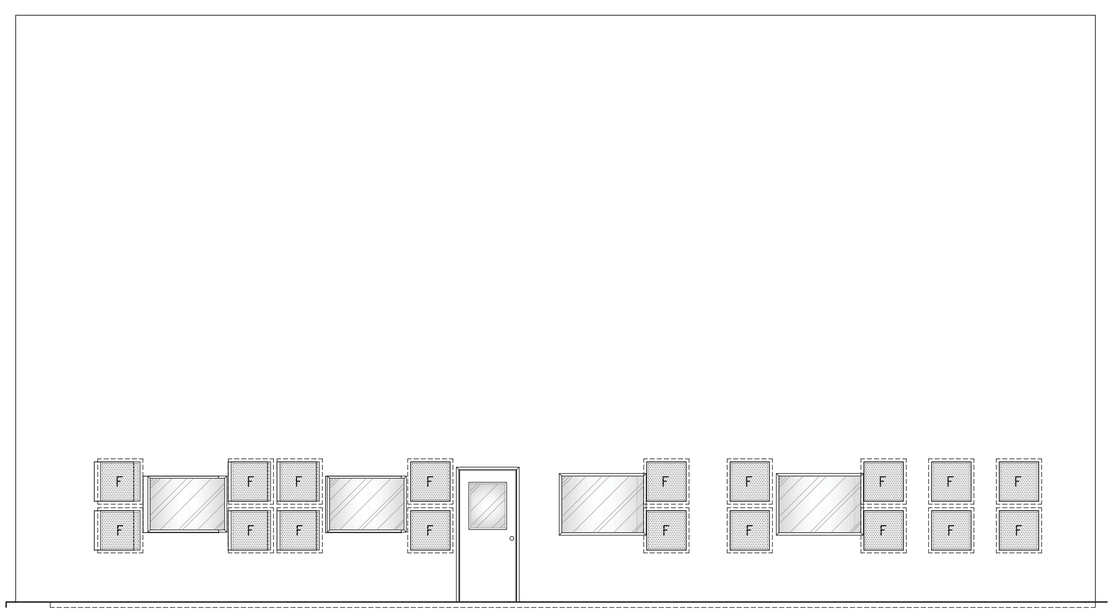
REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC 6828, 7044 & 7202 AS-BUILT AS OF 5/10/2012 SEE DRF-336389



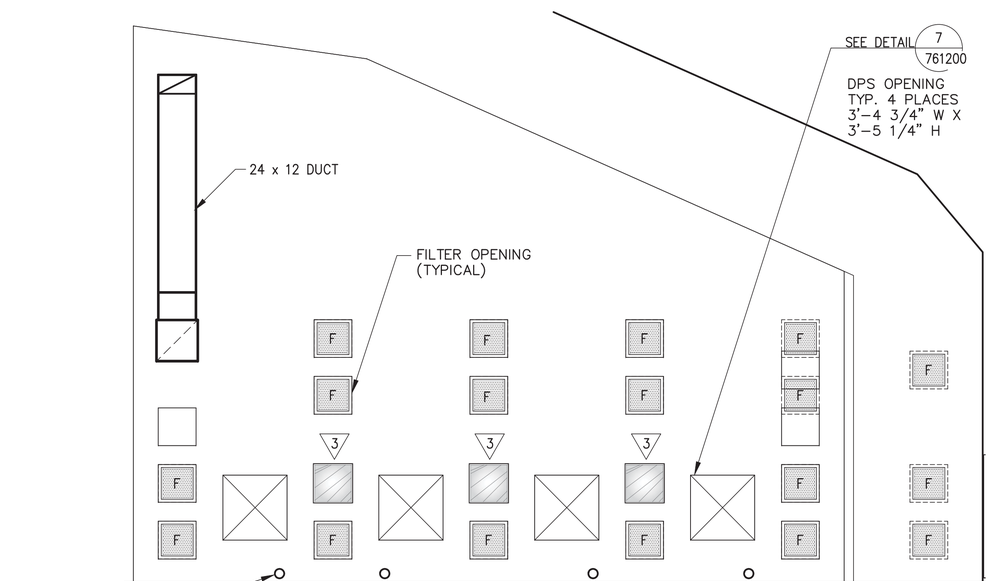
ELEVATION J 761194
ROOM 103 EAST WALL



ELEVATION E 761194
ROOM 106 EAST WALL



ELEVATION K 761194
ROOM 106 NORTH WALL



ELEVATION L 761194
ROOM 105 EAST WALL

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: J. WITT, P.E.	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:39:41 -06'00'
TECHNICAL CHECK: EGS	NA NA
ENG GROUP SUPERVISOR: N.K. ROGERS, P.E.	NA NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:35:19 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 327002	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
WMF-1617 AL5
AIRLOCK 5
INTERIOR ELEVATIONS

SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	01	136	761195	1

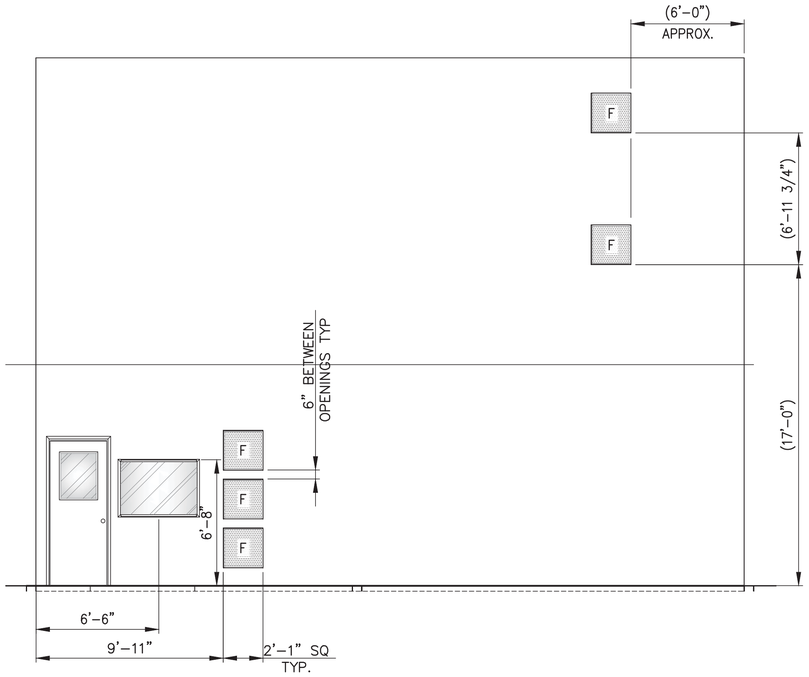
SCALE: NOTED — SHEET 1 OF 1

File: 761195-1.dwg
Path: P:\RESRCRA
Date: 06/18/12 - 2:51 PM | Layout Name: A-4 | ID: HLY

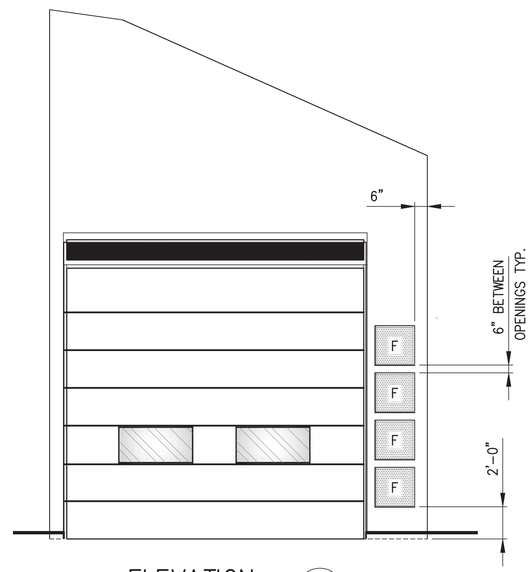
FMT-D1-REV 2012-02-14

NOTES:
1. THIS DRAWING IS QUALITY LEVEL 3.

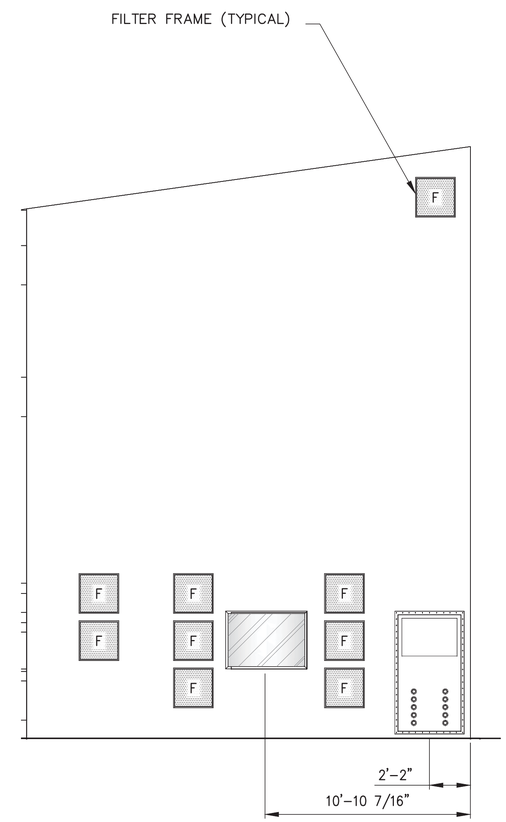
REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC 6523, 6753, 6907 & 7044 AS-BUILT AS OF 5/10/2012 SEE DRF-336389



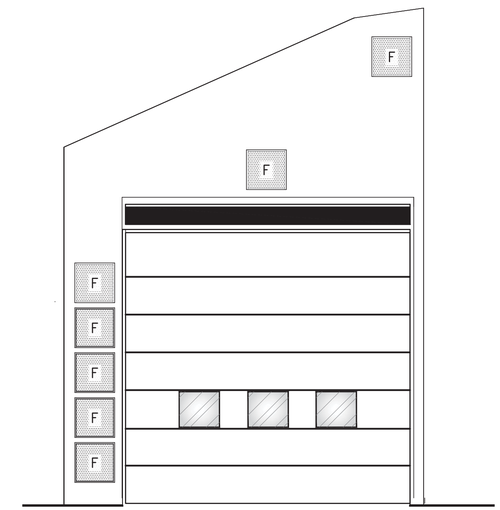
ELEVATION
ROOM 104 SOUTH WALL (G 761194)



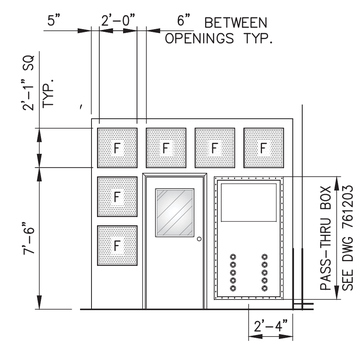
ELEVATION
ROOM 104 WEST WALL (H 761194)



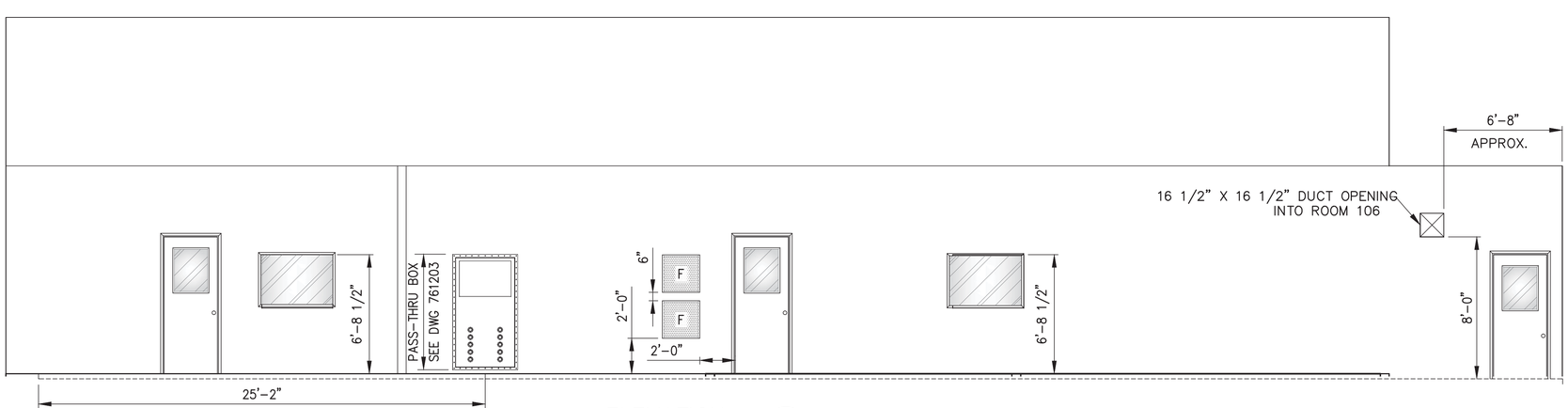
ELEVATION
ROOM 106 EAST WALL (D 761194)



ELEVATION
ROOM 104 EAST WALL (F 761194)



ELEVATION
ROOM 101 WEST WALL (C 761194)



ELEVATION
ROOM 102 SOUTH WALL (B 761194)

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: J. WITT, P.E.	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:41:37 -06'00'
TECHNICAL CHECK: EGS	NA NA
ENG GROUP SUPERVISOR: N.K. ROGERS, P.E.	NA NA
DESIGN LEAD: \N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:36:36 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 326838	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

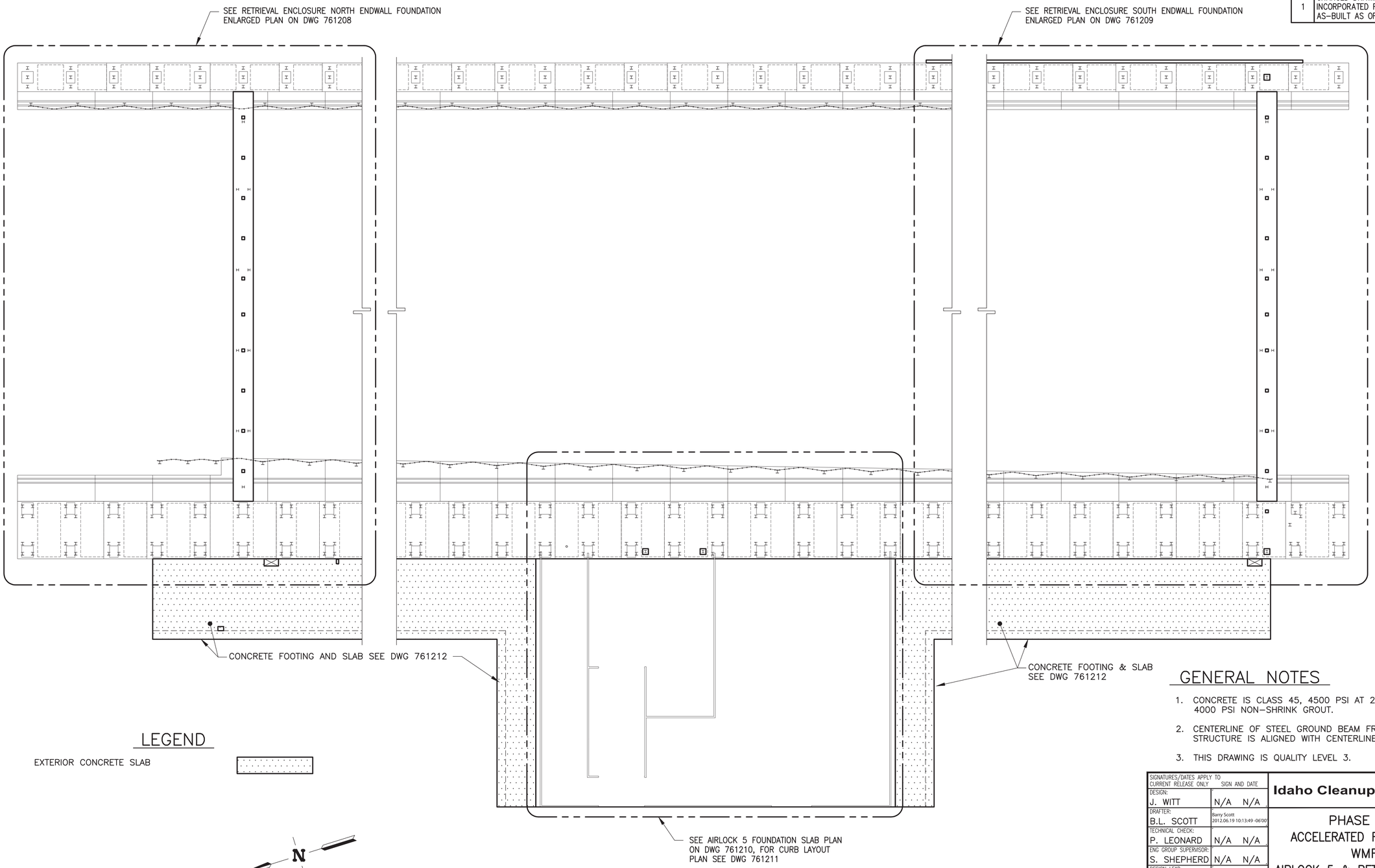
PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
WMF-1617 AL5
AIRLOCK 5
INTERIOR ELEVATIONS

SIZE	INDEX CODE NUMBER (AREA / TYPE / CL / ORIG)	DWG-	REV
D	098 / 1617 / 01 / 136	761196	1
SCALE: NOTED		SHEET 1 OF 1	

File: 761196-1.dwg
Path: P:\RESRCRA
Date: 06/19/12 - 10:18 AM | Layout Name: A-5 | ID: HLY

FMT-D1-REV 2012-02-14

REVISIONS	
REV	DESCRIPTION
1	CHANGED DRAWING TITLE, INCORPORATED FDC-6472, AS-BUILT AS OF 5-10-2012, SEE DRF-336389



LEGEND

EXTERIOR CONCRETE SLAB

GENERAL NOTES

1. CONCRETE IS CLASS 45, 4500 PSI AT 28 DAYS. GROUT IS 4000 PSI NON-SHRINK GROUT.
2. CENTERLINE OF STEEL GROUND BEAM FROM RETRIEVAL ENCLOSURE STRUCTURE IS ALIGNED WITH CENTERLINE OF GRADE BEAMS.
3. THIS DRAWING IS QUALITY LEVEL 3.

AIRLOCK & RETRIEVAL ENCLOSURE FOUNDATION PLAN

SCALE: 1/16"=1'-0"

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: J. WITT	N/A N/A
DRAFTER: B.L. SCOTT	Barry Scott 2012.06.19 10:13:49 -06'00'
TECHNICAL CHECK: P. LEONARD	N/A N/A
ENG GROUP SUPERVISOR: S. SHEPHERD	N/A N/A
DESIGN LEAD: S. CARNAHAN	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 08:50:30 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 326838	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE ACCELERATED RETRIEVAL PROJECT WMF-1617
AIRLOCK 5 & RETRIEVAL ENCLOSURE 5 FOUNDATION PLAN AND LEGEND

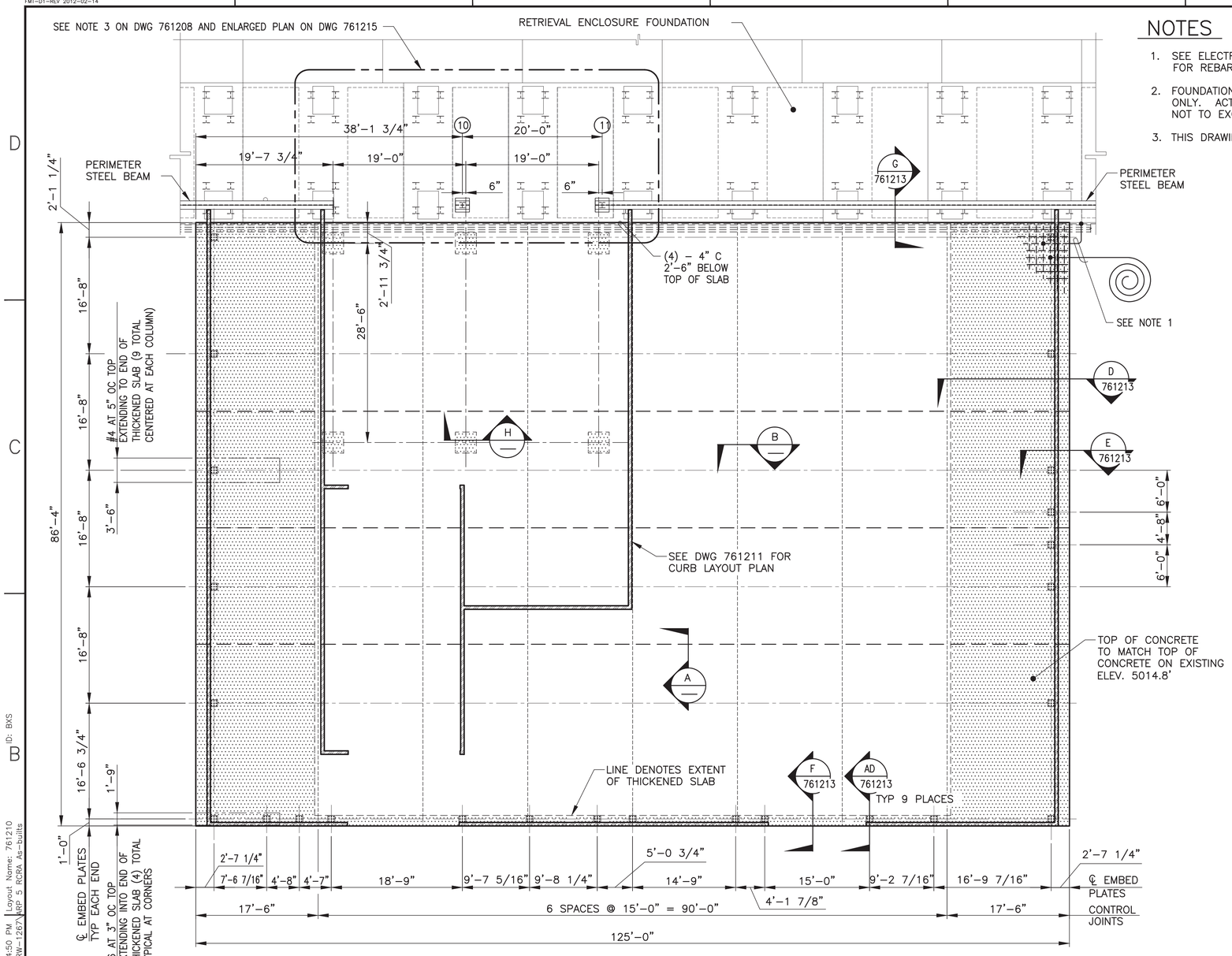
SIZE	INDEX CODE NUMBER (AREA / TYPE / CL / ORIG)	DWG-	REV
D	098 / 1617 / 60 / 136	761207	1
SCALE: NOTED		SHEET 1 OF 1	

RW-1267

File: 761207-1.dwg Path: C:\Documents and Settings\ces\My Documents\BXS\RW-1267\RP 5 RCRA As-builts Date: 06/18/12 - 3:58 PM Layout Name: 761207 ID: BXS

FMT-D1-REV 2012-02-14

REVISIONS	
REV	DESCRIPTION
1	CHANGED DRAWING TITLE, INCORPORATED FDC-6282, -6342, -6573 & -6587, AS-BUILT AS OF 5-10-2012, SEE DRF-336389

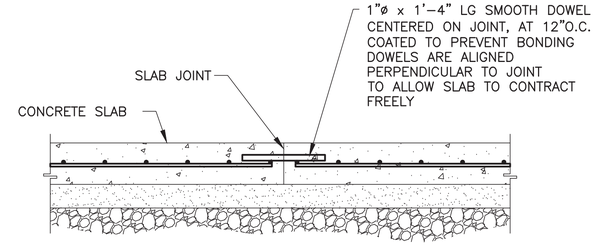


AIRLOCK FOUNDATION SLAB PLAN

SCALE: 1/8"=1'-0"

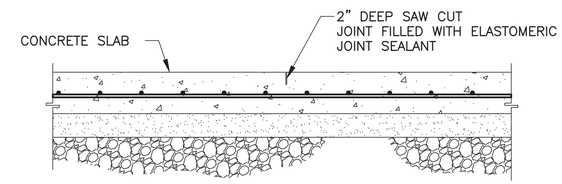
NOTES

1. SEE ELECTRICAL DRAWINGS 761217 AND 761218 FOR REBAR GROUNDING.
2. FOUNDATION DESIGN SHOWN IS BASED ON ESTIMATED BUILDING REACTIONS ONLY. ACTUAL SERVICE LEVEL BUILDING REACTIONS FOR THE AIRLOCK ARE NOT TO EXCEED 30 KIPS UPLIFT, 35 KIPS LATERAL.
3. THIS DRAWING IS QUALITY LEVEL 3.



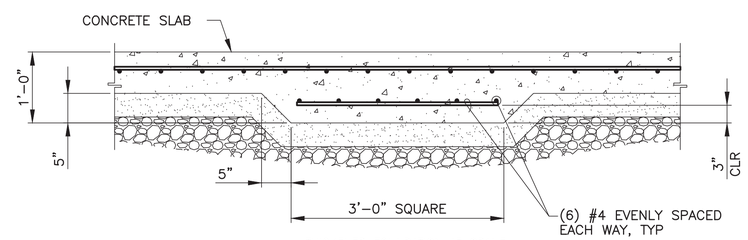
CONSTRUCTION JOINT (CENTERED BETWEEN COLUMNS)

SECTION A — SCALE: 1"=1'-0"



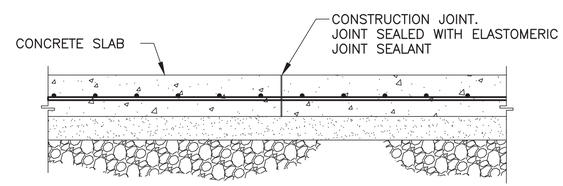
CONTROL JOINT

SECTION B/B 761212 — SCALE: 1"=1'-0"



THICKENED FOUNDATION AT CRANE

SECTION H — SCALE: 1"=1'-0"



CONSTRUCTION JOINT IN SNOW CANOPY

SECTION AE 761212 — SCALE: 1"=1'-0"

LEGEND

- CONCRETE CURB
- CONSTRUCTION JOINT
- CONTROL JOINT
- THICKENED SLAB

SCALE: 1/8" = 1'-0"

SCALE: 1" = 1'-0"

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: P. LEONARD	N/A N/A
DRAFTER: B.L. SCOTT	Barry Scott 2012.06.19 10:15:23 -06'00'
TECHNICAL CHECK: J. WITT	N/A N/A
ENG GROUP SUPERVISOR: S. SHEPHERD	N/A N/A
DESIGN LEAD: S. CARNAHAN	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 08:50:02 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 326838	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE ACCELERATED RETRIEVAL PROJECT WMF-1617 AIRLOCK 5 FOUNDATION SLAB PLAN, LEGEND AND SECTIONS

SIZE	INDEX CODE NUMBER (AREA / TYPE / G / ORG)	DWG-	REV
D	098 / 1617 / 62 / 136	761210	1

SCALE: NOTED — SHEET 1 OF 1

RW-1267

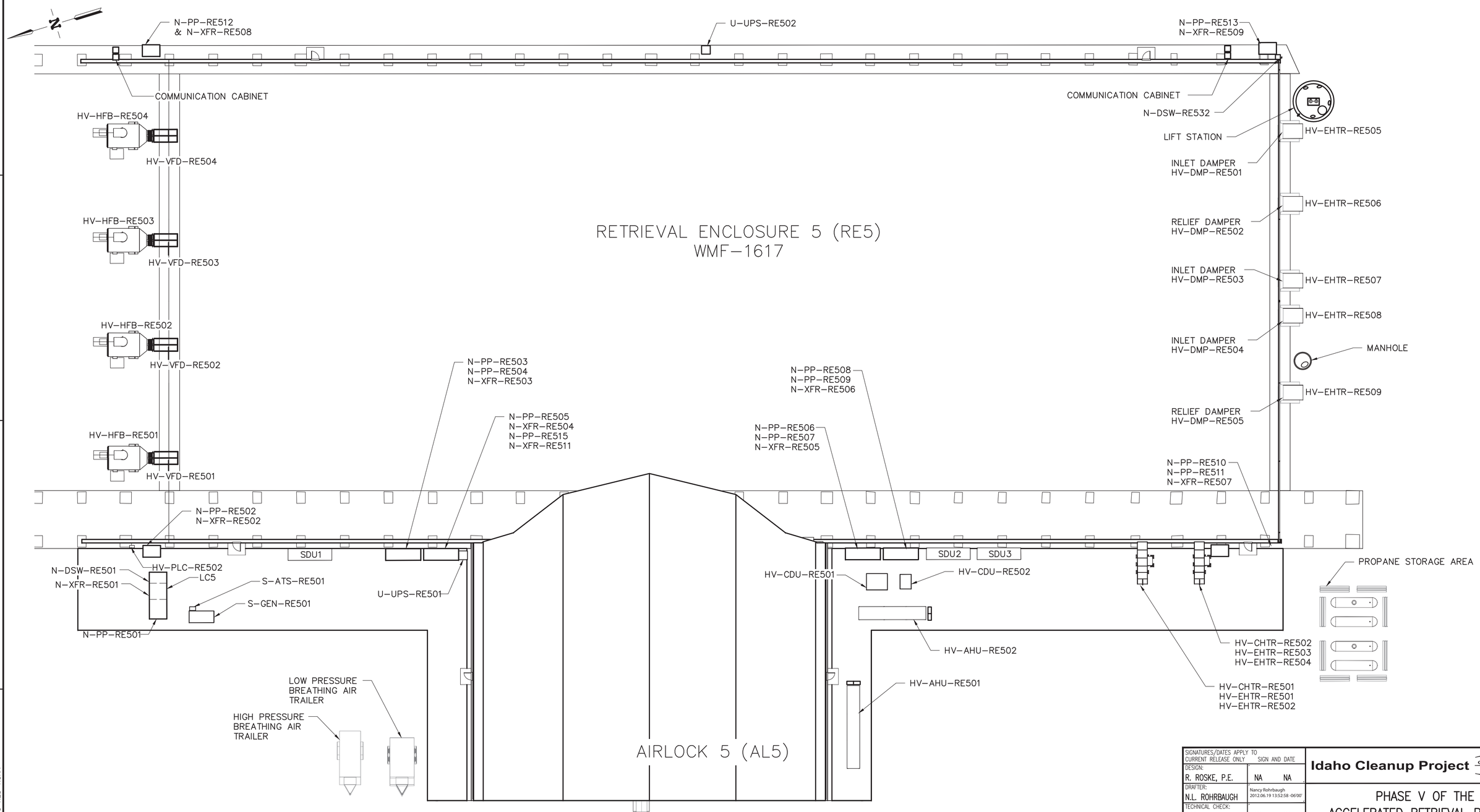
File: 761210-1.dwg Path: C:\Documents and Settings\BXS\My Documents\BXS\RW-1267\RRP 5 RCRA As-builts Date: 06/18/12 - 4:50 PM Layout Name: 761210 ID: BXS

FMT-D1-REV 2012-02-14

NOTES:

1. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC 6732, 7022, 7119 & 7155 AS-BUILT AS OF 5/2/2012 SEE DRF-336389



RETRIEVAL ENCLOSURE 5 EQUIPMENT LOCATION PLAN

SCALE: 1/16" = 1'-0"

X-REF DRAWINGS

762161 – RETRIEVAL ENCLOSURE 5
762162 – RETRIEVAL ENCLOSURE 5 EQUIPMENT
762163 – AIRLOCK 5
762164 – AIRLOCK 5 EQUIPMENT

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE	
DESIGN: R. ROSKE, P.E.	NA	NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 13:52:58 -06'00'	
TECHNICAL CHECK: EGS	NA	NA
ENG GROUP SUPERVISOR: N.K. ROGERS, P.E.	NA	NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA	NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 13:55:28 -06'00'	
PROJECT NUMBER: 30198		
DRF NUMBER: 327002		

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
RE5/AL5 WMF-1617
EQUIPMENT
LOCATION PLAN

SIZE	INDEX CODE NUMBER AREA	TYPE	CI	ORIG	DWG-	REV
D	098	1617	02	136	762023	1

SCALE: NOTED SHEET 1 OF 1

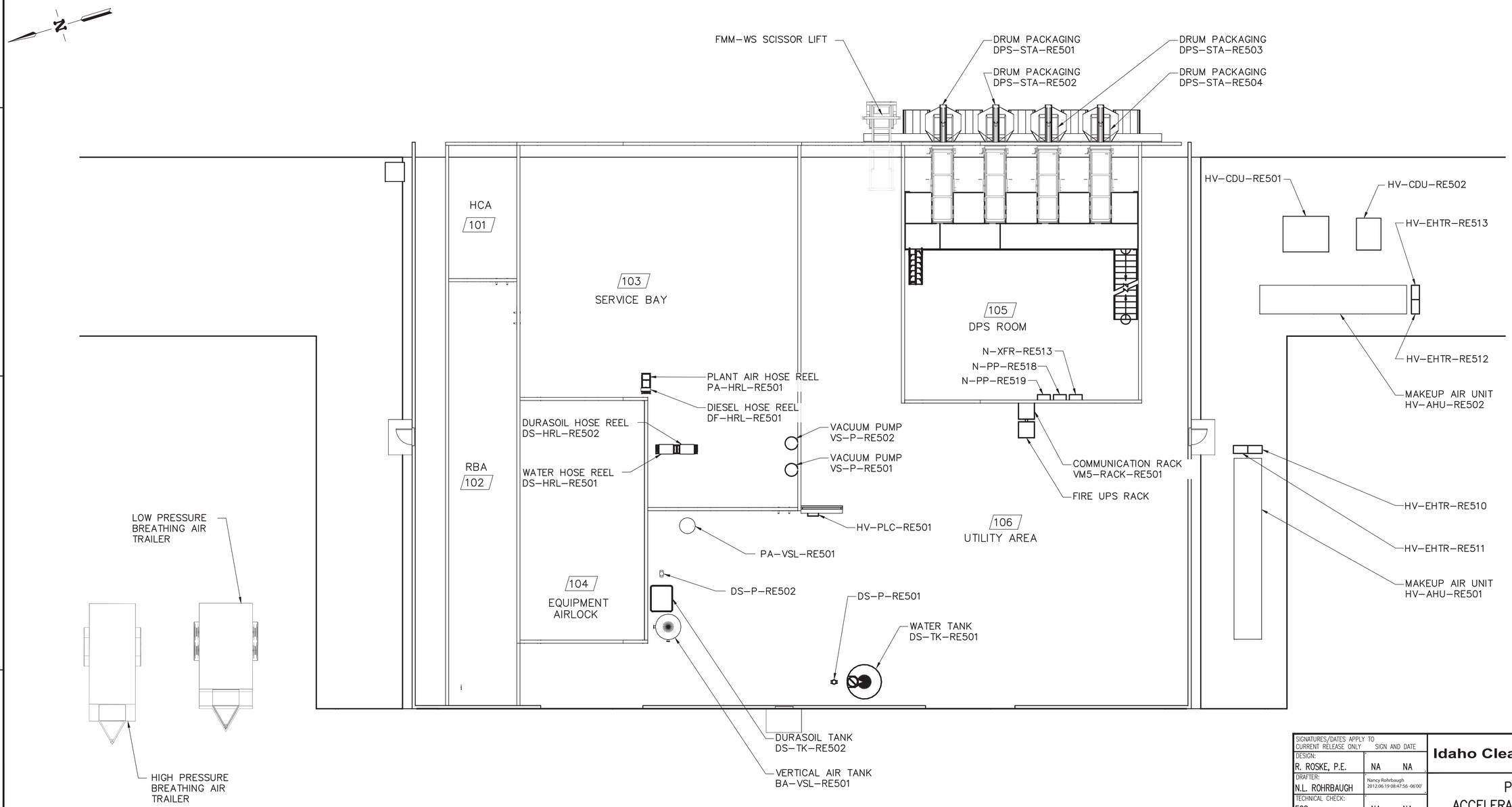
File: 762023-1.dwg
Path: W:\cwi-drawings\DRF-336389-RE5-RCRA
Date: 06/19/12 – 1:43 PM | Layout Name: Layout1 | ID: HLY

FMT-D1-REV 2012-02-14

NOTES:

1. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC 6573, 6871, 6902 & 7155 AS-BUILT AS OF 5/2/2012 SEE DRF-336389



AIRLOCK 5 EQUIPMENT LOCATION PLAN

SCALE: 1/8"=1'-0"

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN	AND DATE
DESIGN: R. ROSKE, P.E.	NA	NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 08:47:56 -06'00'	
TECHNICAL CHECK: EGS	NA	NA
ENG GROUP SUPERVISOR: N.K. ROGERS, P.E.	NA	NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA	NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:43:03 -06'00'	
PROJECT NUMBER: 30198		
DRF NUMBER: 327002		

Idaho Cleanup Project — CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
WMF-1617 AL5
AIRLOCK 5
EQUIPMENT LOCATION PLAN

SIZE	INDEX CODE NUMBER AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	02	136	762024	1

SCALE: NOTED — SHEET 1 OF 1

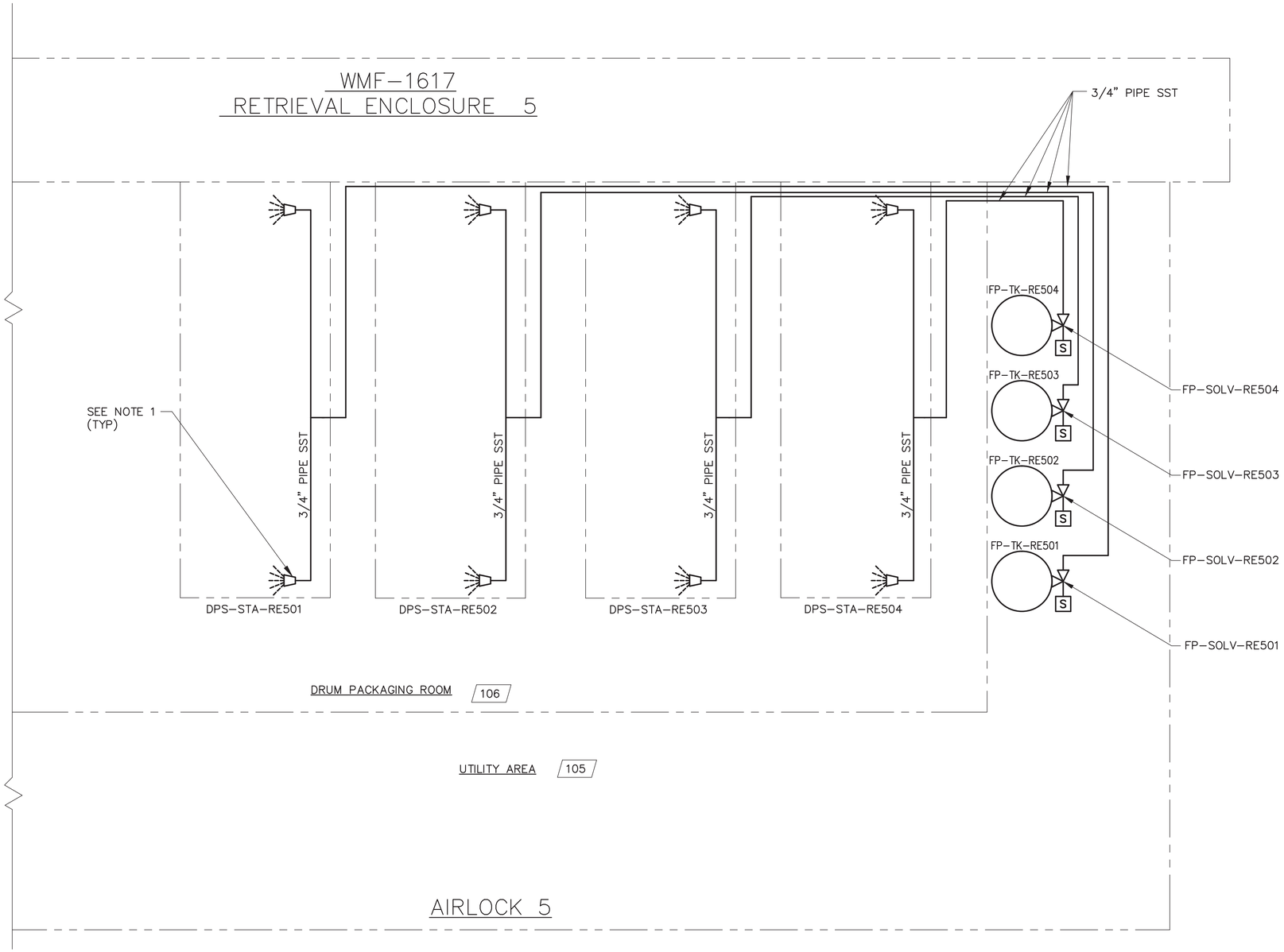
File: 762024-1.dwg
Path: P:\RES\RCRA
Date: 06/18/12 – 4:05 PM | Layout Name: A-1 | ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE, AS-BUILT AS OF 9/16/2010 SEE DRF-331288
2	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 5/3/2012 SEE DRF-336389

NOTES:

1. DISCHARGE NOZZLE HEADS SPRAY DOWNWARD.
2. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.



FIRE PROTECTION SYSTEM DIAGRAM

NTS

LEGEND

S — CHEMICAL STORAGE CYLINDER WITH INTEGRAL SOLENOID VALVE

DISCHARGE NOZZLE

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: H. VESELKA	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:44:06 -06'00'
TECHNICAL CHECK: D. CLARK, P.E.	NA NA
ENG GROUP SUPERVISOR: R. ROSKE, P.E.	NA NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:44:46 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 327002	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
RE5/AL5 WMF-1617
DPS FIRE PROTECTION SYSTEM
DRY CHEMICAL DIAGRAM

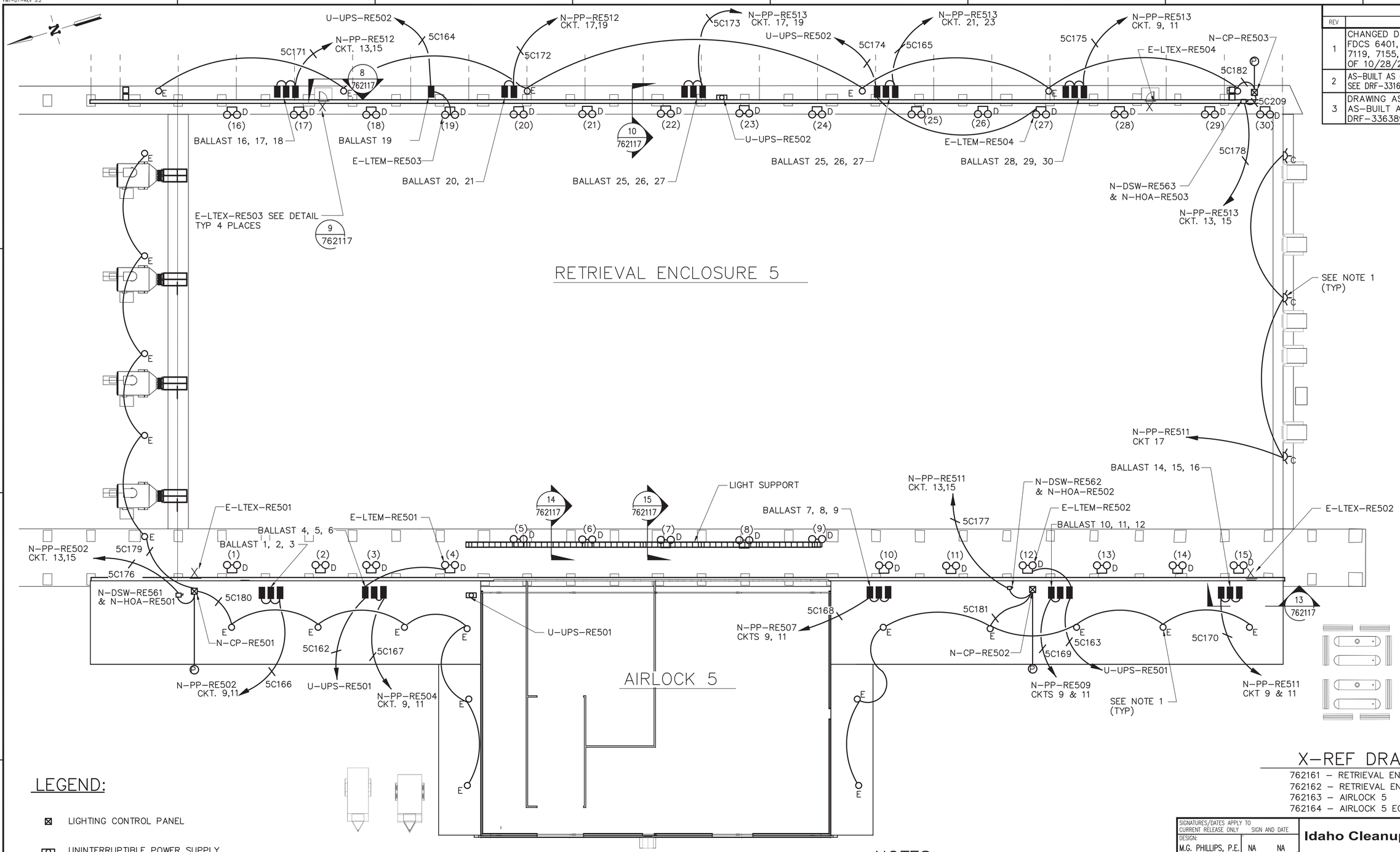
SIZE	INDEX CODE NUMBER AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	12	136	762067	2

SCALE: NONE — SHEET 1 OF 1

File: 762067-2.dwg Path: P:\RESRCRA Date: 06/19/12 – 10:04 AM Layout Name: FP-1 ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE, INCORPORATED FDCS 6401, 6680, 6732, 6923, 7022, 7119, 7155, 7267 & 7276 AS-BUILT AS OF 10/28/2010 SEE DRF-331574
2	AS-BUILT AS OF 11/9/2010 SEE DRF-331696
3	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 5/9/2012 SEE DRF-336389



RETRIEVAL ENCLOSURE 5 LIGHTING PLAN

SCALE: 1/16"=1'-0"

LEGEND:

- ⊠ LIGHTING CONTROL PANEL
- UNINTERRUPTIBLE POWER SUPPLY
- INTERIOR LIGHTS/RACK (TYP 30 PLCS)
- BALLAST, LIGHTING, REMOTE
- Ⓟ PHOTO-EYE SENSOR (PES)
- X EXIT SIGN PHOTO LUMINESCENT MOUNT ABOVE DOOR ACCUFORM #PLW275GN

NOTES:

1. EXTERIOR FIXTURES ARE MOUNTED AT 15'-0" AFG.
2. SEE DRAWING 762117 FOR LIGHTING DETAILS.
3. SEE DRAWINGS 762119, 762120, 762121, 762122 & 762123 FOR CABLE & CONDUIT SCHEDULES.
4. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

X-REF DRAWINGS

762161 – RETRIEVAL ENCLOSURE 5
762162 – RETRIEVAL ENCLOSURE 5 EQUIPMENT
762163 – AIRLOCK 5
762164 – AIRLOCK 5 EQUIPMENT

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE	
DESIGN: M.G. PHILLIPS, P.E.	NA	NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:47:02 -06'00'	
TECHNICAL CHECK: L.D. FISHER, P.E.	NA	NA
ENG GROUP SUPERVISOR: W.H. REED, P.E.	NA	NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA	NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:46:18 -06'00'	
PROJECT NUMBER: 30198		
DRF NUMBER: 327002		

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE ACCELERATED RETRIEVAL PROJECT RE5/AL5 WMF-1617

RE5 LIGHTING PLAN

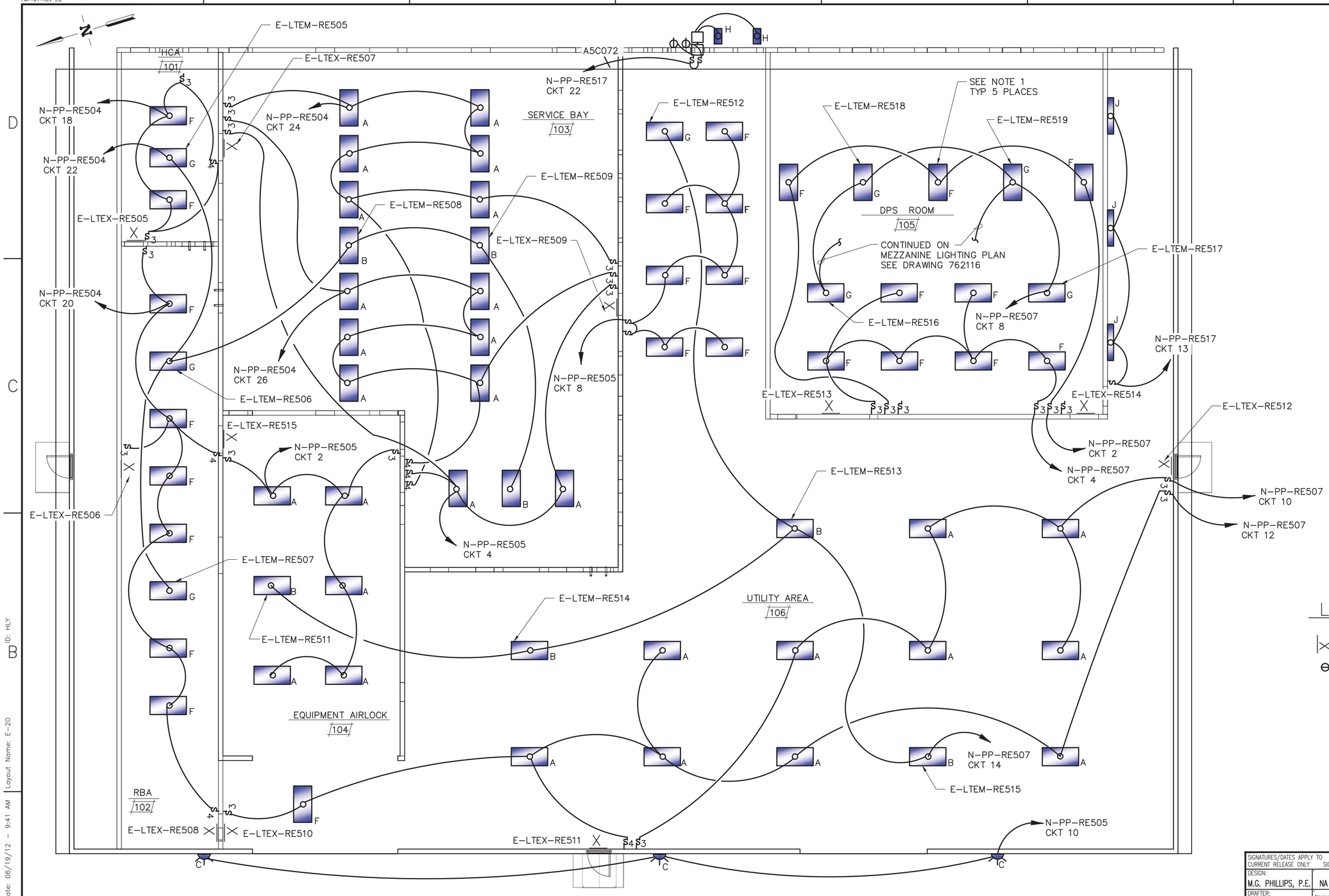
SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	10	136	762114	3

SCALE: NOTED SHEET 1 OF 1

File: 762114-3.dwg Path: P:\RE5RCRA Date: 06/18/12 – 4:17 PM Layout Name: E-19 ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE, INCORPORATED FDCS 6865, 6956, 7009, 7020, 7021, 7028, 7265 & 7296 AS-BUILT AS OF 10/29/2010 SEE DRF-331574
2	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 5/9/2012 SEE DRF-336389



AIRLOCK 5 LIGHTING PLAN

SCALE: 3/16" = 1'-0"

LEGEND

EXIT SIGN, PHOTO-LUMINESCENT PERMANENTLY MOUNT ABOVE DOOR ACCUFORM #PLW275GN

20A SINGLE RECEPTACLE

NOTES:

1. LIGHTS ARE MOUNTED UNDER THE DPS DECK PLATE AT FLOOR LEVEL.
2. LIGHTING MOUNTING HEIGHT WAS ADJUSTED AS NECESSARY TO AVOID OBSTRUCTIONS AND/OR CEILING SLOPE
3. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

X-REF DRAWINGS

762163 – AIRLOCK 5

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: M.G. PHILLIPS, P.E.	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:46:36 -06'00'
TECHNICAL CHECK: L.D. FISHER, P.E.	NA NA
ENG GROUP SUPERVISOR: W.H. REED, P.E.	NA NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:48:00 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 327002	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE ACCELERATED RETRIEVAL PROJECT RE5/AL5 WMF-1617

AL5 LIGHTING PLAN

SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	10	136	762115	2

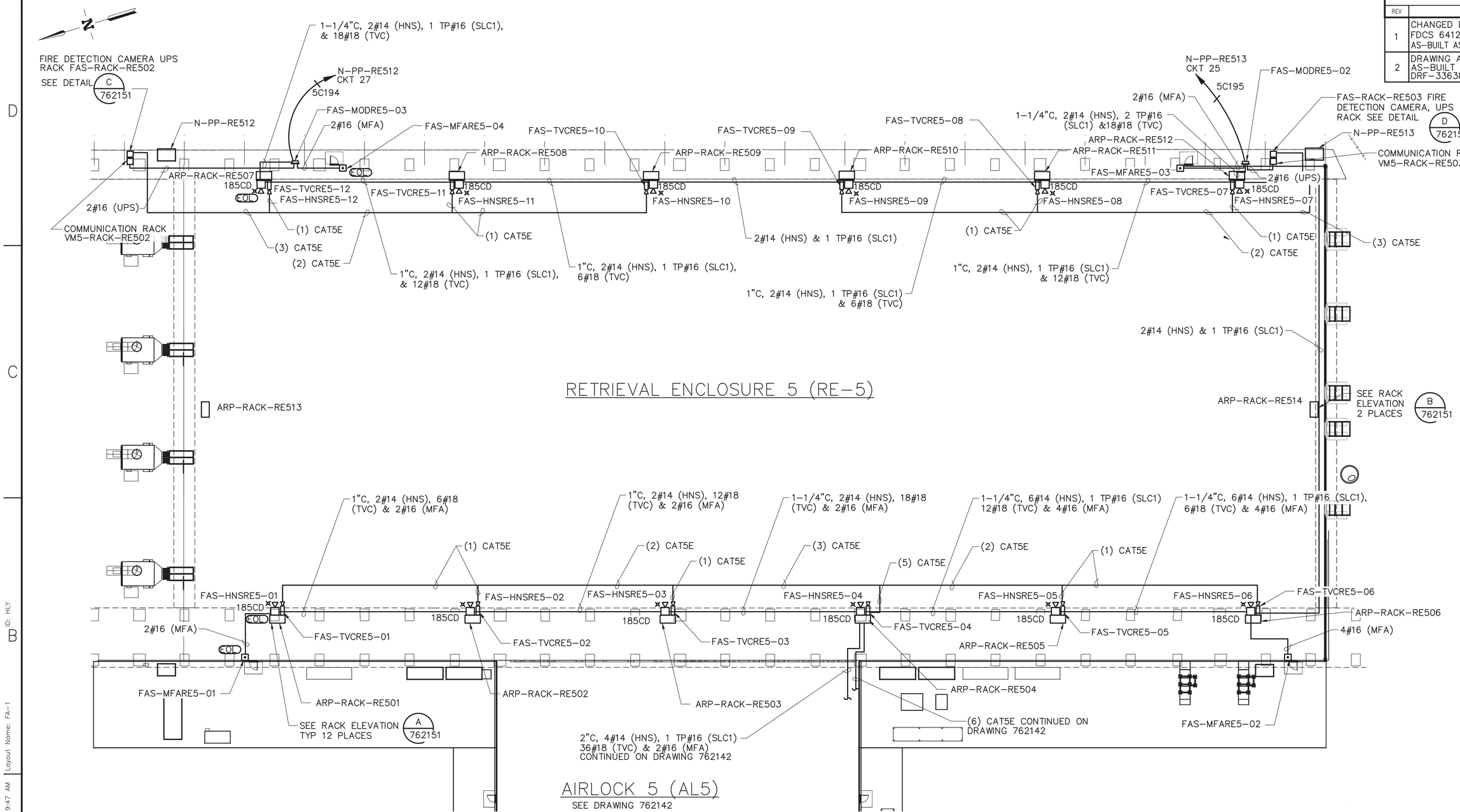
SCALE: NOTED

SHEET 1 OF 1

File: 762115-2.dwg Path: P:\RE5RCRA Date: 06/19/12 – 9:41 AM Layout Name: E-20 ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE, INCORPORATED FDCS 6412, 6921, 7022 & 7075 AS-BUILT AS-OF 10/11/2010 SEE DRF-331493
2	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 5/7/2012 SEE DRF-336389



RE5 FIRE ALARM FLOOR PLAN

SCALE: 1/16" = 1'-0"

LEGEND

- MANUAL FIRE ALARM STATION
- HORN/STROBE
- EOL END OF LINE RESISTOR
- SMOKE/FIRE DETECTION CAMERA WITH HOUSING

NOTES:

1. ALL CONDUCTORS ARE IN 3/4"C UNLESS SHOWN OTHERWISE ON THE DRAWING.
2. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

X-REF DRAWINGS

762161 – RETRIEVAL ENCLOSURE 5
762162 – RETRIEVAL ENCLOSURE 5 EQUIPMENT
762163 – AIRLOCK 5

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE	
DESIGN: W.B. FARMER	NA	NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:46:07 -06'00'	
TECHNICAL CHECK: D.W. CLARK, P.E.	NA	NA
ENG GROUP SUPERVISOR: W.H. REED, P.E.	NA	NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA	NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:50:03 -06'00'	
PROJECT NUMBER: 30198		
DRF NUMBER: 327002		

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE ACCELERATED RETRIEVAL PROJECT RE5/AL5 WMF-1617

FIRE ALARM PLAN

SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	12	136	762141	2

SCALE: NOTED SHEET 1 OF 1

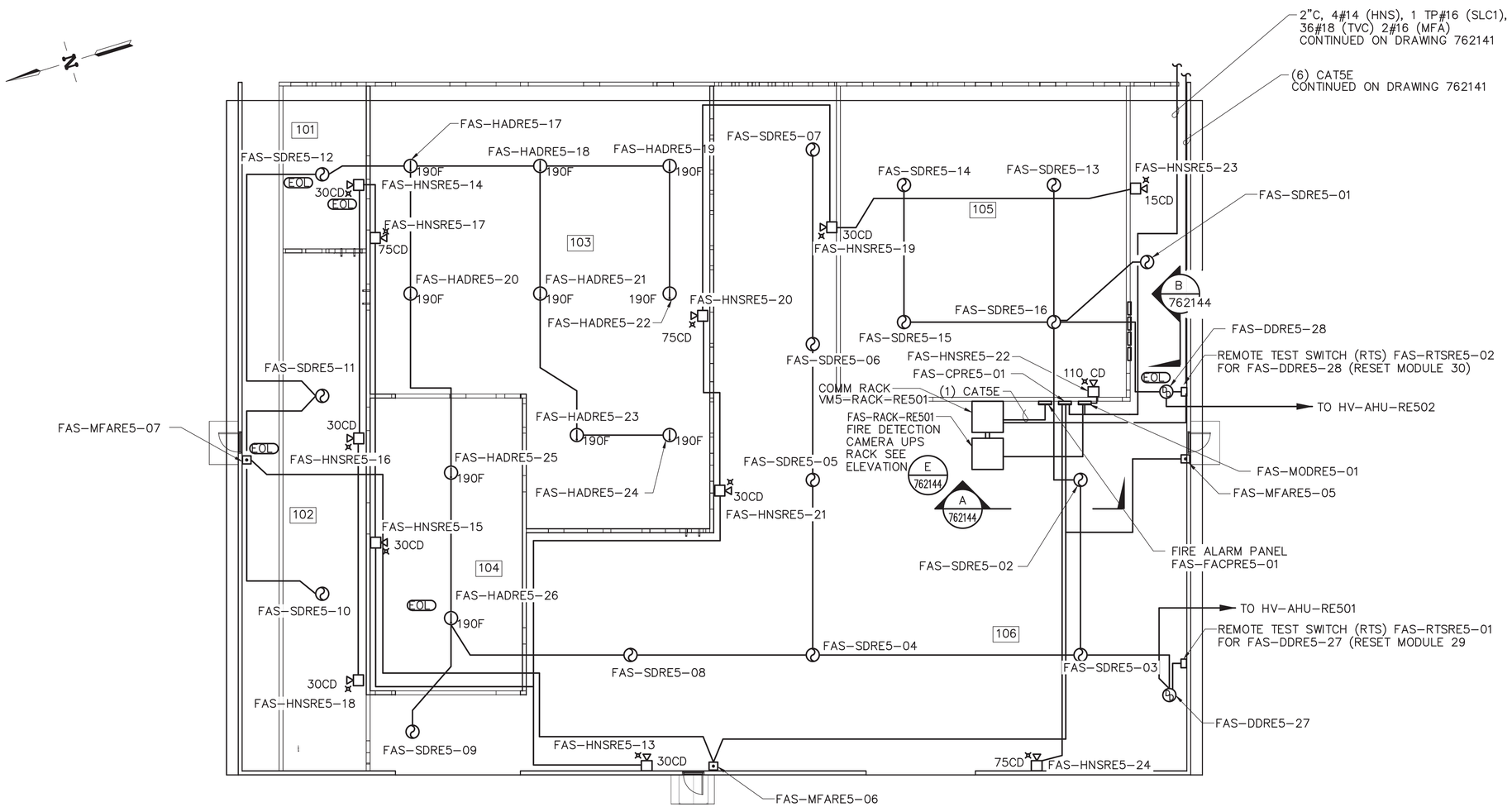
File: 762141-2.dwg Path: P:\RE5RCRA Date: 06/19/12 – 9:47 AM Layout Name: FA-1 ID: HLY

FMT-D1-REV 5.2

NOTES:

1. ALL CONDUCTORS ARE IN 3/4"C UNLESS SHOWN OTHERWISE.
2. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.
3. THIS DRAWING IS TO BE USED IN CONJUNCTION WITH DWGS:
   762145 FIRE ALARM CONTROL PANEL FAS-FACPRE5-01 CONNECTION DIAGRAM
   762146 FAS-CPRE5-01 WIRING DIAGRAM, FAS-DDRE5-27 & FAS-DDRE5-28 WIRING DIAGRAM.

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE, INCORPORATED FDCS 6412, 6921 & 7173 AS-BUILT AS OF 10/13/2010 SEE DRF-331493
2	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 5/7/2012 SEE DRF-336389



AIRLOCK 5 FLOOR PLAN

SCALE 1/8" = 1'-0"

LEGEND

- MANUAL FIRE ALARM STATION
- HORN/STROBE
- END OF LINE RESISTOR
- SMOKE DETECTOR
- HEAT DETECTOR (190F)
- DUCT SMOKE DETECTOR
- FIRE ALARM PANEL

X-REF DRAWING

762163 – AIRLOCK 5

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: W.B. FARMER	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:45:30 -06'00'
TECHNICAL CHECK: D.W. CLARK, P.E.	NA NA
ENG GROUP SUPERVISOR: W.H. REED, P.E.	NA NA
DESIGN LEAD: N.K.ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:51:22 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 327002	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
RE5/AL5 WMF-1617
AIRLOCK 5
FIRE ALARM PLAN

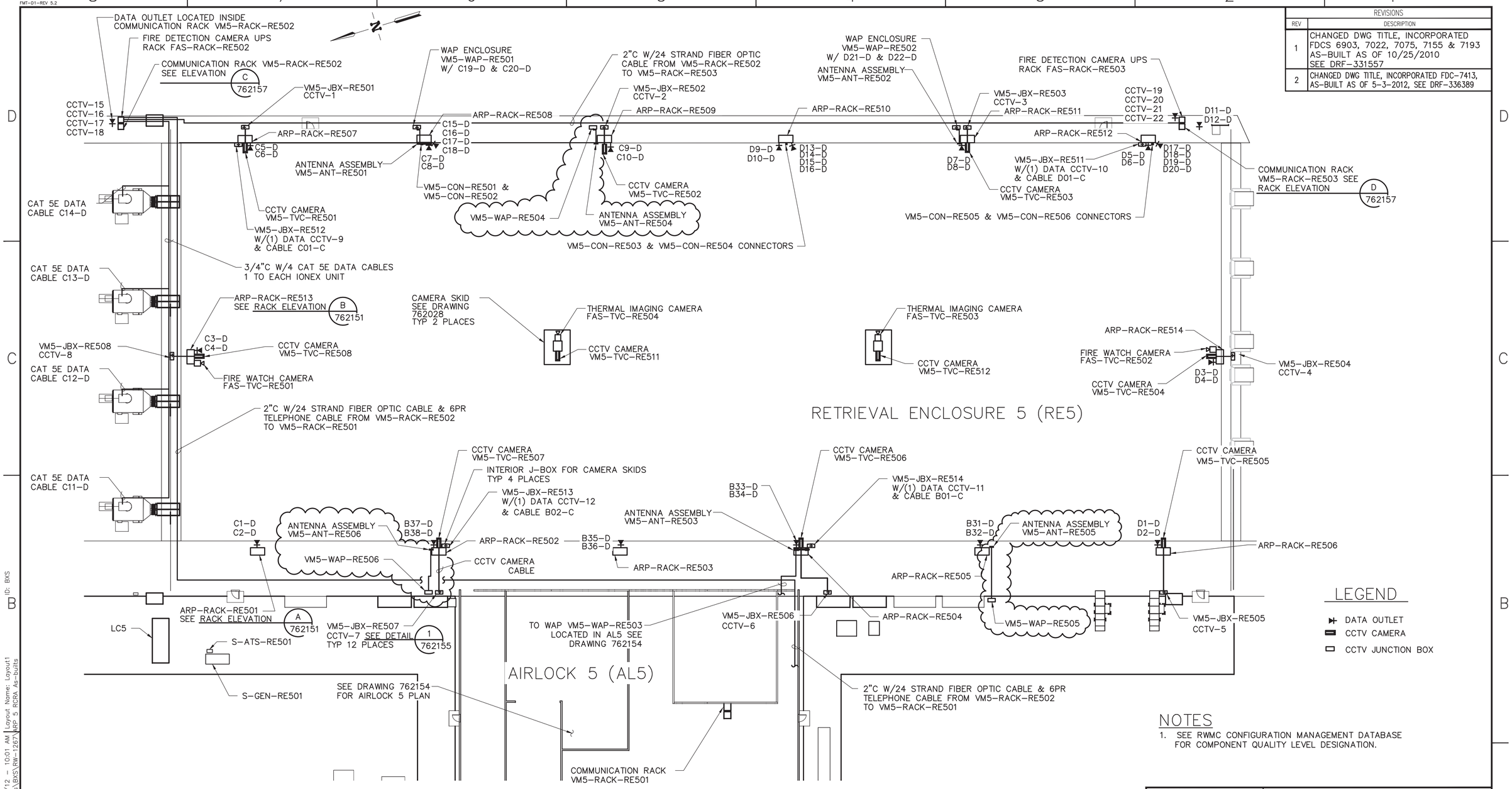
SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	12	136	762142	2

SCALE: NOTED SHEET 1 OF 1

File: 762142-2.dwg Path: P:\RE5RCRA Date: 06/18/12 – 4:22 PM Layout Name: FA-2 ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE, INCORPORATED FDCS 6903, 7022, 7075, 7155 & 7193 AS-BUILT AS OF 10/25/2010 SEE DRF-331557
2	CHANGED DWG TITLE, INCORPORATED FDC-7413, AS-BUILT AS OF 5-3-2012, SEE DRF-336389



NOTES

1. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

RE5 DATA/DATA CCTV FLOOR PLAN

SCALE: 1/16" = 1'-0"

LAST NO. USED

DATA/DATA	B38-D
DATA/DATA	C20-D
DATA/DATA	D22-D
DATA	CCTV-22

X-REF DRAWINGS

762161 – RETRIEVAL ENCLOSURE 5
762162 – RETRIEVAL ENCLOSURE 5 EQUIPMENT
762163 – AIRLOCK 5
762164 – AIRLOCK 5 EQUIPMENT

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: W.B. FARMER	NA NA
DRAFTER: B.L. SCOTT	Barry Scott 2012.06.19 10:17:42 -06'00'
TECHNICAL CHECK: EGS	NA NA
ENG GROUP SUPERVISOR: W.H. REED, P.E.	NA NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:45:00 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 327002	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

PHASE V OF THE
ACCELERATED RETRIEVAL PROJECT
WMF-1617
RETRIEVAL ENCLOSURE 5
DATA/DATA CCTV FLOOR PLAN

SIZE	INDEX CODE NUMBER (AREA / TYPE / CL / ORIG)	DWG-	REV
D	098 / 1617 / 06 / 136	762153	2

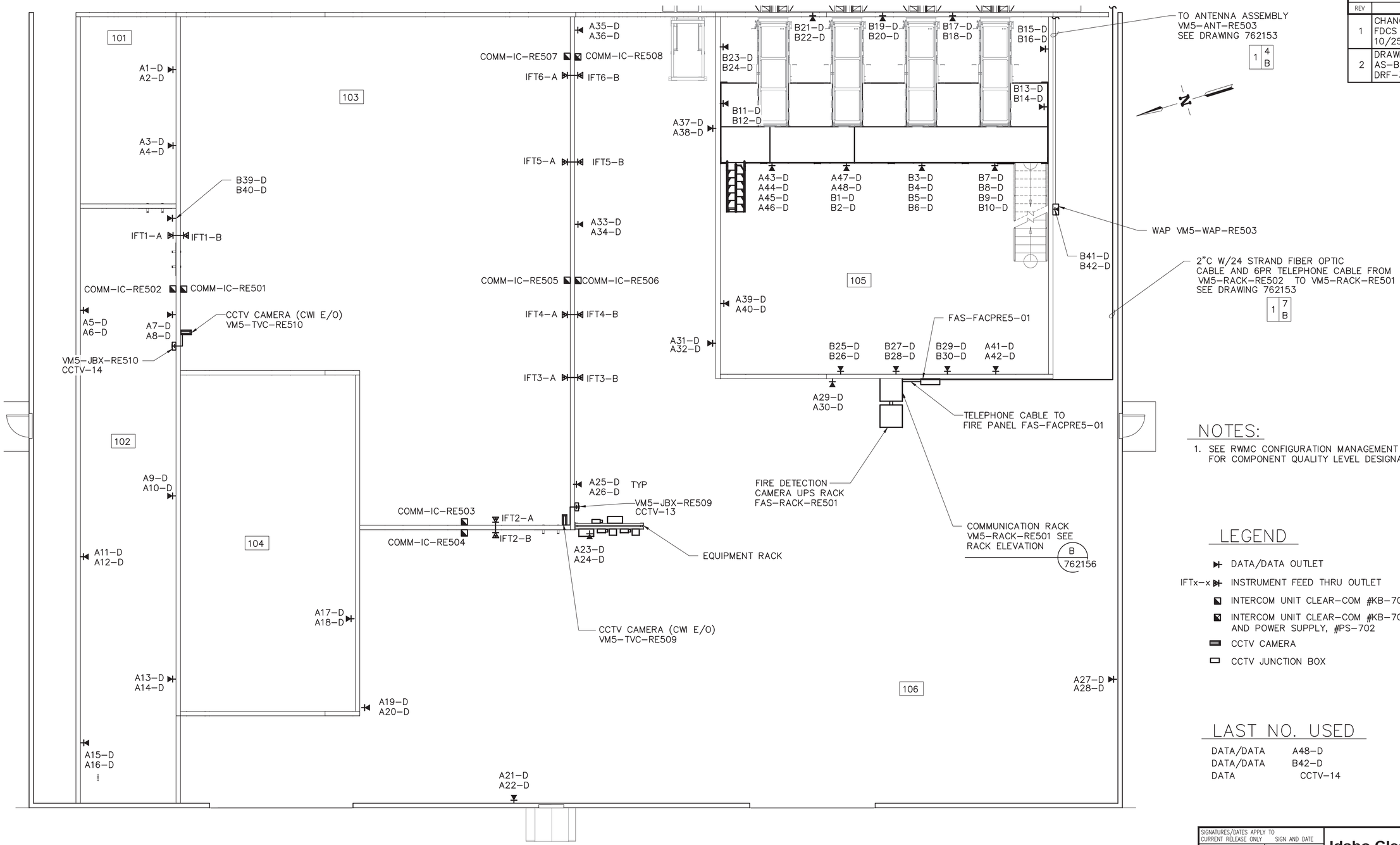
SCALE: NOTED — SHEET 1 OF 1

RW-1267

File: 762153-2.dwg
Path: C:\Documents and Settings\EGS\My Documents\BXS\RW-1267\RRP 5 RCRA As-builts
Date: 06/19/12 – 10:01 AM | Layout Name: Layout1
ID: BXS

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE, INCORPORATED FDCS 6871 & 6903 AS-BUILT AS OF 10/25/2010 SEE DRF-331557
2	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 5/7/2012 SEE DRF-336389



AIRLOCK 5 FLOOR PLAN

SCALE: 3/16" = 1'-0"

NOTES:

1. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

LEGEND

- DATA/DATA OUTLET
- IFTx-x INSTRUMENT FEED THRU OUTLET
- INTERCOM UNIT CLEAR-COM #KB-701
- INTERCOM UNIT CLEAR-COM #KB-701 AND POWER SUPPLY, #PS-702
- CCTV CAMERA
- CCTV JUNCTION BOX

LAST NO. USED

DATA/DATA	A48-D
DATA/DATA	B42-D
DATA	CCTV-14

X-REF DRAWINGS

762163 – AIRLOCK 5
762164 – AIRLOCK 5 EQUIPMENT

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: W.B. FARMER	NA NA
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.06.19 10:47:24 -06'00'
TECHNICAL CHECK: EGS	NA NA
ENG GROUP SUPERVISOR: W.H. REED, P.E.	NA NA
DESIGN LEAD: N.K. ROGERS, P.E.	NA NA
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.06.19 11:53:40 -06'00'
PROJECT NUMBER: 30198	
DRF NUMBER: 327002	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

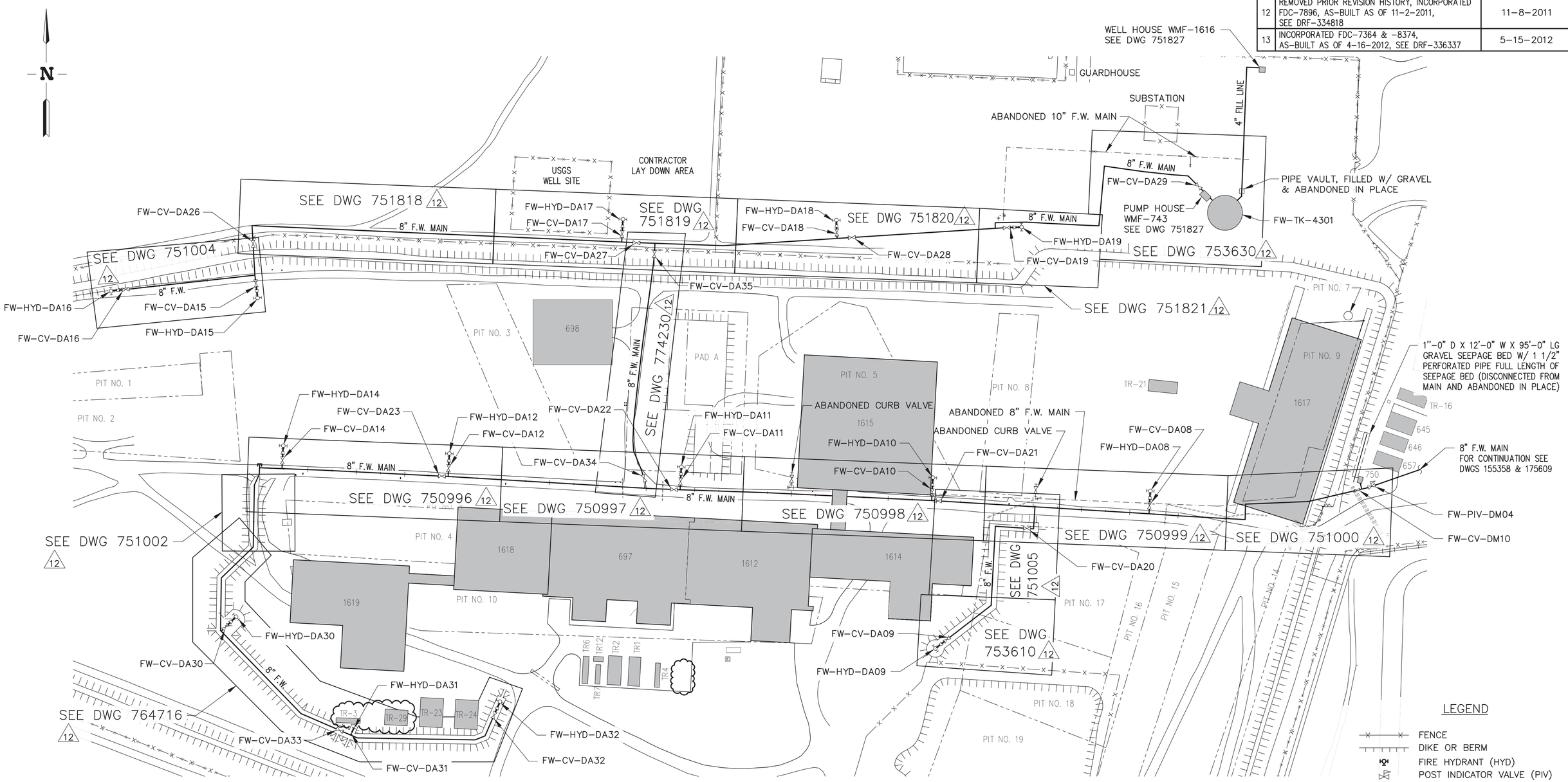
PHASE V OF THE ACCELERATED RETRIEVAL PROJECT RE5/AL5 WMF-1617 DATA/DATA, CCTV AND INTERCOM FLOOR PLAN

SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	1617	06	136	762154	2

SCALE: NOTED SHEET 1 OF 1

File: 762154-2.dwg Path: P:\RE5RCRA Date: 05/16/12 – 9:17 AM Layout Name: Layout1 ID: HLY

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
12	REMOVED PRIOR REVISION HISTORY, INCORPORATED FDC-7896, AS-BUILT AS OF 11-2-2011, SEE DRF-334818	11-8-2011	
13	INCORPORATED FDC-7364 & -8374, AS-BUILT AS OF 4-16-2012, SEE DRF-336337	5-15-2012	



SITE PLAN

NOTES

1. ALL UNDERGROUND F.W. PIPING IS CL. 200 C.I. W/ MJ FITTINGS OR TYTON JT. FITTINGS (SEE SPECS) IN ACCORDANCE W/ NFPA 24.
2. THRUST BLOCKS ARE PROVIDED IN ACCORDANCE W/ NFPA 24. THRUST BLOCKS ARE CAST IN PLACE AGAINST UNDISTURBED TRENCH WALLS WHEN NOT UTILIZING THRUST RESTRAINT SYSTEM PIPING.
3. REMOVED
4. REMOVED
5. REMOVED
6. LAYOUT OF FIREWATER PIPING IS BASED UPON RWMC SITE SPECIFIC DATUM TO AGREE WITH THE RWMC NORTH AND SOUTH CONTROL POINTS WHICH HAVE BEEN MEASURED WITH A 1991 GPS FIRST LEVEL CONTROL. FOR THE LOCATION OF PIPING COMPONENTS SEE RWMC DRAFTING. FIELD VERIFY BEFORE BEGINNING SUBSURFACE WORK.
7. REMOVED
8. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.
9. SEE DRAWING 415445 SHEET 3 FOR THE OPERATIONS AREA PRIMARY FIREWATER PUMP HOUSE P & ID.
10. THE PRIMARY RWMC FIRE WATER SUPPLY SYSTEM FROM WMF-639 CONSISTS OF TWO 2000 GPM PUMPS OPERATING AT 125 PSI NET DISCHARGE PRESSURE (ONE DIESEL ENGINE DRIVEN, ONE ELECTRIC MOTOR DRIVEN 480 VAC) TAKING SUCTION FROM A 250,000 GALLON (MINIMUM LEVEL 207,413 GALLON) GRADE LEVEL WATER STORAGE TANK. THE ELECTRIC MOTOR DRIVEN PUMP AUTOMATICALLY STARTS AT 120 PSIG. THE DIESEL ENGINE DRIVEN PUMP AUTOMATICALLY STARTS WHEN THE SYSTEM PRESSURE DROPS TO BELOW 110 PSIG AND AFTER A 24 SECOND TIME DELAY.
11. THE SECONDARY WATER SUPPLY FROM WMF-743 CONSISTS OF A 1500 GPM AT 85 PSIG NET, AUTOMATIC STARTING, DIESEL ENGINE DRIVEN FIRE PUMP TAKING SUCTION FROM FW-TK-4301 GRADE LEVEL SUCTION TANK.

12. REFERENCE DRAWING ONLY.

PROJECT NO. 015575

QTY. REQD.	QUAL. LEVEL	PART OR IDENTIFYING NO.	DESCRIPTION/MATERIAL/SPECIFICATION	ITEM/ FIND

PARTS LIST

DIMENSIONING AND SYMBOLOGY ARE AMERICAN NATIONAL STANDARD UNLESS OTHERWISE SPECIFIED
SURFACE ROUGHNESS 125
DIMENSIONS AND TOLERANCES ARE IN INCHES
TOLERANCES: .X = ± .1
DECIMALS: .XX = ± .03
.XXX = ± .010
FRACTIONS ± 1/8
ANGULAR ± 2°
DO NOT SCALE DRAWING

NEXT ASSY/REF DWG	N/A	
P.M.	D.L. FRENCH	11/5/92
DESIGN MGR	J.C. KVAMME	11/5/92
DESIGN	D.R. SCHIESS	DATE 11/9/92
CHECKED	D.R. SCHIESS	DATE 11/9/92
DRAWN	B.L. SCOTT	DATE 5/27/92
RELEASE	A.L. WATLINGTON	DATE 11-9-92

EG&G Idaho, Inc.

RWMC — SDA AREA

RADIOACTIVE WASTE MANAGEMENT COMPLEX
SDA FIREWATER PIPING
PLOT PLAN

SIZE	INDEX CODE NUMBER (AREA / TYPE / CL / ORIG.)	DRAWING NO.	REV
D	098 0200 52 220	177425	13
SCALE 1'=100' & NOTED	SPEC CODE	SHT 1 OF 1	

RW-1266

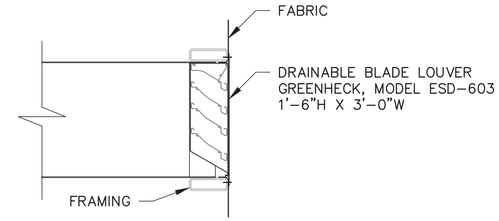
File: 177425-13.dwg Path: C:\Documents and Settings\ID: BXS\My Documents\BXS\RW-1266 Date: 05/15/12 – 8:33 AM Layout Name: Sheet 1

FMT-D1-REV 4

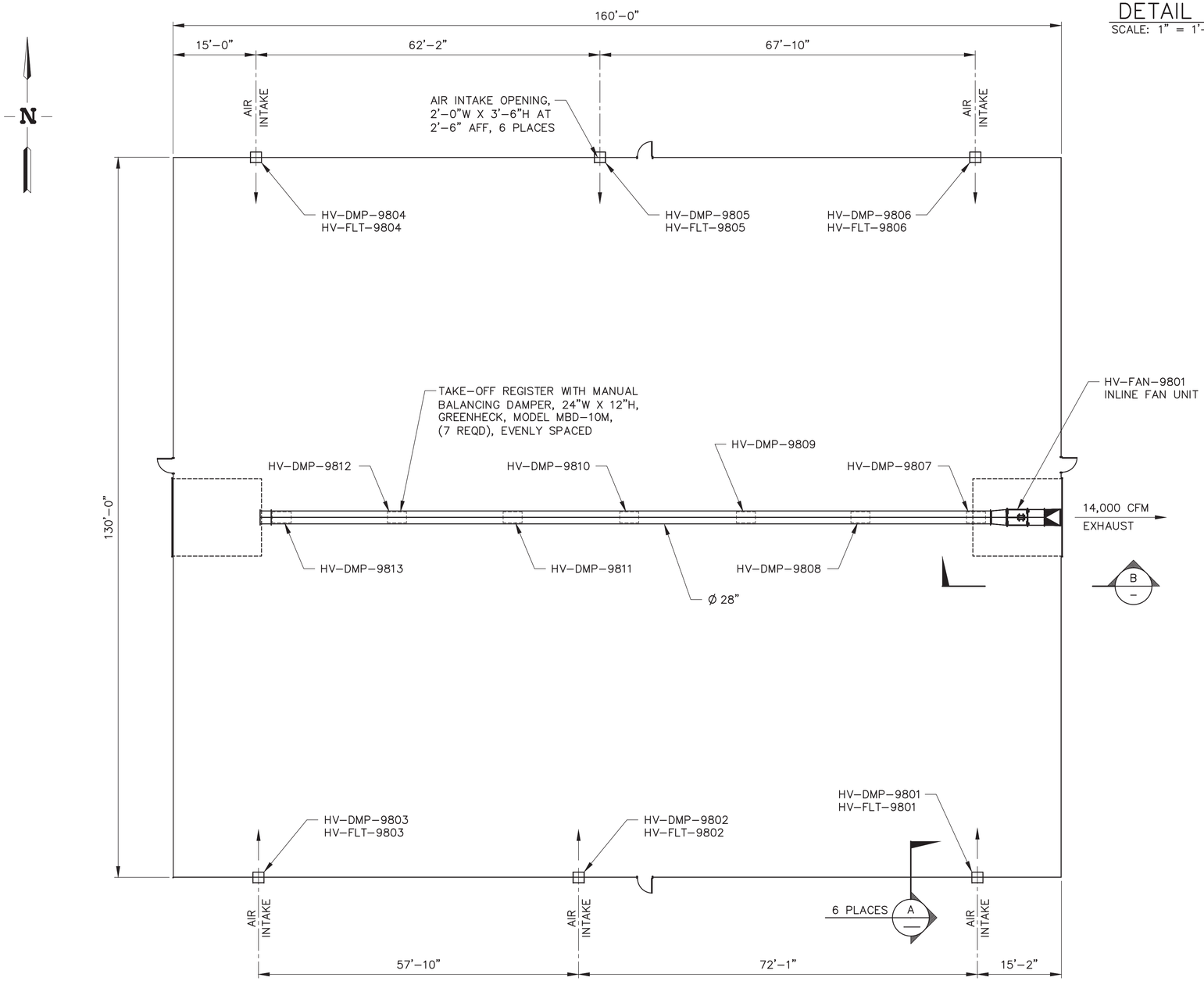
REVISIONS		
REV	DESCRIPTION	EFFECTIVE DATE:
1	CHANGED DRAWING TITLE & INDEX CODE CLASS, INCORPORATED PERTINENT INFO FROM DWG 631229, AS-BUILT AS OF 9-29-2005, SEE DAR-125738	10-6-2005
2	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 1/26/2012 SEE DRF-335441	2/6/2012

NOTES

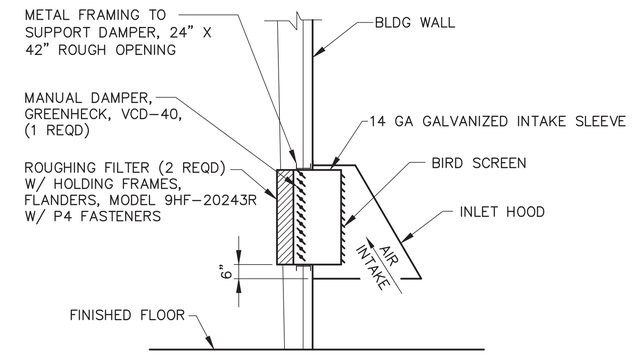
1. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT SAFETY CATEGORY DESIGNATION



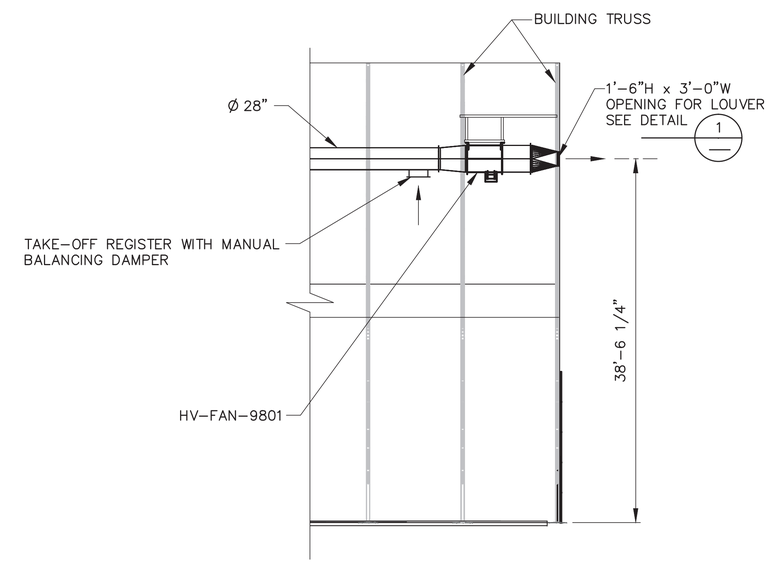
DETAIL 1
SCALE: 1" = 1'-0"



HVAC FLOOR PLAN
SCALE: 3/32" = 1'-0"



SECTION A
SCALE: 3/8" = 1'-0"



SECTION B
SCALE: 1/8" = 1'-0"

REQUESTER: S.L. AUSTAD	
DESIGN: L.E. GUILLEN	
DRAWN: E.L. TOMLIN	
PROJECT NO.	23927
SPCL CODE	
FOR REVIEW/APPROVAL SIGNATURES SEE DAR NO. 124246	
EFFECTIVE DATE:	7-20-05

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
AND DISPOSITION PROJECT
STORAGE ENCLOSURE
VENTILATION PLAN, SECTIONS AND DETAIL

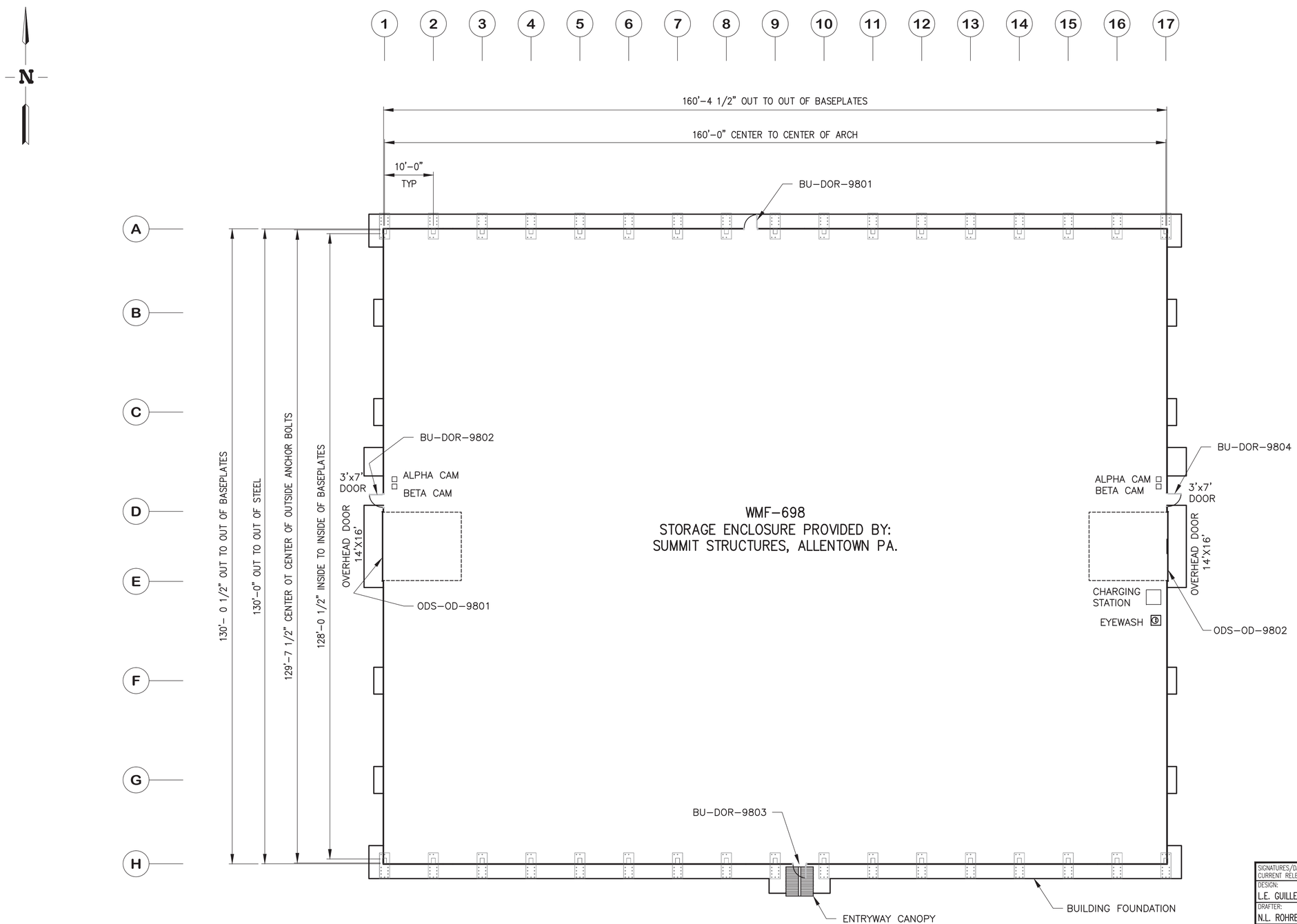
SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	0698	22	136	631228	2

SCALE: NOTED — SHEET 1 OF 1

File: 631228-2.dwg
Path: H:\NANCY R\WMF-698
Date: 02/06/12 - 4:06 PM
Layout Name: 130X160
ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DRAWING TITLE, INCORPORATED FDC-6025, AS-BUILT AS OF 11-17-2009, SEE DRF-328954
2	INCORPORATED FDC-7494, AS-BUILT AS OF 1-17-2011, SEE DRF-332225
3	DRAWING ASSESSED AND VERIFIED AS-BUILT AS OF 1/26/2012 SEE DRF-335441



STORAGE ENCLOSURE PLAN

SCALE: 3/32"=1'-0"
12,480 DRUM MAX COUNT

NOTES

1. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

GENERAL NOTES

1. GENERAL DESIGN:
   DESIGN CODES:
   - GENERAL – INTERNATION BUILDING CODE (2003 EDITION)
   - CONCRETE – ACI-318-00
   - STEEL – AISC (NINTH EDITION)
   - IBC OCCUPANCY: S-2
   - IBC BUILDING TYPE: IIB
   - NFPA 101 OCCUPANCY: ORDINARY HAZARD STORAGE
   - DESIGN LOADS: SEE SPC-521

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: L.E. GUILLEN	N/A N/A
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.02.06 08:36:50 -07'00'
TECHNICAL CHECK: EGS	N/A N/A
ENG GROUP SUPERVISOR: S.L. AUSTAD	N/A N/A
DESIGN LEAD: S.L. AUSTAD	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.02.06 13:43:33 -07'00'
PROJECT NUMBER: 23927	
DRF NUMBER: 124246	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
AND DISPOSITION PROJECT
STORAGE ENCLOSURE
PLAN

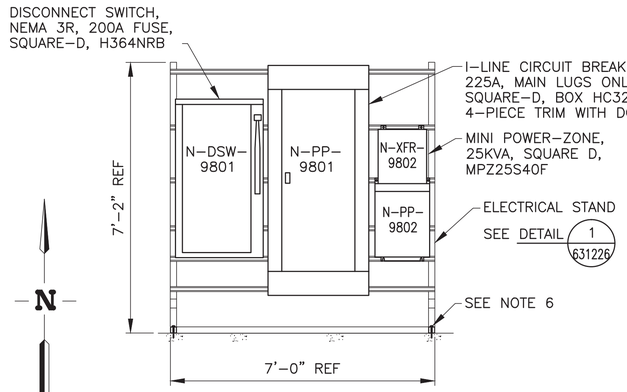
SIZE	INDEX CODE NUMBER AREA	TYPE	CL	ORIG	DWG-	REV
D	098	0698	00	136	631225	3

SCALE: NOTED SHEET 1 OF 1

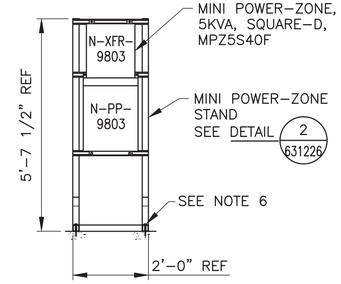
RW-1265

File: 631225-3.dwg Path: H:\NANCY R\WMF-698 Date: 02/06/12 - 8:07 AM Layout Name: S-3 ID: HLY

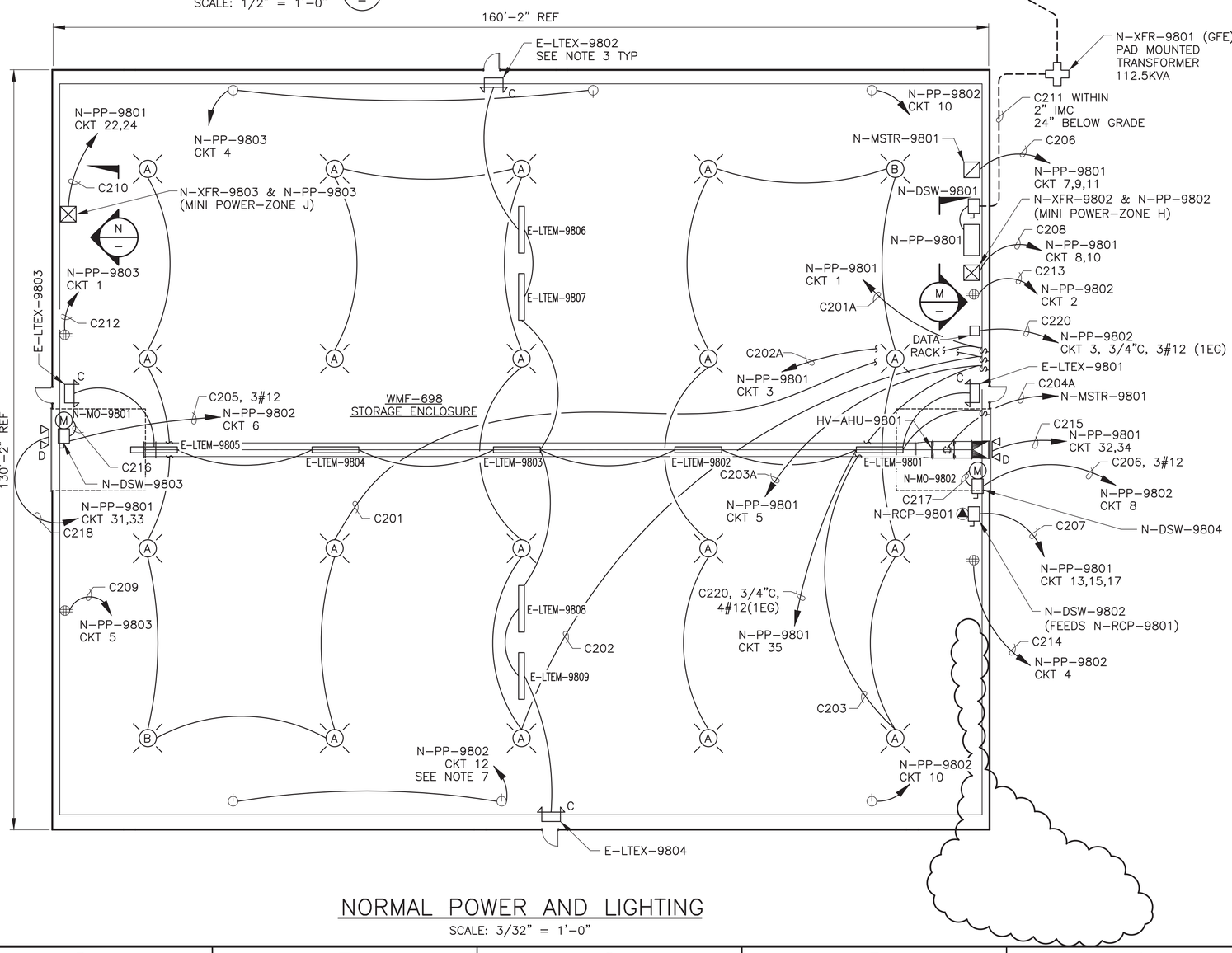
FMT-D1-REV 4



ELEVATION (M / –)
SCALE: 1/2" = 1'-0"



ELEVATION (N / –)
SCALE: 1/2" = 1'-0"



NORMAL POWER AND LIGHTING
SCALE: 3/32" = 1'-0"

X-REF DRAWING
631242

REVISIONS		
REV	DESCRIPTION	EFFECTIVE DATE:
4	REMOVED PRIOR REVISION HISTORY, AS-BUILT AS OF 1/26/2012, SEE DRF-335441	2/6/2012

NOTES

1. LUMINAIRE LOCATION IS APPROXIMATE. LUMINAIRES ARE SUPPORTED FROM THE TRUSSES. MOUNT PER MANUFACTURER'S INSTRUCTIONS.
2. UPPER CASE LETTERS WITHIN OR NEAR LUMINAIRE INDICATE LUMINAIRE TYPE, SEE LUMINAIRE SCHEDULE, SEE SHEET E-1.
3. EMERGENCY EXIT LIGHTS AND SIGNS ARE NOT TO BE SWITCHED AND MUST BE ON AT ALL TIMES.
4. USE EXISTING/AVAILABLE RISER AND CUTOUTS.
5. IF ROCK IS ENCOUNTERED AND 24" BELOW GRADE IS NOT POSSIBLE THEN COVER CONDUIT IN CONCRETE PER FDC-SD-11. CONNECT TO TRANSFORMER WITH 200A LOAD BREAK ELBOWS.
6. ANCHOR STAND TO CONCRETE FLOOR USING Ø3/8" EXPANSION ANCHORS WITH 1 1/2" MIN EMBEDMENT. FIELD LOCATE AS REQD. ANCHOR STAND PRIOR TO INSTALLING EQUIPMENT.
7. USE #10 AWG (VOLTAGE DROP).
8. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

LEGEND

- SINGLE 5-20R RCPT; MARKED "CAM USE"
- POWER POLE
- GFCI PROTECTED QUAD RECEPTACLE
- CHARGING STATION RECEPTACLE (480V, 3Ø)
- POWER PANEL
- MINI POWER-ZONE
- TRANSFORMER
- DISCONNECT SWITCH
- MOTOR STARTER
- MOTOR FOR ROLL UP DOOR
- CEILING MOUNT LUMINAIRE, LETTER INDICATES FIXTURE TYPE
- EMERGENCY EXIT LIGHT & SIGN WITH BATTERY BACKUP
- EXTERIOR LIGHTING, LETTER INDICATES FIXTURE TYPE
- UNDERGROUND RACEWAY
- ABOVE GROUND RACEWAY

FOR DRAWING INDEX SEE DRAWING NO. 631223

SCALE: 1/2" = 1'-0"
SCALE: 3/32" = 1'-0"

DESIGN PHASE: N/A
SAFETY CATEGORY: NOTE 8

REQUESTER: S.L. AUSTAD
DESIGN: M.G. PHILLIPS
DRAWN: J.L. ROBERTS
PROJECT NO. 23927
SPCL CODE
FOR REVIEW/APPROVAL SIGNATURES SEE DAR NO. 124246
EFFECTIVE DATE: 7/20/05

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
& DISPOSITION PROJECT
WMF-698 STORAGE ENCLOSURE
NORMAL POWER AND LIGHTING PLAN

SIZE	INDEX CODE NUMBER AREA	TYPE	CL	ORIG	DWG-	REV
D	098	0698	10	136	631233	4

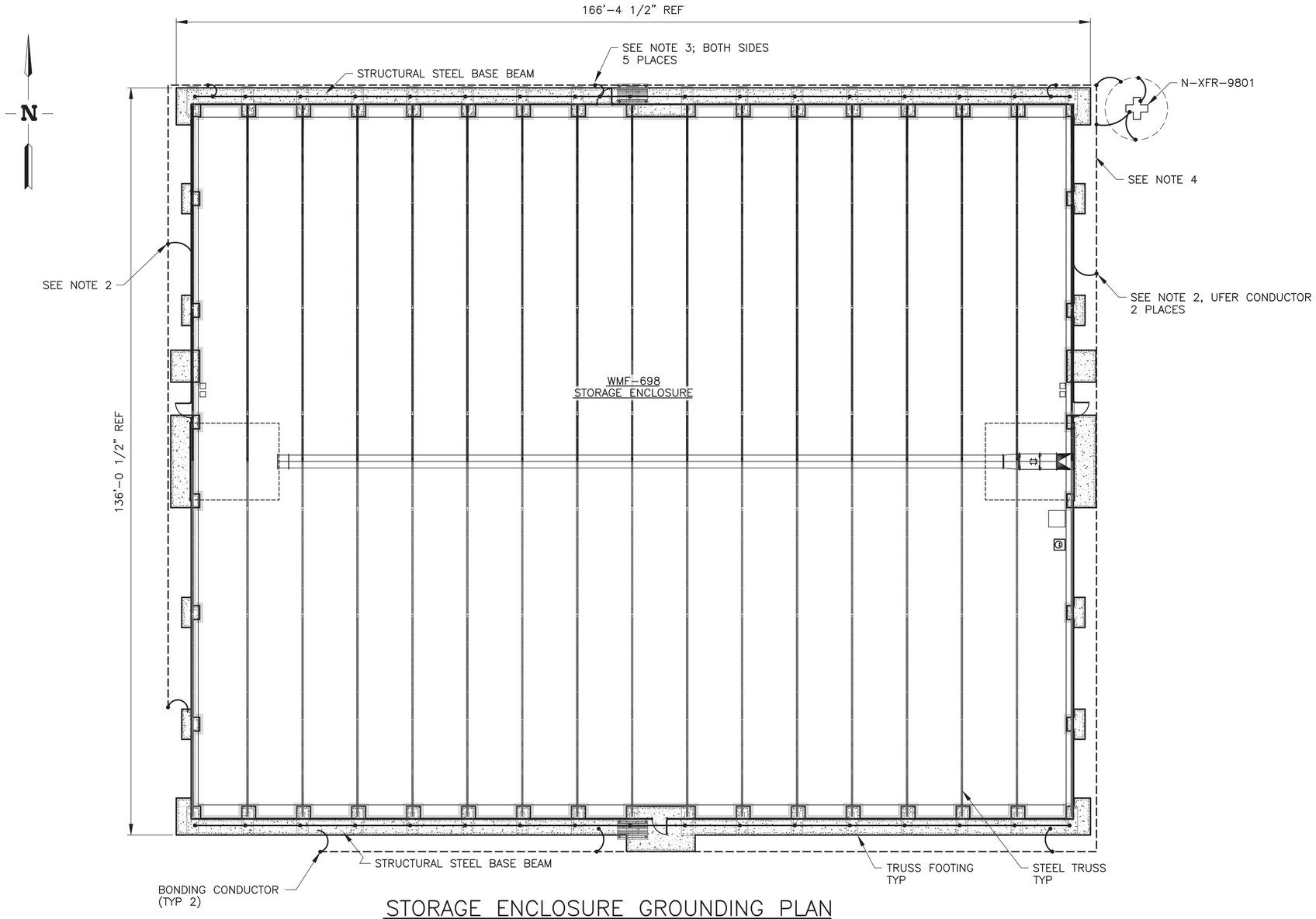
SCALE: NOTED
SHEET 1 OF 1

RW-1264

File: 631233-4.dwg
Path: H:\NANCY R\WMF-698
Date: 02/06/12 - 8:09 AM
Layout Name: D Size
ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE AS-BUILT AS OF 1/26/2012 SEE DRF-335441



STORAGE ENCLOSURE GROUNDING PLAN

SCALE: 3/32" = 1'-0"

NOTES

1. ALL LIGHTNING PROTECTION AND GROUNDING CONDUCTORS ARE #2/0 AWG BARE COPPER.
2. CONCRETE-ENCASED ELECTRODE (UFER) CONDUCTOR IS BONDED TO BUILDING GROUNDING RING.
3. BUILDING GROUNDING RING IS BONDED TO STRUCTURAL STEEL BASE BEAM.
4. BUILDING GROUNDING RING IS AGAINST THE PERIMETER SIDE OF STEM WALL 30" BELOW GROUND LEVEL AROUND THE STORAGE ENCLOSURE AS SHOWN.
5. STRUCTURAL STEEL BASE BEAM GROUND CONDUCTOR IS BONDED TO STRUCTURAL STEEL.
6. THIS IS A QUALITY LEVEL 4 SYSTEM.

LEGEND

- • GROUND CONNECTION
- BURIED GROUND WIRE
- EXPOSED GROUND BONDING CONDUCTOR
- TRANSFORMER

X-REF DRAWING

631242

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: M.G. PHILLIPS	N/A N/A
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.02.06 08:38:05 -07'00'
TECHNICAL CHECK: M.W. VAUGHN	N/A N/A
ENG GROUP SUPERVISOR: T.M. HIPP	N/A N/A
DESIGN LEAD: S.L. AUSTAD	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.02.06 13:39:35 -07'00'
PROJECT NUMBER: 23927	
DRF NUMBER: 124246	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
AND DISPOSITION PROJECT
STORAGE ENCLOSURE
GROUNDING PLAN

SIZE	INDEX CODE NUMBER: AREA	TYPE	CL	ORIG	DWG-	REV
D	098	0698	10	136	631234	1

SCALE: NOTED SHEET 1 OF 1

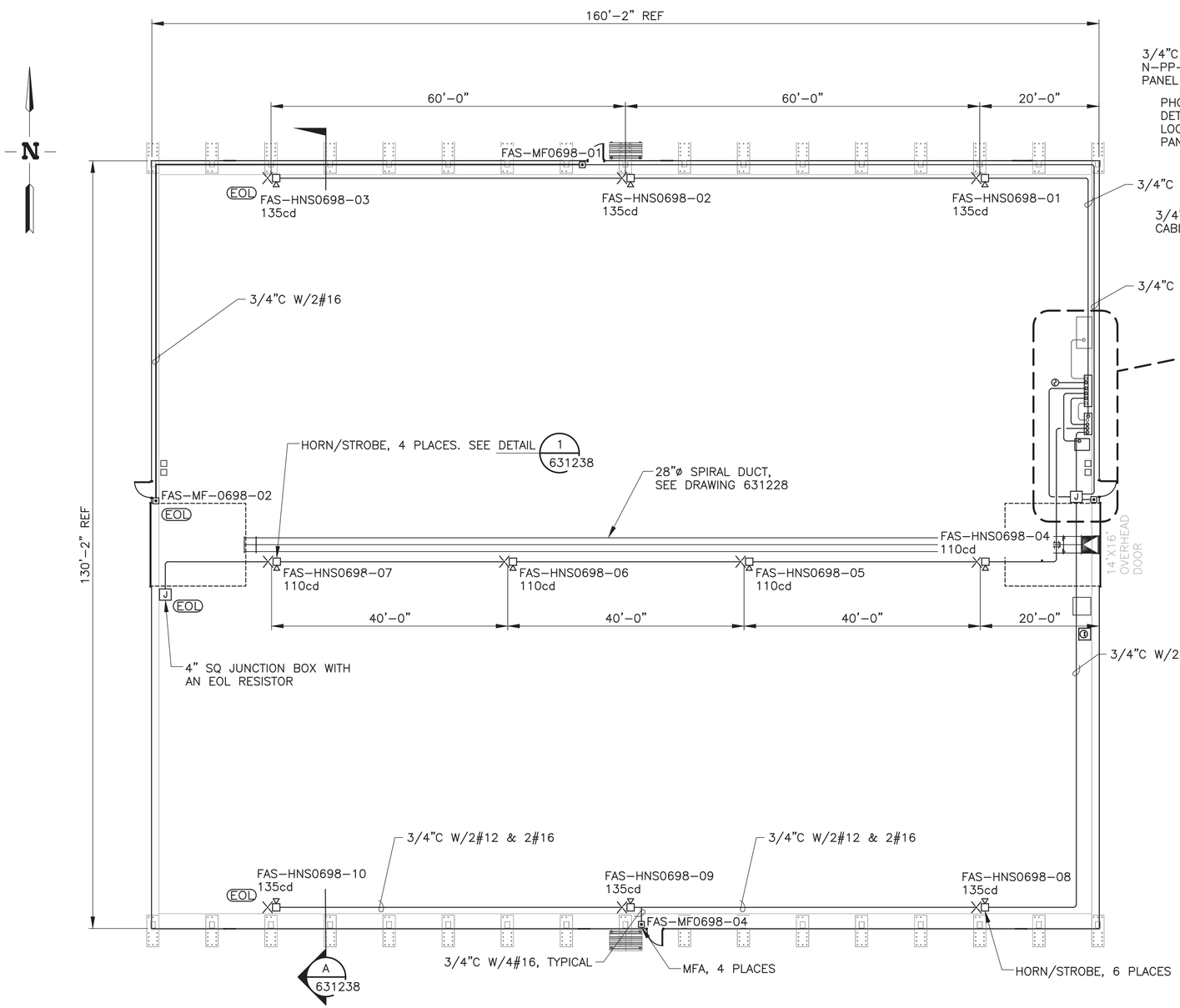
File: 631234-1.dwg
Path: H:\NANCY R\WMF-698
Date: 02/06/12 - 8:21 AM | Layout Name: D Size | ID: HLY

FMT-D1-REV 5.2

NOTES

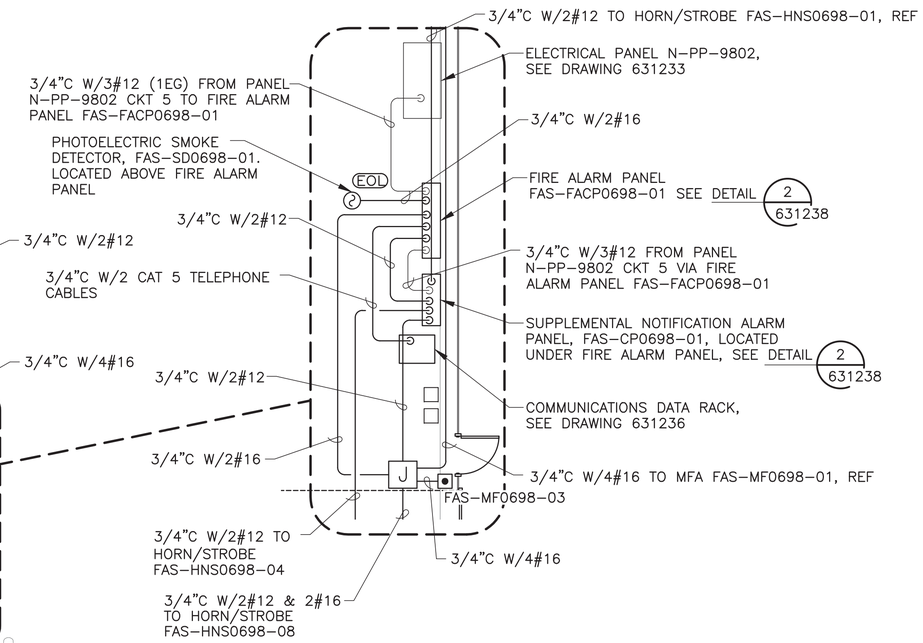
1. SEE DRAWINGS 631239 & 631240 FOR WIRING DIAGRAMS AND DRAWING 631241 FOR BATTERY CALCULATIONS.
2. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT QUALITY LEVEL DESIGNATION.

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC 2884 AS-BUILT AS OF 1/26/2012 SEE DRF-335441



STORAGE ENCLOSURE PLAN

SCALE: 3/32" = 1'-0"



LEGEND

- MANUAL FIRE ALARM STATION
- HORN/STROBE
- EOL — END OF LINE RESISTOR
- SMOKE DETECTOR

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: BRUNSON	N/A N/A
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.02.06 08:38:44 -07'00'
TECHNICAL CHECK: D.W. CLARK	N/A N/A
ENG GROUP SUPERVISOR: W.H. REED	N/A N/A
DESIGN LEAD: T. LANGENWALTER	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.02.06 13:42:33 -07'00'
PROJECT NUMBER: 23927	
DRF NUMBER: 124426	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
AND DISPOSITION PROJECT
STORAGE ENCLOSURE
FIRE ALARM PLAN

SIZE	INDEX CODE NUMBER AREA	TYPE	CL	ORIG	DWG-	REV
D	098	0698	12	136	631237	1

SCALE: NOTED — SHEET 1 OF 1

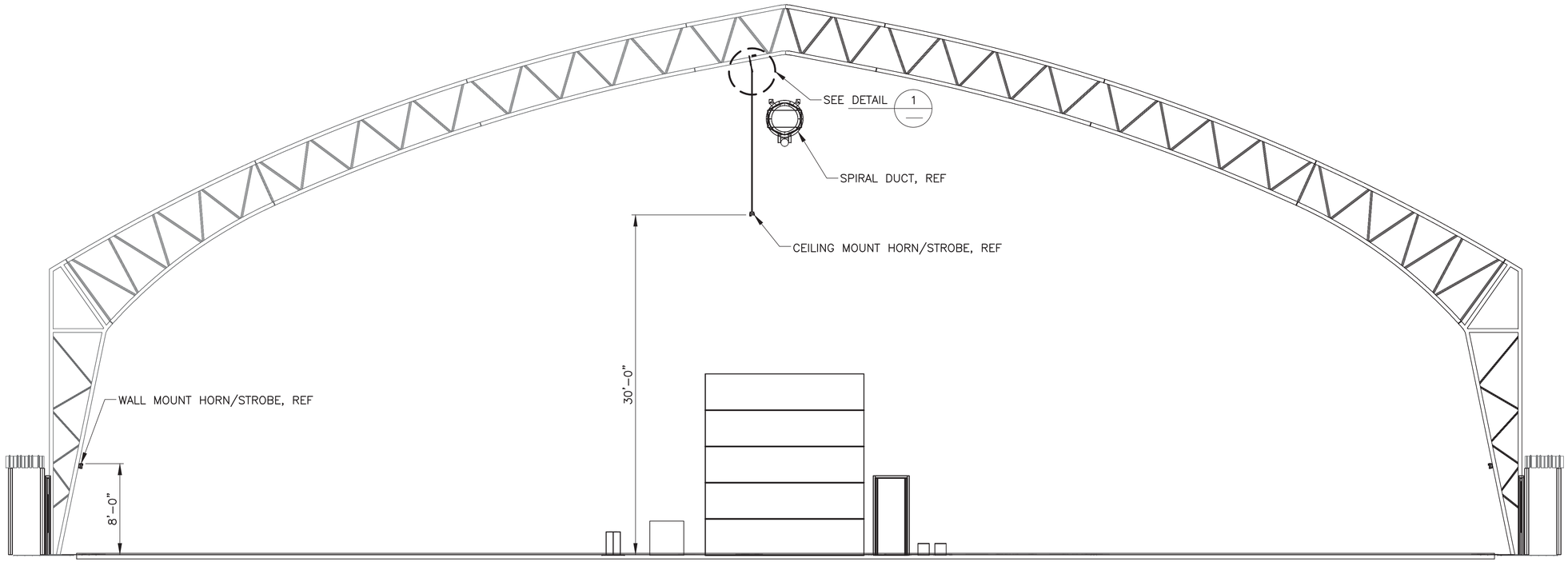
File: 631237-1.dwg
Path: H:\NANCY R\WMF-698
Date: 02/02/12 - 12:22 PM | Layout Name: Layout1
ID: HLY

FMT-D1-REV 5.2

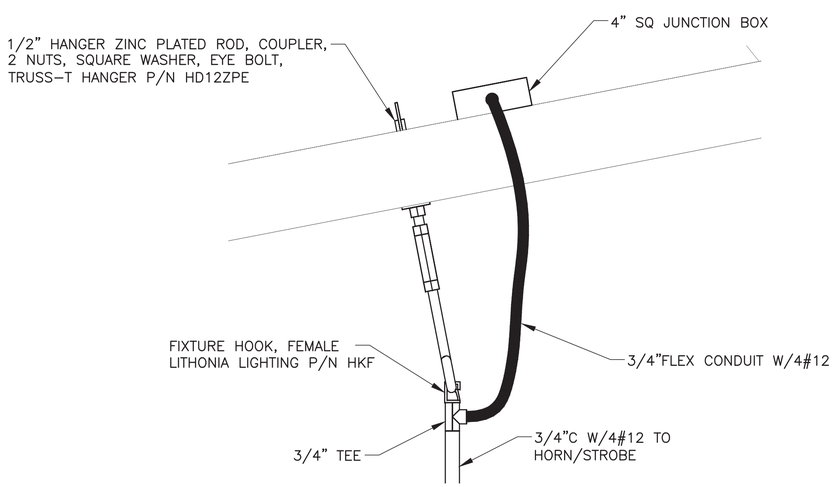
NOTES

1. SEE RWMC CONFIGURATION MANAGEMENT DATABASE FOR COMPONENT LEVEL DESIGNATION.

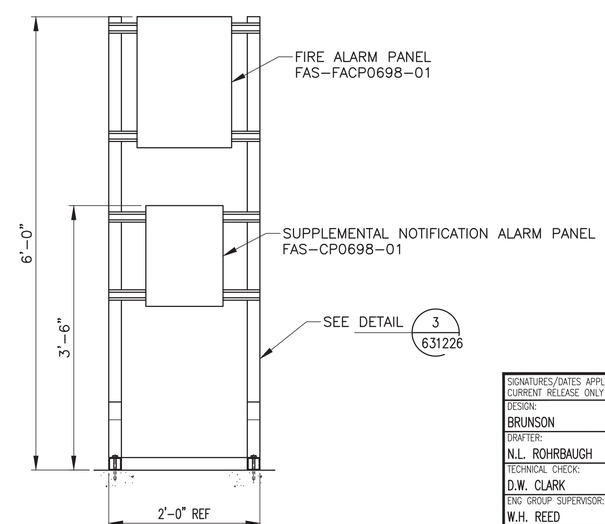
REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE AS-BUILT AS OF 1/26/2012 SEE DRF-335441



SECTION A 631237
SCALE 3/16 = 1'-0"



DETAIL 1 —
SCALE: 3"=1'-0"



DETAIL 2 631237
SCALE: 3"=1'-0"

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: BRUNSON	N/A N/A
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.02.06 08:39:44 -07'00'
TECHNICAL CHECK: D.W. CLARK	N/A N/A
ENG GROUP SUPERVISOR: W.H. REED	N/A N/A
DESIGN LEAD: T. LANGEWALTER	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.02.06 14:02:26 -07'00'
PROJECT NUMBER: 23927	
DRF NUMBER: 124426	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
AND DISPOSITION PROJECT
STORAGE ENCLOSURE
FIRE ALARM SECTION AND DETAILS

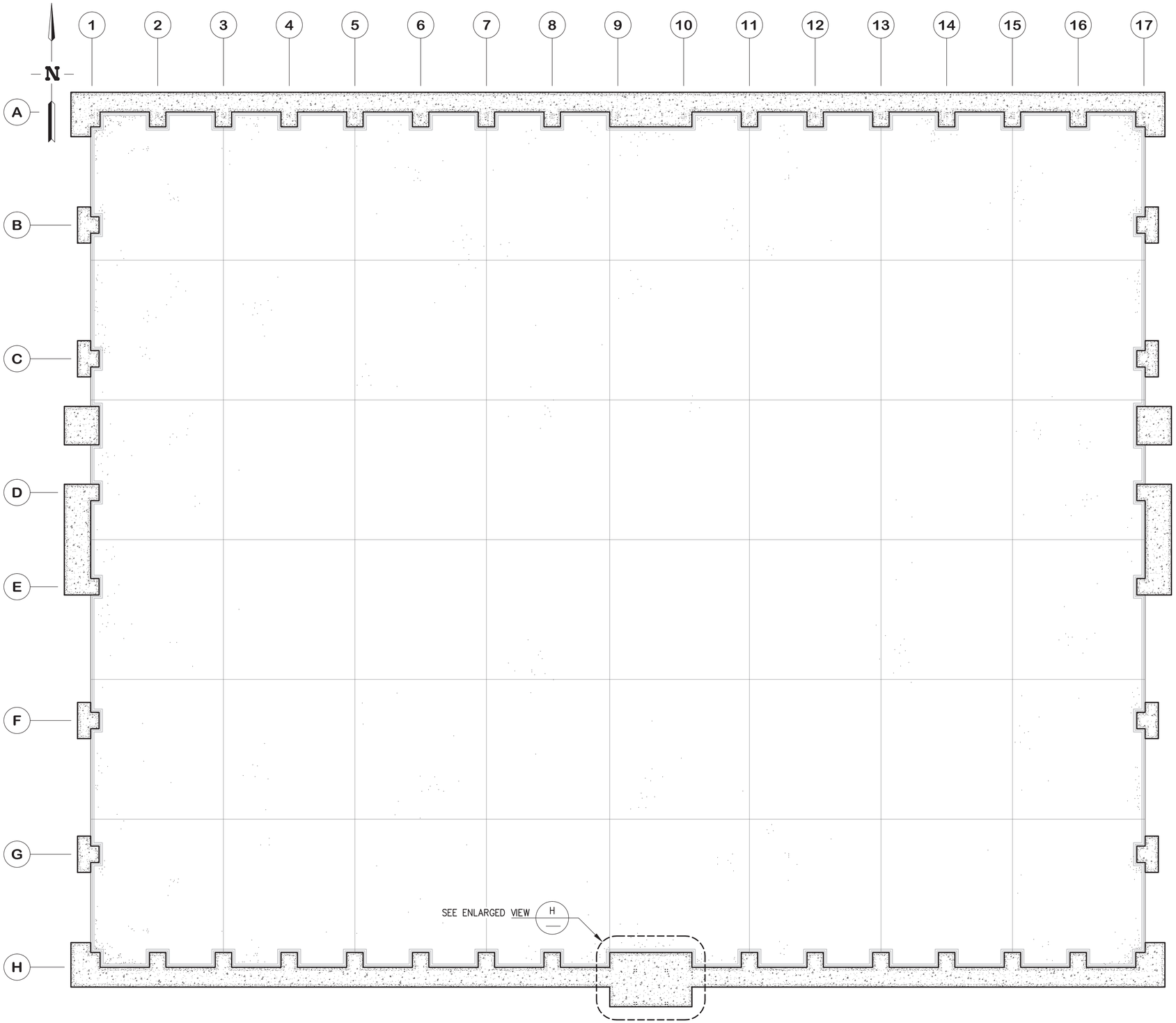
SIZE	INDEX CODE NUMBER AREA	TYPE	CL	ORIG	DWG-	REV
D	098	0698	12	136	631238	1

SCALE: NOTED
SHEET 1 OF 1

File: 631238-1.dwg
Path: H:\NANCY R\WMF-698
Date: 02/06/12 - 8:27 AM
Layout Name: Details
ID: HLY

FMT-D1-REV 5.2

REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC-SE-6 AS-BUILT AS OF 1/26/2012 SEE DRF-335441

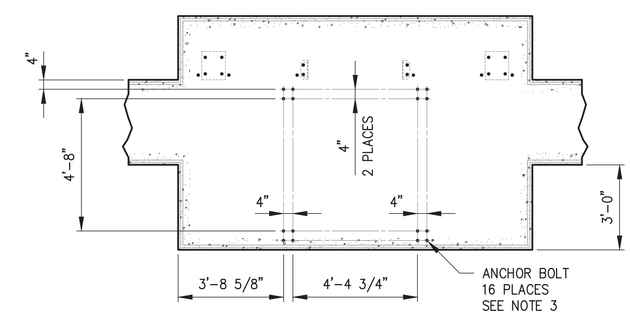


FOUNDATION INSTALLATION PLAN

SCALE: 1/8"=1'-0"

NOTES:

1. REINFORCEMENT IS #4 REBAR AT 12" OC MAXIMUM SPACING EACH WAY, EACH FACE.
2. ENCLOSURE ANCHOR BOLTS ARE 5/8" DIAMETER ASTM A325 BOLTS. PROJECT 2" ABOVE CONCRETE. EMBEDMENT IS A MINIMUM OF 9". FLAT WASHERS ARE 1 1/2" DIAMETER .
3. CANOPY ANCHOR BOLTS ARE 1/2" DIAMETER ASTM A307 OR ASTM A325 BOLTS. PROJECTED 2" ABOVE CONCRETE. EMBEDMENT IS A MINIMUM OF 4". FLAT WASHERS ARE 1 3/8" DIAMETER
4. SEE PAD REFERENCE DRAWINGS 627916 & 627917 FOR ADDITIONAL INFORMATION.
5. SEE DRAWING 631234 FOR GROUNDING PLAN.
6. THIS IS A QUALITY LEVEL 4 SYSTEM.



ENLARGED VIEW H

SCALE: 3/8"=1'-0"

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: S.A. JENSEN	N/A N/A
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.02.06 08:35:53 -07'00'
TECHNICAL CHECK: EGS	N/A N/A
ENG GROUP SUPERVISOR: V.J. BALLS	N/A N/A
DESIGN LEAD: C.J. HURST	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.02.06 13:41:19 -07'00'
PROJECT NUMBER: 023927	
DRF NUMBER: 123945	

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
AND DISPOSITION PROJECT
STORAGE ENCLOSURE
FOUNDATION PLAN

SIZE	INDEX CODE NUMBER				DWG-	REV
	AREA	TYPE	CL	ORIG		
D	098	0698	62	136	631130	1

SCALE: NOTED

SHEET 1 OF 1

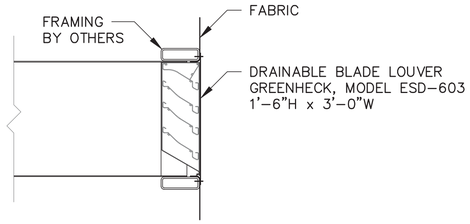
File: 631130-1.dwg
Path: H:\NANCY R\WMF-698
Date: 02/06/12 - 8:05 AM | Layout Name: S-1
ID: HLY

FMT-D1-REV 5.2

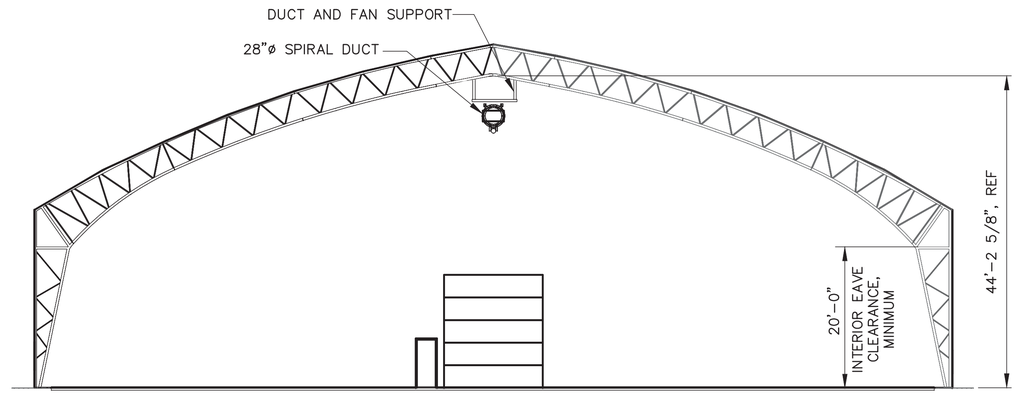
NOTES:

1. THIS IS A QUALITY LEVEL 4 SYSTEM.

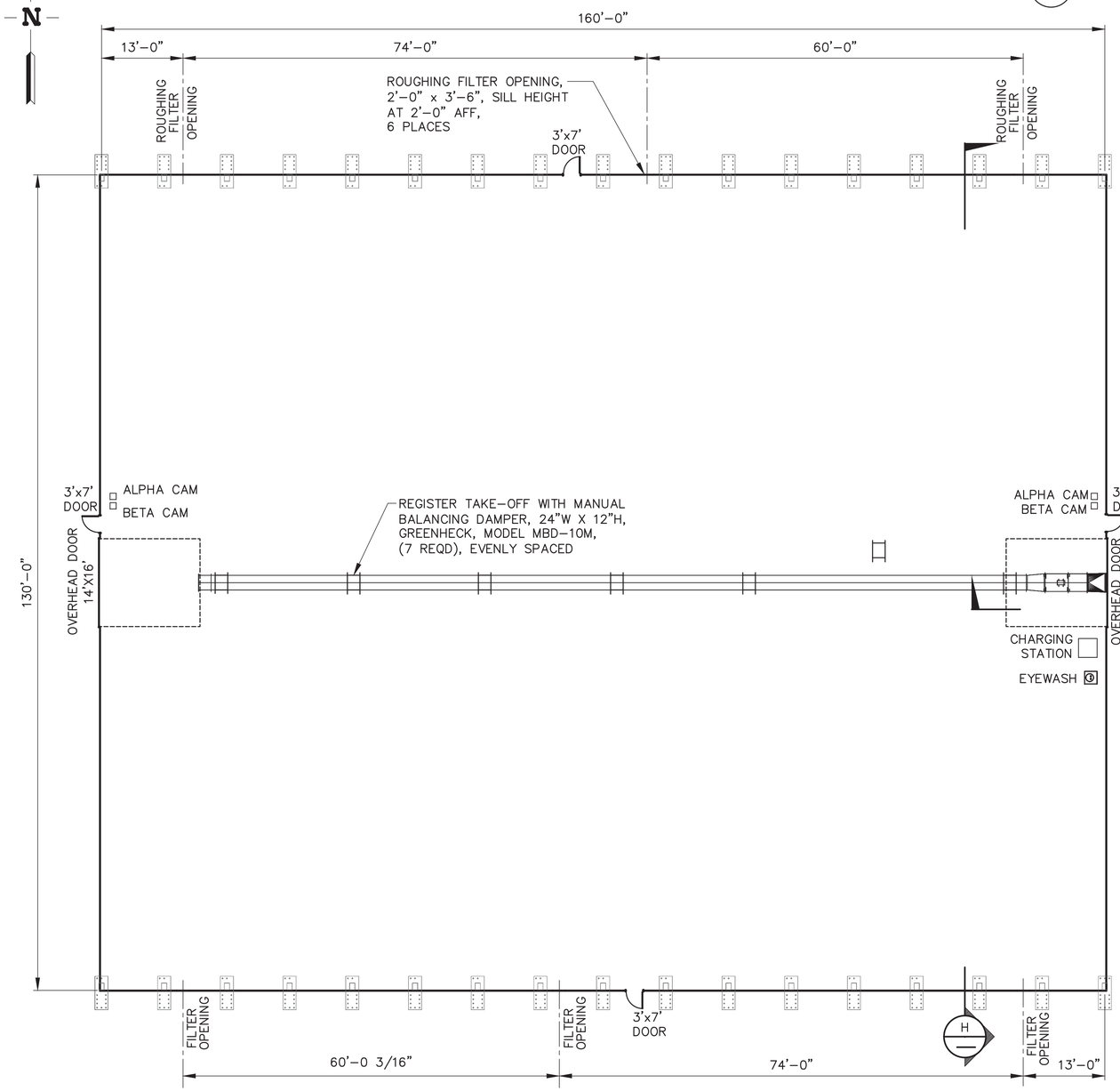
REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE AS-BUILT AS OF 1/26/2012 SEE DRF-335441



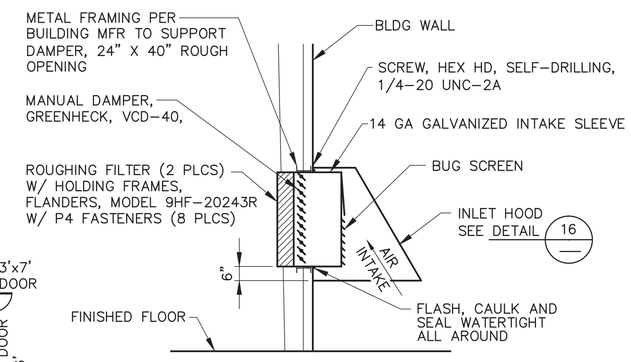
DETAIL 30
SCALE: 1" = 1'-0"



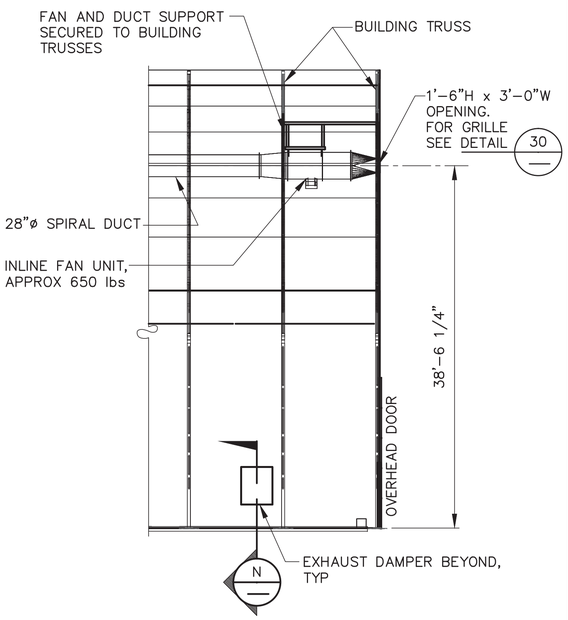
SECTION H
SCALE: 3/32" = 1'-0"



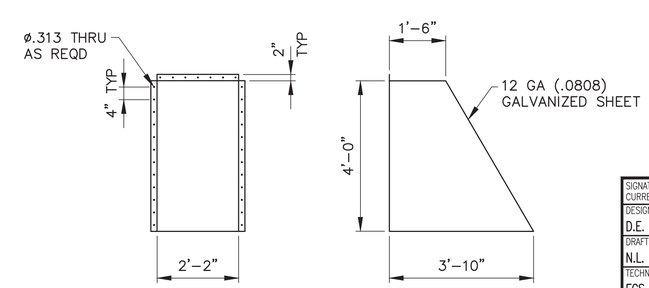
STORAGE ENCLOSURE PLAN
SCALE: 3/32" = 1'-0"
12,480 DRUM MAX COUNT



SECTION N N 631228
SCALE: 3/8" = 1'-0"



SECTION M M 631228
SCALE: 1/8" = 1'-0"



DETAIL 16
SCALE: 1/2" = 1'-0"

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: D.E. NISHOKA	N/A N/A
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.02.06 08:34:18 -07'00'
TECHNICAL CHECK: EGS	N/A N/A
ENG GROUP SUPERVISOR: S.L. AUSTAD	N/A N/A
DESIGN LEAD: S.L. AUSTAD	N/A N/A
DRAFTING CHECK/ EFFECTIVE DATE: B.L. SCOTT	Barry Scott 2012.02.06 13:45:31 -07'00'
PROJECT NUMBER: 23927	
DRF NUMBER: 112500	

INDEX CODE NUMBER			
AREA	TYPE	CL	ORIG
098	0698	22	090

Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL
AND DISPOSITION PROJECT
STORAGE ENCLOSURE
PLAN AND SECTIONS

SIZE	INDEX CODE NUMBER				DWG-	REV
	AREA	TYPE	CL	ORIG		
D	098	0698	00	136	627752	1

SCALE: NOTED
SHEET 1 OF 1

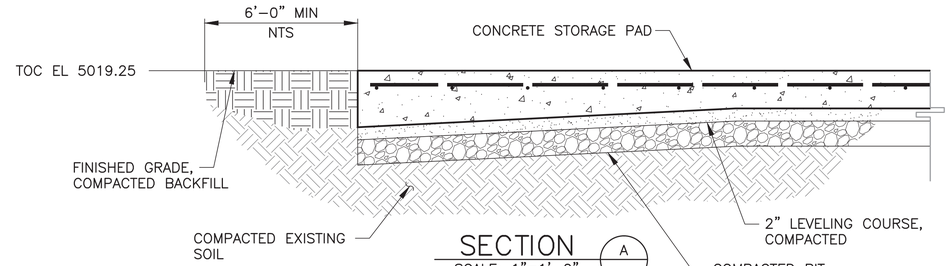
File: 627752-1.dwg
Path: H:\NANCY R\WMF-698
Date: 02/06/12 - 7:56 AM
Layout Name: 130X160
ID: HLY

FMT-D1-REV 5.2

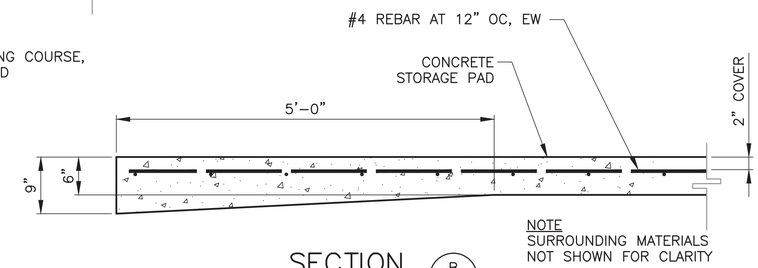
NOTES

1. THIS IS A QUALITY LEVEL 4 SYSTEM.
2. HORIZONTAL DATUM IS RWMC SITE SPECIFIC.

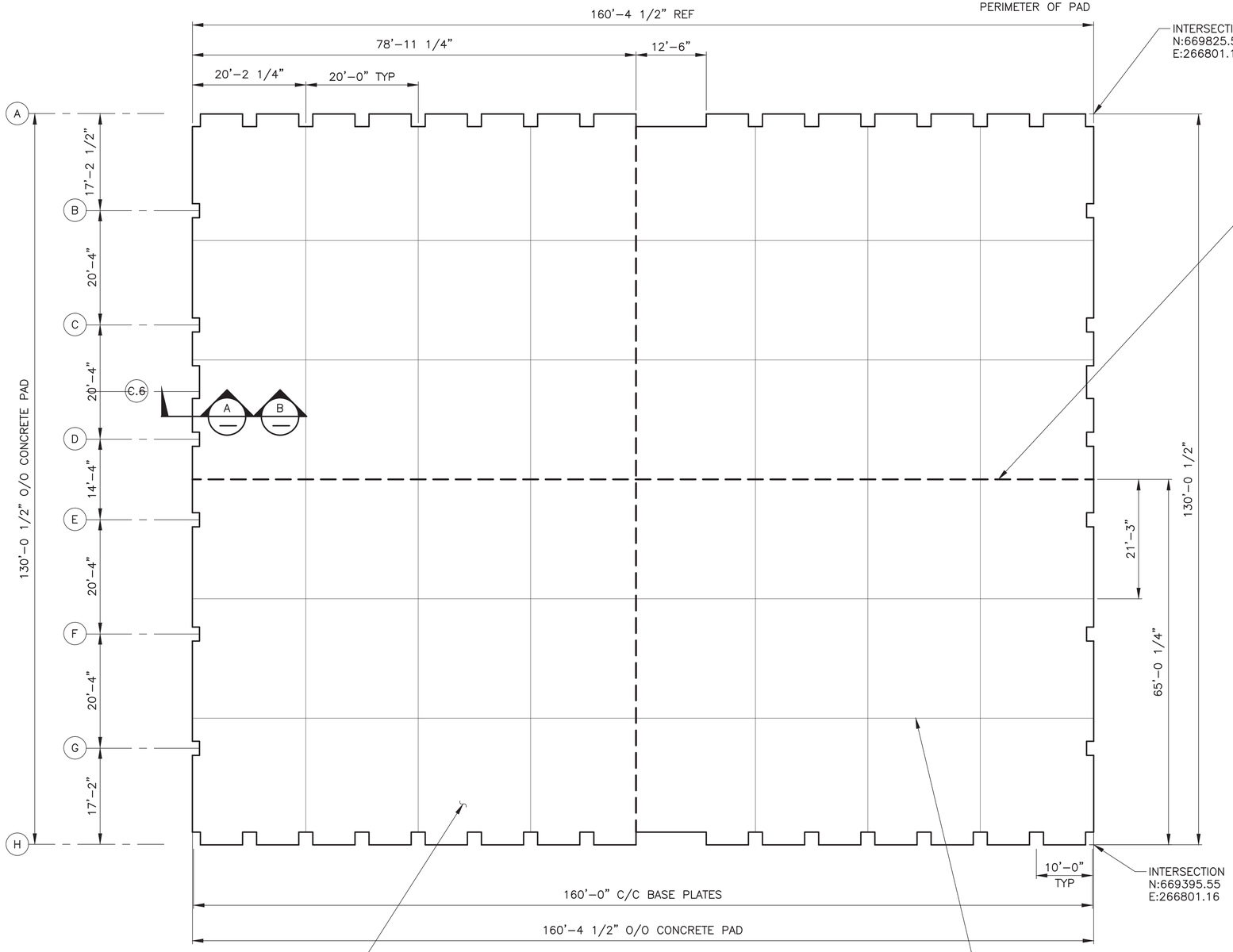
REVISIONS	
REV	DESCRIPTION
1	CHANGED DWG TITLE INCORPORATED FDC-RI-12 AS-BUILT AS OF 1/26/2012 SEE DRF-335441



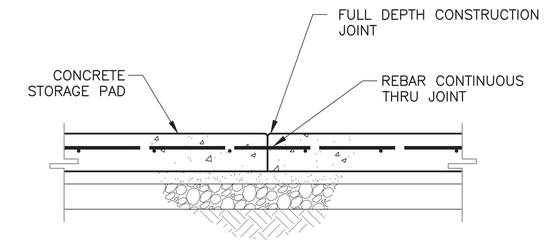
SECTION A/— SCALE: 1"=1'-0" TYPICAL ALL AROUND PERIMETER OF PAD



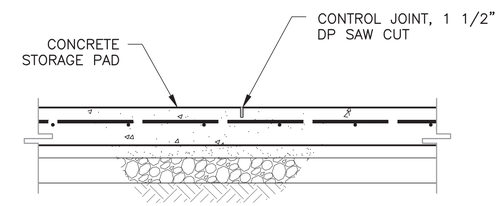
SECTION B/— SCALE: 1"=1'-0" TYPICAL ALL AROUND PERIMETER OF PAD



CONCRETE STORAGE PAD PLAN SCALE: 1/8"=1'-0"



CONSTRUCTION JOINT DETAIL 1/— SCALE: 1"=1'-0"



CONTROL JOINT DETAIL 2/— SCALE: 1"=1'-0"

LEGEND

EL	ELEVATION
TOC	TOP OF CONCRETE
———	CONTROL JOINT
— — —	CONSTRUCTION JOINT

SIGNATURES/DATES APPLY TO CURRENT RELEASE ONLY	SIGN AND DATE
DESIGN: R.F. LIPPERT	N/A N/A
DRAFTER: N.L. ROHRBAUGH	Nancy Rohrbaugh 2012.02.06 08:35:08 -07'00'
TECHNICAL CHECK: N/A	N/A N/A
ENG GROUP SUPERVISOR: N/A	N/A N/A
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Idaho Cleanup Project CH2M•WG IDAHO, LLC

RWMC
TARGETED WASTE REMOVAL AND DISPOSITION PROJECT
STORAGE ENCLOSURE
PAD PLAN, SECTIONS, AND DETAILS

SIZE	INDEX CODE NUMBER AREA	TYPE	CI	ORIG	DWG-	REV
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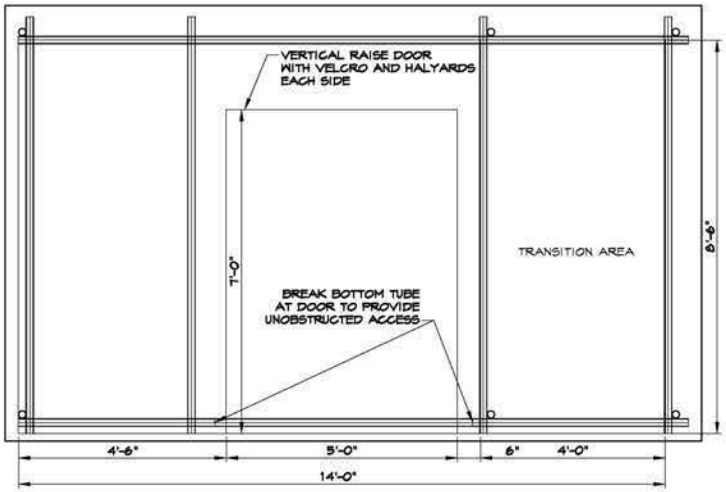

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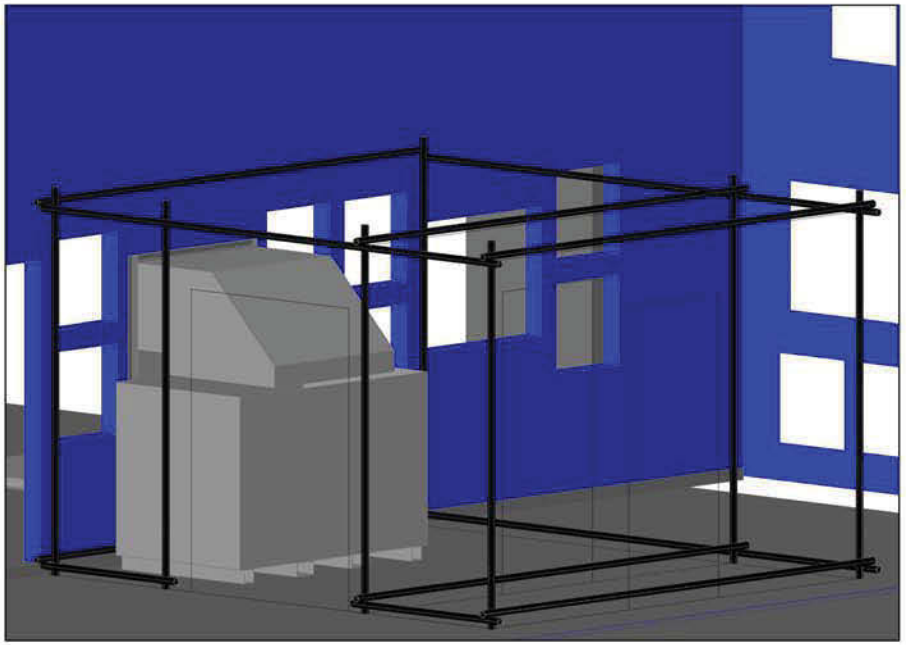

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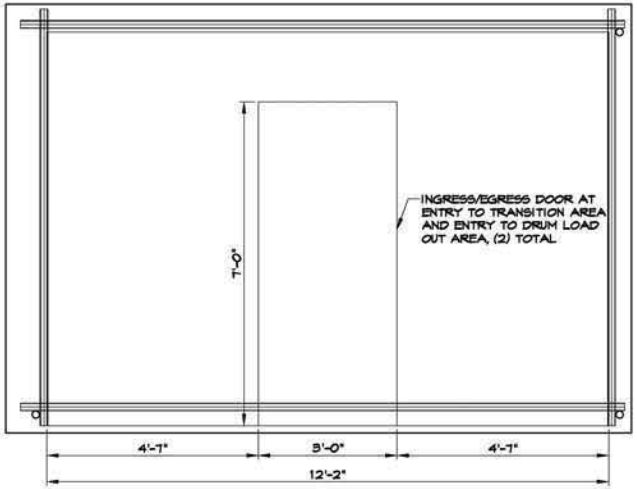

FRONT VIEW LOOKING NORTH

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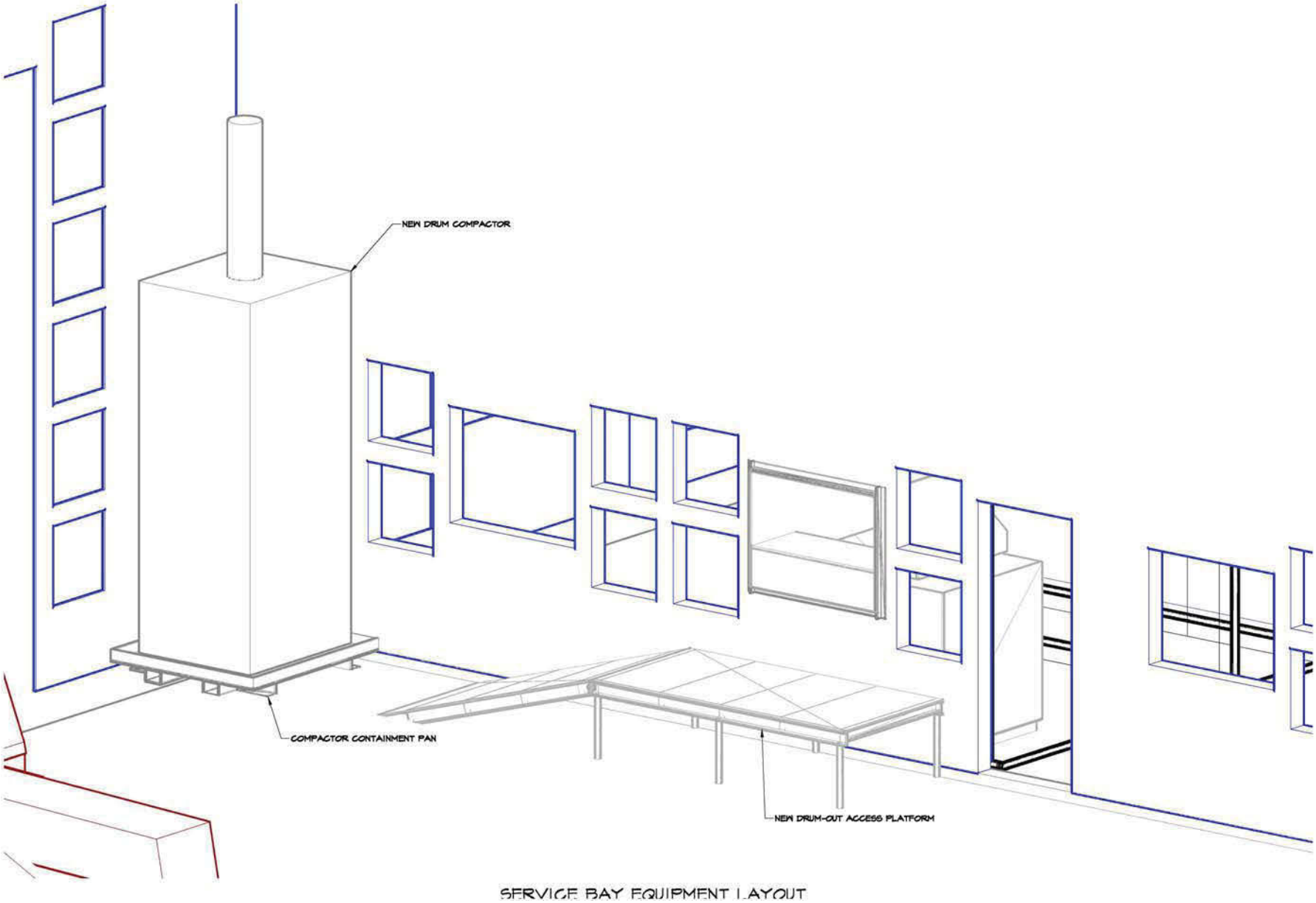

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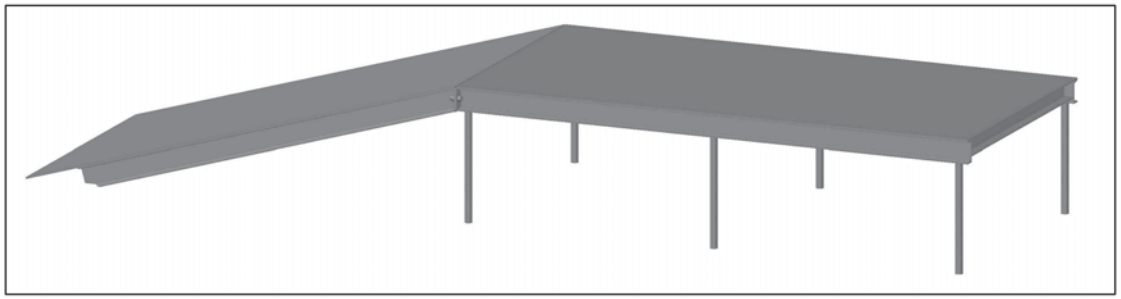

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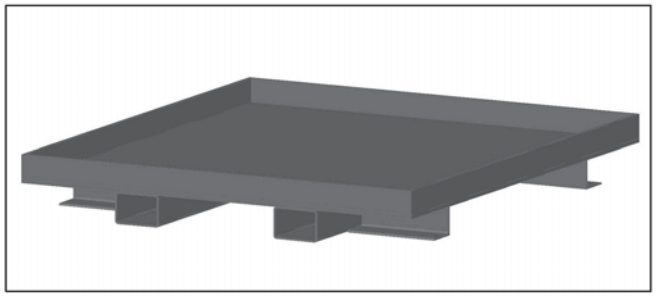

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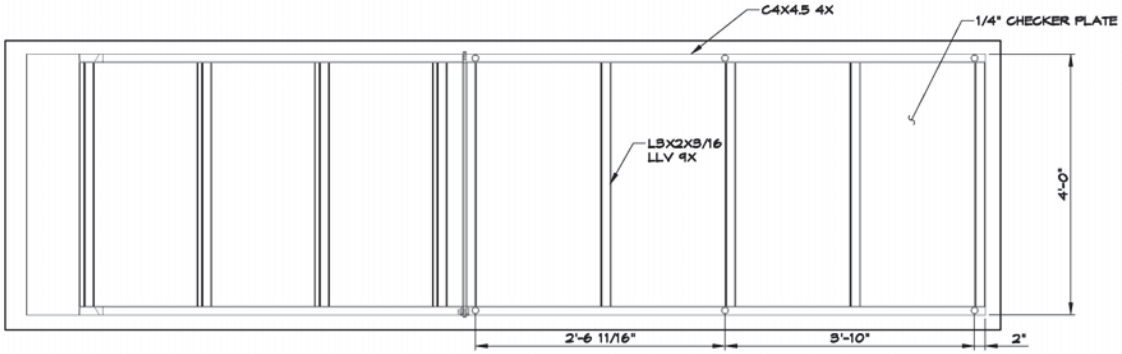

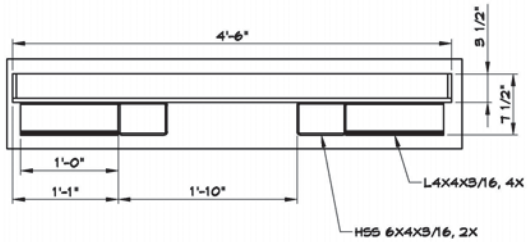

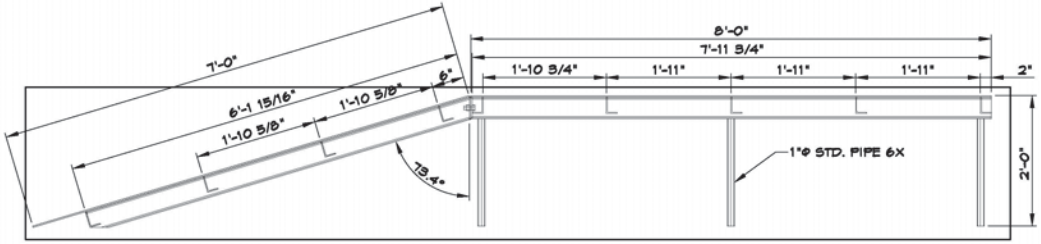

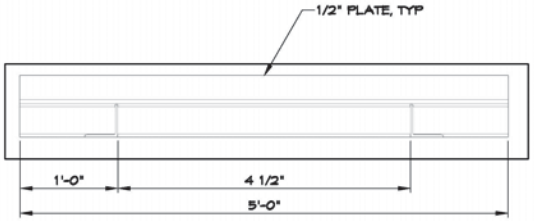

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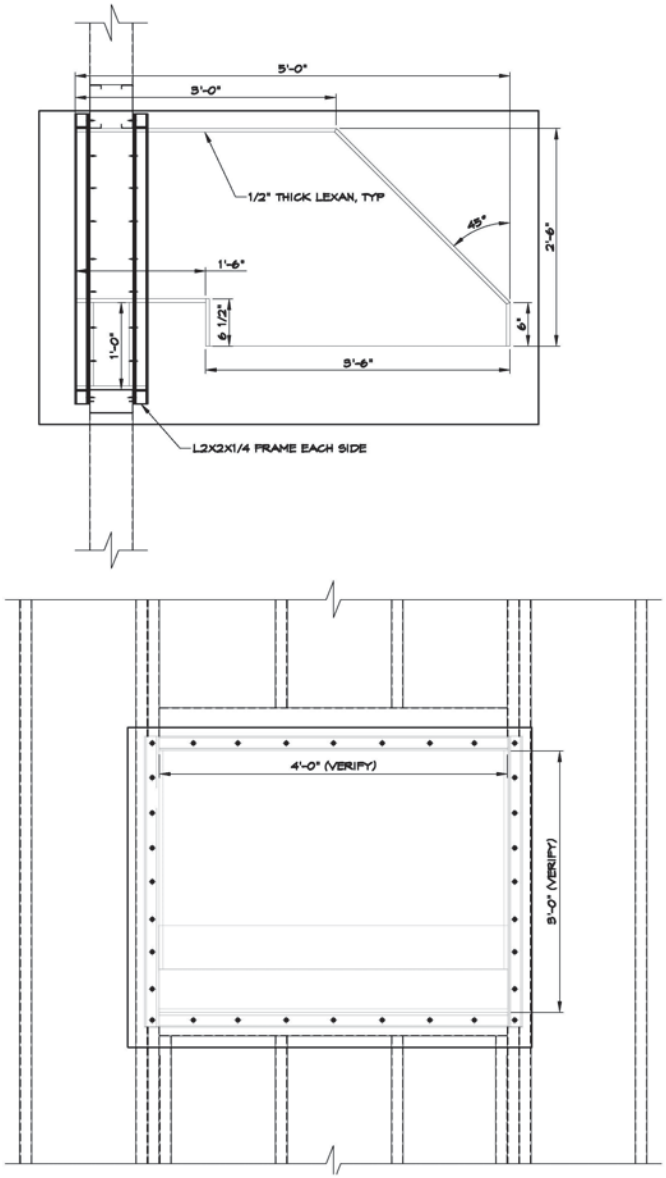

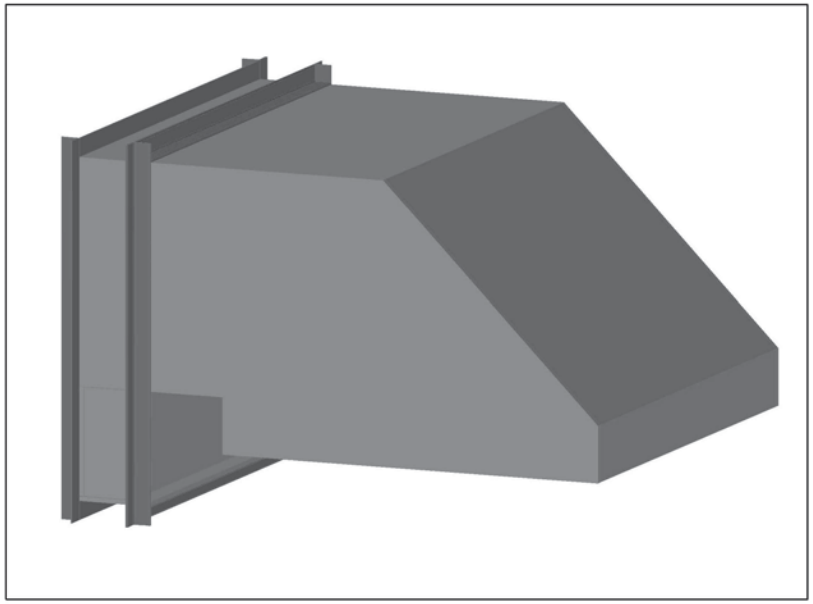

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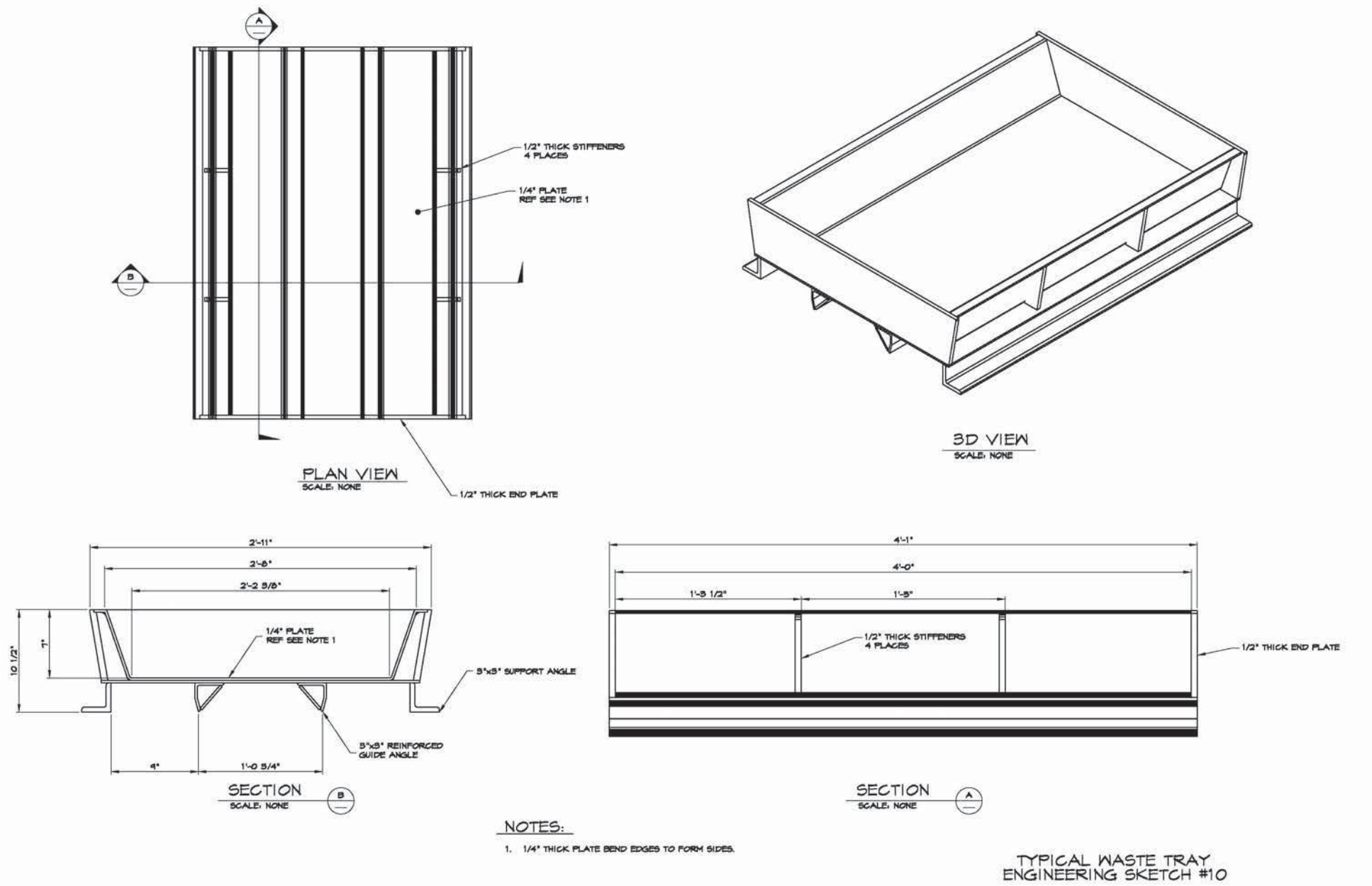

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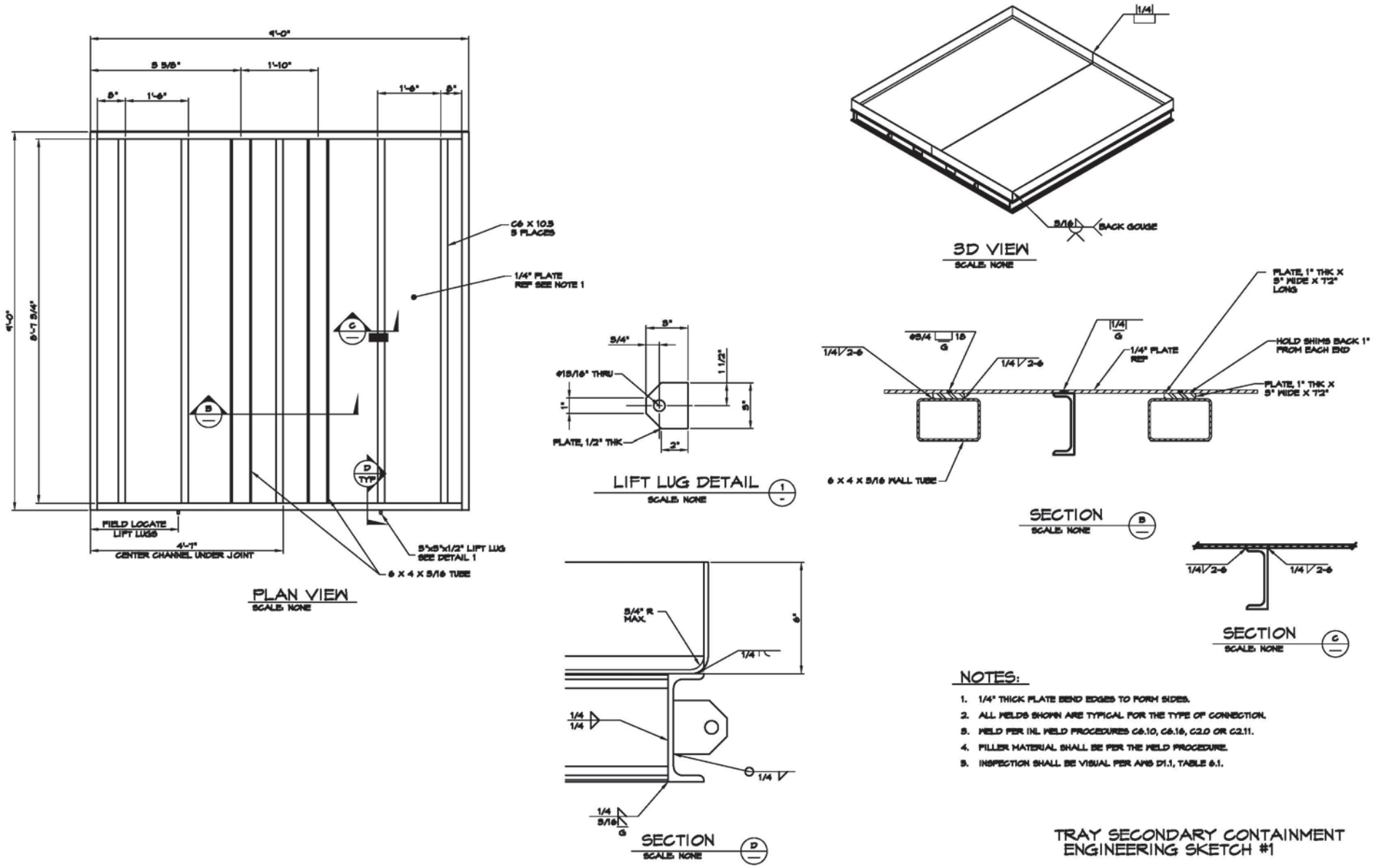

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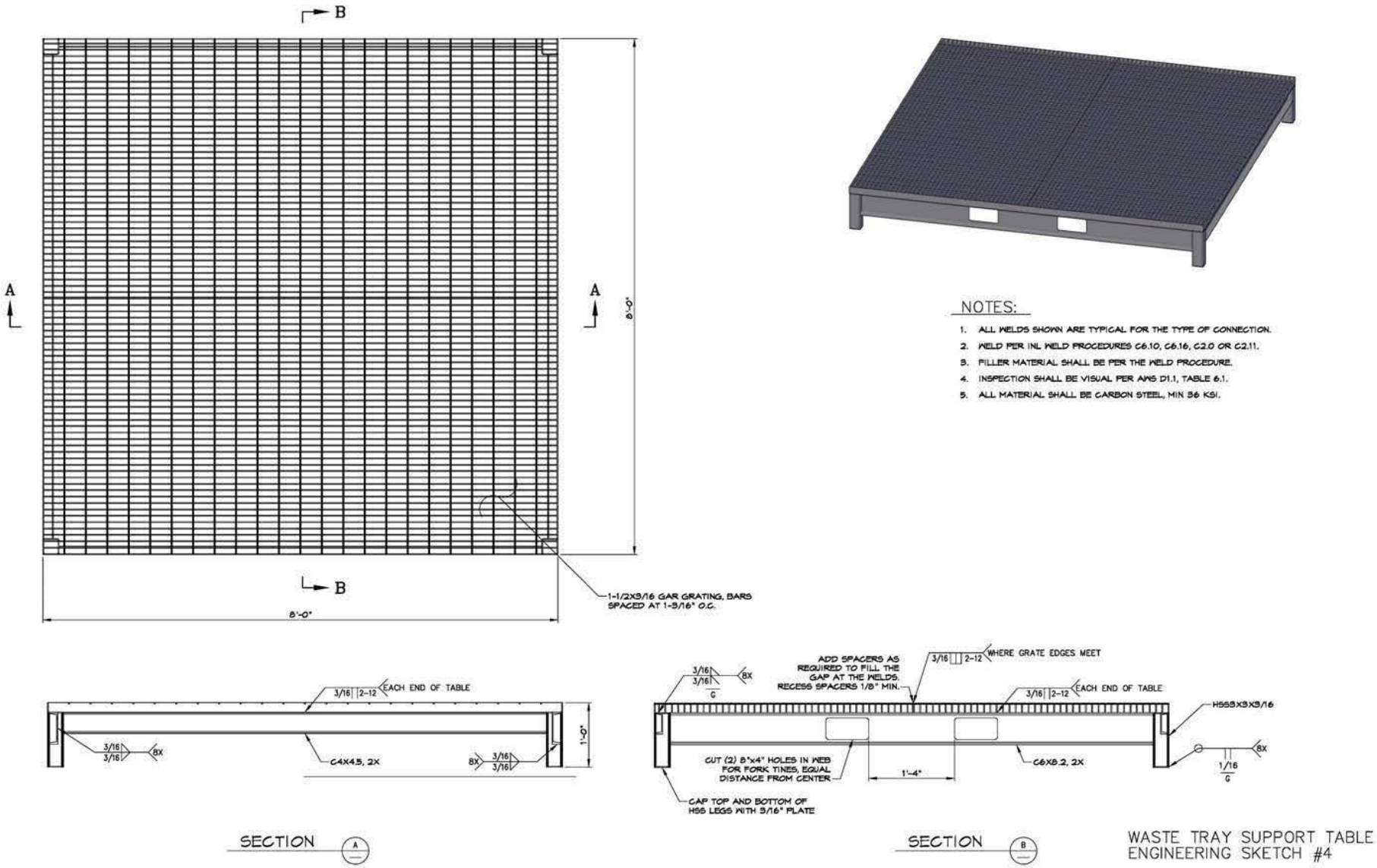

EXHIBIT 8. WASTE TRAY SUPPORT TABLE

APPENDIX 2

100-YEAR FLOODPLAIN AND 25-YEAR RUNOFF ANALYSES FOR THE RADIOACTIVE WASTE MANAGEMENT COMPLEX AREA AT THE IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY (INEEL/EXT-02-00093)

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Revision 0
December 2001

100-Year Floodplain and 25-Year Runoff Analyses for the Radioactive Waste Management Complex Area at the Idaho National Engineering and Environmental Laboratory

T. Mitchell, P.E.
S. Mitchell
J. Humphrey, PhD
D. Kennedy
T. Funderburg

INEEL/EXT-02-00093
Revision 0

100-Year Floodplain and 25-Year Runoff Analyses for the Radioactive Waste Management Complex Area at the Idaho National Engineering and Environmental Laboratory

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Prepared for the
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Assistant Secretary for Environmental Affairs
Under DOE Idaho Operations Office

ABSTRACT

This hydrologic study of the Radioactive Waste Management Complex (RWMC) at the Idaho National Engineering and Environmental Laboratory (INEEL) was conducted to identify the 100-year overland floodplain boundary for the major surface water channels at the site. The RWMC comprises the Subsurface Disposal Area (SDA), the Transuranic Storage Area (TSA) and the Administrative facilities supporting the RWMC. The Main Channel Flow System (MCFS) was constructed through the RWMC area to control storm water run-on to and runoff from the SDA, TSA and administrative areas. The MCFS has undergone several modifications throughout the history of this facility in order to meet changes in the building layouts, subsurface drainage systems, and the overall hydrologic conditions of the RWMC area. Previous studies identified areas where some buildings in the TSA perimeter may be within the limits of the 25- and 100- and year floodplains. Construction of new buildings, topography modifications, and replacement of one bridge on Adams Boulevard over the past several years have prompted the need to revise the floodplain mapping for the RWMC.

The study was conducted to evaluate the largest 25-year and 100-year flood flows through this facility. Summer, winter rain on snow, and winter rain on snow with frozen ground conditions were evaluated as a part of this study to identify the maximum flows anticipated for storms with these return intervals. Flood flows were generated using hydrologic models of the facility and incorporated into hydraulic models of the MCFS. Peak water surface profiles were used to develop a map with 100-year floodplain boundaries to represent conditions at the RWMC as of August 2001.

CONTENTS

ABSTRACT iii

1. INTRODUCTION 1

1.1 General 1

1.2 Objective 2

1.3 Previous Investigations 2

1.4 Acknowledgements 3

2. REGIONAL HYDROLOGY 6

2.1 Climatology and Historic Flooding Data Sources 6

2.2 Historical Flood Events 7

2.3 Summer and Winter Design Storm Conditions 8

2.3.1 Design Storm Precipitation 8
2.3.2 Snowmelt 10
2.3.3 Frozen Ground and Concrete Impermeable Frost 11

2.4 Summer and Winter Design Storm Parameters 12

3. HYDROLOGIC MODELING 15

3.1 Hydrologic Characteristics and Modeling Parameters 16

3.1.1 Watershed and Sub Area Delineation 16
3.1.2 Soil Type and Vegetation 16
3.1.3 Impervious Surfaces 19
3.1.4 Natural Surface Channels 19
3.1.5 Storm Water Retention Areas 19
3.1.6 Main Channel Flow System 19

3.2 Hydrologic Modeling and Analysis 20

3.2.1 SCS Curve Numbers and Precipitation Losses 20
3.2.2 Time of Concentration 21
3.2.3 HEC-1 Model Input and Output 24

3.3 Hydrologic Modeling Results 25

3.4 Comparison of Results to Historic Rain/Snow/Frozen Ground Floods 28

3.5 Discussion of Previous Hydrologic Studies and Reports 29

4. Hydraulic Analysis 33

4.1 Main Channel Flow System 33

4.1.1 Channel Geometry 33
4.1.2 Bridges and Culverts 33
4.1.3 Roughness Coefficients 33
4.1.4 Hydraulic Modeling Process and Equations 34
4.1.5 HEC-RAS Model Simulations 36

4.2 TSA Surface/Subsurface Drainage Network Modeling 36

4.2.1 SWMM Program Input Parameters 36
4.2.2 Storm Water Runoff Hydrographs 37
4.2.3 SWMM Analysis 37
4.2.4 SWMM Modeling Results 38

4.3 25- and 100-year Floodplain Mapping 38

5. CONCLUSIONS 40

6. REFERENCES 41

Sheet 1—Main channel flow system 100-Year Flood Plain

Appendix A—RWMC Watershed Boundary

TABLES

2-1. Precipitation depths for summer design storms. 9

2-2. Precipitation depths for winter design storms. 9

2-3. Precipitation depths for winter rain on frozen ground design storms. 10

3-1. SCS Curve Numbers for sage-grass complexes. 18

3-2. SCS Curve numbers used in hydrologic modeling. 20

3-3. Time of concentration (t_c) for sub basins. 22

3-4. Peak flow for individual sub basins. 26

3-5. Peak flows input into HEC-RAS Models for each return period. 28

4-1. Basin 22 TSA Perimeter Storm Water Management Modeling, 25-Year Summer Cloudburst. 39

Figures

1. RWMC area map. 4

2. RWMC plan view. 5

3. 25-year, 24-hour summer storm hydrographs. 31

4. 100-year, 24-hour summer storm hydrographs. 31

5. 25-year, 24-hour winter storm hydrographs. 32

6. 100-year, 24-hour winter storm hydrographs. 32

7. Main channel flow system modeled cross-section numbers. 35

ACRONYMS

AMC	antecedent moisture condition
amsl	above mean sea level
CFS	cubic feet per second
DDF	depth duration frequency
HEC-HMS	Hydrologic Engineering Center Hydrologic Management System
HEC-RAS	Hydrologic Engineering Center River Analysis System
INEEL	Idaho National Engineering and Environmental Laboratory
MCFS	Main Channel Flow Systems
NOAA	National Oceanographic and Atmospheric Administration
NRCS	National Resource Conservation Service
NWS	National Weather Service
RCRA	Resource Conservation and Recovery Act
RWMC	Radioactive Waste Management Complex
SCS	Soil Conservation Service
SDA	Subsurface Disposal Area
SWMM	Storm Water Management Model
TRU	transuranic
TSA	Temporary Storage Area
USCOE	United States Corps of Engineers
USGS	United States Geological Survey

100-Year Floodplain and 25-Year Runoff Analyses for the Radioactive Waste Management Complex Area at the Idaho National Engineering and Environmental Laboratory

1. INTRODUCTION

1.1 General

The Radioactive Waste Management Complex (RWMC), located in the southwestern quadrant of the Idaho National Engineering and Environmental Laboratory (INEEL), encompasses a total of 174 acres and is divided into three separate areas by function: the Subsurface Disposal Area (SDA), the Transuranic Storage Area (TSA), and the Administrative Area (see Figure 1 RWMC area map and Figure 2 RWMC plan view). The original facility covered 13 acres and was used for shallow burial of solid radioactive waste. In 1958, the burial ground was expanded to 88 acres. Relocation of the security fence in 1988 to the outside of the dike surrounding the burial ground established the current 95.9-acre size of the SDA. The TSA was added to the RWMC in 1970. Located adjacent to the east side of the SDA, TSA encompasses 56.1 acres and is used for retrievable storage of transuranic (TRU) waste pending characterization, certification, and shipment out of the state to a permanent disposal repository. The 22-acre Administrative area maintains administrative offices, maintenance buildings, equipment storage, and miscellaneous support facilities.

Though the RWMC is located within a natural topographic depression, no permanent surface water features are located near the site. However, the local depression tends to hold precipitation and to collect additional runoff from the surrounding slopes. Surface water within the surrounding area eventually infiltrates the soils or evaporates before reaching the Big Lost River (Keck 1998).

Historically, the SDA has been flooded by local runoff at least three times because of a combination of snowmelt, rain and warm winds. The Main Channel Flow System (MCFS), consisting of dikes and drainage channels, was constructed around the perimeter of the SDA in response to the first flooding event, which occurred in 1962. Following a second flood in 1969, the height of the dike was increased and the drainage channel around the perimeter was enlarged. The dike was breached by accumulated snowmelt in 1982, resulting in a third inundation of open pits within the SDA. Significant flood-control improvements included increasing the height and breadth of the dike, deepening and widening the drainage channel, and contouring to eliminate the formation of surface ponds and route runoff to the drainage channel. Localized runoff from surrounding slopes is now prevented from entering the SDA by the perimeter drainage channel and dike surrounding the facility. Runoff from within the SDA is directed to the perimeter drainage channel, thus exiting the disposal area.

The Big Lost River, 2-mi north of the RWMC, is at an elevation 30-ft to 40-ft higher than the SDA (DOE-ID, 1998). However, the Big Lost River poses no flood threat to the RWMC (DOE-ID, 1998). The Big Lost River flows northeast, away from the RWMC, to its termination in the playas. A detailed flood-routing analysis of a hypothetical failure of Mackay Dam resulting from hydrologic and seismic failure shows that the RWMC would not be inundated by the severe flooding caused by the failure of the dam (Koslow and Van Haaften 1986). Big Lost River flows have not entered the RWMC since operations began in 1952. However, evidence indicates alluvial deposits in the RWMC area were possibly deposited during the Pleistocene period. A mineralogical correlation of surficial sediment from

area drainages with sedimentary interbeds at the RWMC suggests that the present day drainage patterns of the streams may be similar to historical patterns (Bartholomay 1990).

1.2 Objective

The primary objective of this project is to determine the magnitude and extent of the hypothetical 100-year flood event within the RWMC drainage area and develop a floodplain map from the hypothetical storm event as required by state and federal regulations to determine whether RWMC facilities are constructed in the 100-year floodplain. The secondary objective is to ensure that the facilities storm drain system will pass, at a minimum, the 25-year 24-hour peak storm flow for the TSA.

1.3 Previous Investigations

The potential for flooding in the Big Lost River and in the RWMC watershed has been evaluated through several studies performed at the INEEL. Specific aspects of these studies that are relevant to the current study are discussed below and in subsequent sections of this report.

Tullis and Koslow (1983) characterized Big Lost River floods with recurrence intervals greater than 25 years by a statistical analysis of short-term historical records and through the study of slack-water deposits. The United States Geological Survey (USGS) (Berenbrock and Kjelstrom, 1998) evaluated flood potential on the Big Lost River by applying a one-dimensional hydraulic model to calculate water-surface elevations and estimating the areas of inundation for the 100-year peak flow. Ostenaa, et al. (1999) performed a paleoflood study of the Big Lost River that included estimates of paleohydrologic bounds, hydraulic modeling, and development of Bayesian flood-frequency statistics.

Koslow and Van Haaften (1986) utilized the National Weather Service (NWS) DAMBRK model to simulate four different hypothetical Mackay Dam failure scenarios. One of these scenarios consisted of a hydraulic (piping) failure of the dam combined with Big Lost River runoff from the 100-year recurrence interval flood and subsequent hypothetical failure of Mackay Dam. In this modeled flood scenario, the INEEL Diversion Dam was overtopped by one foot of water at an elevation of 5066 ft msl. The magnitude of the combined probability of the 100-year recurrence interval flood with Mackay Dam failure was not specified in this report, but by definition is less than the probability of the 100-year runoff event alone. Likewise, the probability of the hydrologic events discussed in the current report with the simultaneous occurrence of a hypothetical Mackay Dam failure is much less than 0.01. Analyses of hydrologic events with probabilities less than 0.01 (recurrence intervals greater than 100-years) were considered beyond the scope of this report. Appendix A of the Koslow and Van Haaften (1986) report included a local basin snowmelt study that indicated a low potential for flooding from heavy rains and snowmelt at the facilities.

Dames and Moore (1993 and 1996) performed hydrologic studies of the RWMC watershed area utilizing the available topographic mapping data that represented current surface conditions at the time. The hydrologic analyses performed for the 1993 report included development of 100-, 500- 1000-year, ½ PMF, and PMF hydrographs for sub-basins contributing surface runoff to the main channel flow system (MCFS) of the RWMC. The scope of the 1996 study was specific to evaluating runoff produced by the rain-only 500-year precipitation event.

Zukauskas, et al. (1992) evaluated the adequacy of the storm water drainage control systems at the RWMC in preventing flooding of the TSA resulting from 25- and 100-yr return interval, 24-hr duration, storm events. Taylor, et al. (1994) performed hydrologic analyses as part of their siting activities for new waste handling facilities at the INEEL.

Large-scale aquifer pumping and infiltration tests in the RWMC area by Wood and Norrell (1996) were performed in a constructed basin in which the top 4 ft of topsoil was removed for construction. This study resulted in infiltration flux values that ranged from 1.42×10^{-3} gpm/ft^2 to 2.35×10^{-3} gpm/ft^2 (0.14 in/hr to 0.23 in/hr, respectively). The time weighted average infiltration flux for this experiment was 1.99×10^{-3} gpm/ft^2 (0.19 in/hr).

The current study was performed to include recent precipitation and temperature data, and to address changes that have occurred in topography and facility structures since the previous studies were performed. Topographic data were collected in an aerial photogrammetry flight by Aero-Graphics of Salt Lake City, Utah on October 17, 2000. These data were used to develop the topographic maps that were used in this hydrologic analysis. This hydrologic study was performed pursuant to the surface water requirements relative to the RCRA Part B permit application requirements of 40 Code of Federal Regulations (CFR) Parts 260-281.

1.4 Acknowledgements

Appreciation is extended to Ken Beard, BBWI at the INEEL who provided horizontal and vertical control for this project by use of a Global Positioning System (GPS). Mr. Beard developed survey control targets in support of the aerial photogrammetric flight, surveyed channel cross-sections and provided survey data for hydrologic control structures.

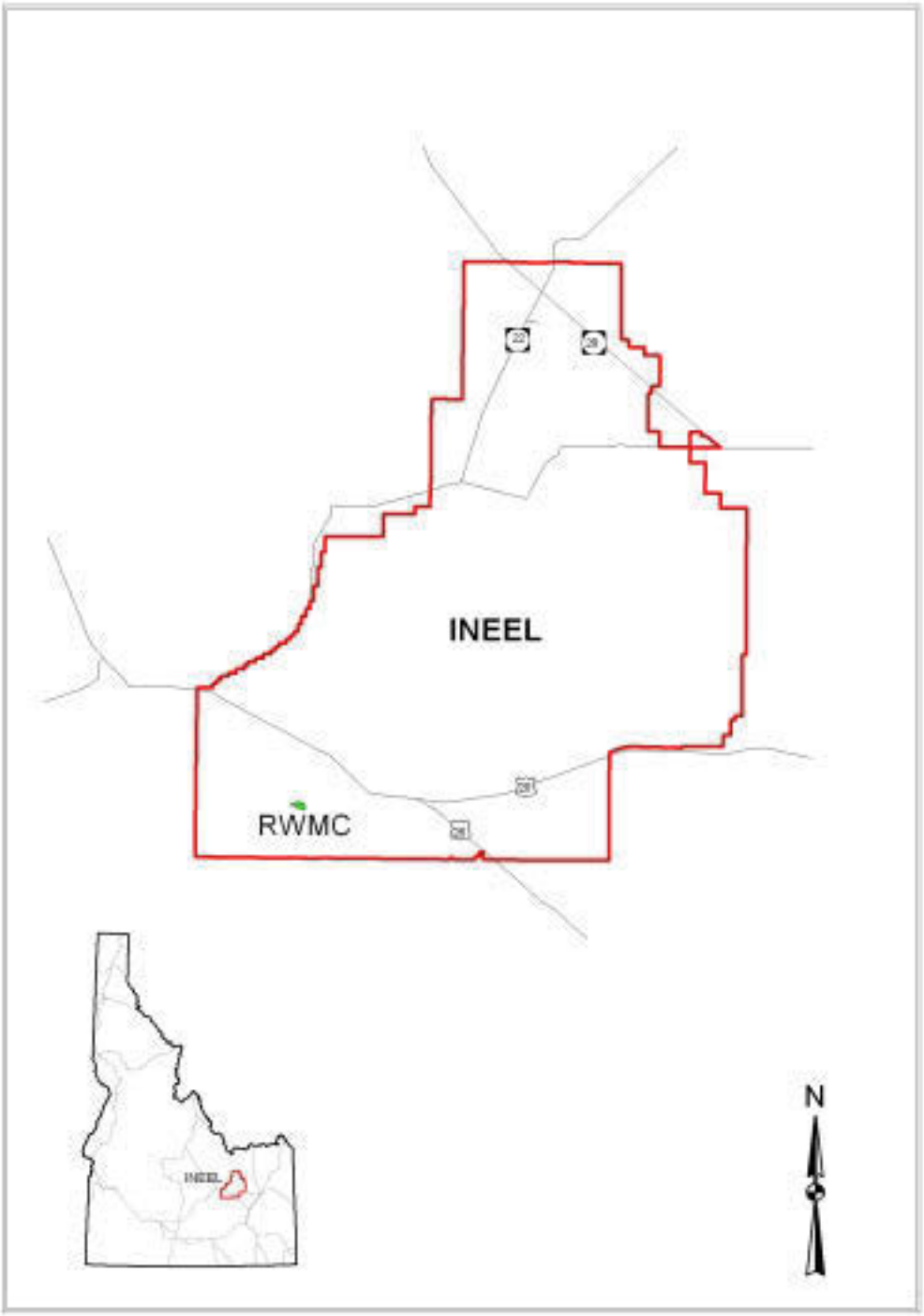
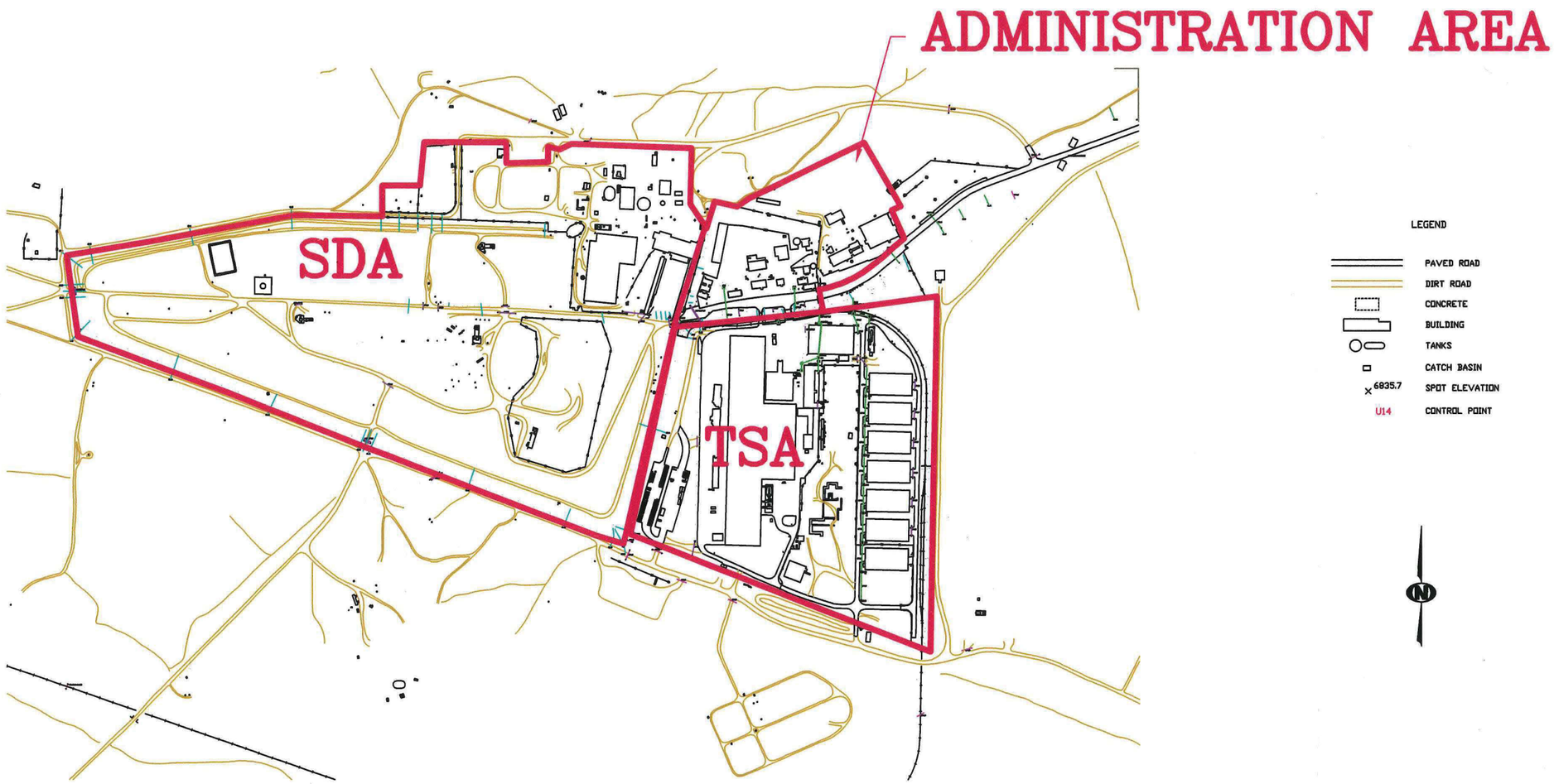


Figure 1. RWMC area map.

Figure 2. RWMC plan view.



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2. REGIONAL HYDROLOGY

A detailed hydrologic analysis was developed specifically for the watershed area contributing to the MCFS to identify the peak 25- and 100-year flood flows and associated floodplains for the RWMC area. An investigation and review of available regional hydrology documentation was conducted in order to determine the appropriate design storm conditions and watershed parameters for use in hydrologic and hydraulic modeling of the site. Several sources of information were utilized to determine existing conditions during previous flooding events throughout southeastern Idaho and the surrounding area, which provides a measure of flood and regional hydrologic conditions for the RWMC facility at INEEL. This section of the report discusses the sources of information reviewed as a part of the evaluation of regional hydrologic conditions, which in turn was used to develop design storm parameters and precipitation statistics for the hydrologic modeling.

2.1 Climatology and Historic Flooding Data Sources

Several sources of information relating to climatology and historic flooding were utilized in determining regional hydrologic conditions for the INEEL and the RWMC facility. Regional hydrologic information is available for southeastern and central Idaho. A report prepared by Taylor (1994), references seven gauge sites and design storms. This report, however, is limited to information relating specifically to stream flows and storm water runoff for the INEEL and the RWMC. Data sources used in this hydrologic study were obtained from the National Weather Service for the area within and surrounding the INEEL. Data utilized for areas outside of the INEEL property were selected for hydrologic regimes with similar characteristics including southern Idaho, northern Utah, northern Nevada and southwestern Montana. Data sources utilized in this hydrologic investigation include the following:

- United States Geological Survey, Methods for Estimating Magnitude and Frequency of Floods in the Southwestern United States, Open File Report 93-419, 1994.
- National Weather Service, INEEL Winter Flood Events, Idaho Falls 46W Data (1952 – 2000).
- National Weather Service, Idaho Falls FAA, Idaho Falls Airport Gage data (1948 – 1952).
- National Weather Service, Idaho Falls 2ESE Gage Data (1952 – 1960)
- National Weather Service, Idaho Falls 16SE Gage Data (1960 – 1997)
- National Weather Service, Dubois Gage Data (1948 – 1997)
- National Weather Service, Twin Falls Gage Data (1978 – 1997)
- Eugene L. Peck and E. Arlo Richardson, An Analysis of the Causative Factors of the February 1962 Floods in Utah and Eastern Nevada, National Weather Service, Salt Lake City, Utah, 1962.
- United States Army Corps of Engineers, Humbolt River and Tributaries, Nevada, Design Memorandum No. 1, Sacramento District, 1975.
- Soil Conservation Service, National Engineering Handbook, 1972

- Dr. John H. Humphrey, Meteorological Analysis, Flood Control Master Plan, Washoe County, Nevada, 1994.

- CH2MHill, Inc., Silver Bow Creek Flood Modeling Study, 1989.

- United States Army Corps of Engineers (USCOE), Northwest Division, Snow Hydrology, 1972.

In addition to the data sources identified above, several reports and technical memoranda regarding the RWMC facility were reviewed to evaluate previous flooding events and hydrologic studies including:

- Dames and Moore, Flood Evaluation Study, Radioactive Waste Management Complex, Idaho National Engineering Laboratory, Idaho Falls, Idaho, 1993.

- K.N. Keck, 25-Year, 24-hour Storm Evaluation for the Transuranic Storage Area, Document No. INEEL/EXT-98-00472, 1998.

- Clinton O. Kingsford, PE and Karen N Keck, As-Built Condition of the Surface Water Drainage System at the SDA, Document No. INEL/EXT-97-00603, June 1997.

- J. Sagendorf, Meteorological Information for RWMC Flood Potential Studies, National Oceanic Atmospheric Administration, Environmental Research Laboratories, Air Resources Laboratory Field Research Division, Idaho Falls, Idaho, 1991.

- J. Sagendorf, Precipitation Frequency and Intensity at the Idaho National Engineering Laboratory, National Oceanic and Atmospheric Administration, Technical Memorandum ERL ARL-215, Air Resources Laboratory, Silver Spring, Maryland, 1996.

2.2 Historical Flood Events

There have been several significant flood events within southern Idaho, northern Utah and northern Nevada with documented information dating from the early 1900's through the present. Four events in particular have enough recorded information to estimate conditions experienced during winter rain and snowmelt storms with return periods ranging from 25 to 100 years. The four events occurred in February 1962, January 1969, February 1980 and February 1982. Of these events, the 1962 rain-on–snow conditions were estimated to represent a storm with a return period of 50 to 100 years (DOE-ID 1998). Climatological and general flooding information was obtained for all of these events and used to evaluate conditions anticipated during a 100-year return period storm. The data provides an approximate measure of the peak flow anticipated for the RWMC complex.

All of the observed flood events required an unusual set of climatological conditions including a wet fall season, very cold temperatures through December, January, and February with little or no snow cover, no thawing of the ground, and some accumulation of snow just prior to the flooding period. This set of conditions would result in a shallow snow cover underlain by concrete impermeable frost.

Based on the historic flooding information and according to limited United States Geological Survey (USGS) stream gage data in the area surrounding INEEL, regional hydrologic conditions indicate that peak flows of 30 to 60 cubic feet per second per square mile (cfs/mi^2) can be expected during a 100-year rain-on-snow event in watersheds similar in size to that of the RWMC watershed. Seven gauge sites identified at the INEEL indicated peak flows of 10 cfs per square mile to 76 cfs per square mile

(Taylor et. al, 1994). The regional flood flow information was used as an approximation of the 100-year flood model developed for the RWMC.

In addition to the peak flow estimations provided by the USGS documentation, limited information relating to runoff volumes was obtained from previous hydrologic studies. Sagendorf (1991) indicates that the 1962 flood event produced approximately 30 acre-ft of runoff in the SDA boundary. It should be noted that there was no perimeter ditch constructed around the SDA at the time, and the 30 acre-ft of runoff was generated in the watershed area contributing to the SDA (3.435 mi^2). Previous reports also indicate that 20 acre-ft of runoff flooded the SDA boundary in 1969, however, it is not known which portions of the watershed contributed to the flooding (a drainage ditch and dike had been constructed around the SDA subsequent to the 1962 event).

2.3 Summer and Winter Design Storm Conditions

In order to evaluate the largest 100-year flood event for the RWMC facility, three separate conditions were considered. Design storms were developed separately for summer cloudburst storms and for winter rain-on-snow and frozen ground events. Separating the different conditions provides more accurate determination of precipitation depths for various return period storms and better representation of hydrologic conditions during the summer and winter seasons. Design storm parameters for the summer and winter conditions are discussed in the following paragraphs.

2.3.1 Design Storm Precipitation

Precipitation depths for summer and winter storms were determined primarily from gage data collected from the City of Idaho Falls and INEEL. Specific gage sites included the following:

- Idaho Falls 46W, National Weather Service (NWS) data (located at the CFA, INEEL).
- Idaho Falls, FAA, National Weather Service data (located at the airport in Idaho Falls).

Gage data from these sources is available for approximately 50 years, providing sufficient data to conduct a statistical analysis for precipitation depths. Depth-duration-frequency (DDF) curves were developed for this study from the gage data obtained from the NWS using standard procedures of ranking maximum observed precipitation depths and plotting data on a log normal probability distribution. Power curve functions were developed for evaluating precipitation depth-duration-frequency statistics for the RWMC facility. The power curve function equation is shown below.

$$Depth = a * t^b$$

where:

Depth	=	design storm precipitation depth (in.)
a	=	statistical parameter based on ranked gage data
b	=	statistical parameter based on ranked gage data
t	=	time (minutes).

Using the above equation, precipitation depths were determined for 5-, 15-minute and 1-, 2-, 3-, 6-, 12- and 24-hour storm events with return periods ranging from 2 to 100 years. It should be noted that the

precipitation depths developed for design storms used in this hydrologic analysis were prepared independently from previous studies and analyses, including those prepared by J. Sagendorf (1991 and 1996), Keck (1998) and Dames and Moore (1993). Most significantly, the DDF statistics developed for this hydrologic analysis compare closely with those prepared by J. Sagendorf in 1996. Slight differences can be identified in precipitation depths for each design storm and return frequency from specific data periods used in developing the statistics, differences in interpretation of best-fit curves and lines, and engineering judgment.

Summer DDF curves were developed from gage data between the months of May through September. Summer precipitation depths (in.) are shown in Table 2-1.

Table 2-1. Precipitation depths (in.) for summer design storms.

Summer Cloudburst Depth Duration Frequency D=a*t^b										
Recurrence	a	b	5-min	15-min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2-year	0.095	0.305	0.155	0.217	0.331	0.409	0.463	0.572	0.707	0.873
5-year	0.154	0.282	0.242	0.331	0.489	0.594	0.666	0.810	0.985	1.197
10-year	0.199	0.269	0.307	0.412	0.599	0.721	0.804	0.969	1.168	1.408
25-year	0.262	0.257	0.396	0.525	0.750	0.897	0.995	1.189	1.421	1.698
50-year	0.302	0.253	0.454	0.599	0.851	1.014	1.124	1.339	1.596	1.901
100-year	0.359	0.243	0.531	0.693	0.971	1.149	1.268	1.501	1.776	2.102

Winter DDF curves were developed using precipitation gage data over the period of record during the months from November through March, when wet soil conditions will occur. Winter precipitation depths (in.) are shown in Table 2-2.

Table 2-2. Precipitation depths (in.) for winter design storms.

Winter Rainfall Depth Duration Frequency D=a*t^b										
Recurrence	a	b	5-min	15-min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2-year	0.015	0.506	0.034	0.059	0.119	0.169	0.208	0.295	0.419	0.595
5-year	0.026	0.469	0.055	0.093	0.177	0.246	0.297	0.411	0.569	0.787
10-year	0.035	0.447	0.072	0.117	0.218	0.297	0.357	0.486	0.663	0.903
25-year	0.047	0.427	0.093	0.149	0.270	0.363	0.432	0.580	0.780	1.049
50-year	0.058	0.413	0.113	0.177	0.315	0.419	0.495	0.659	0.878	1.169
100-year	0.071	0.397	0.135	0.208	0.361	0.475	0.558	0.735	0.967	1.274

Winter rain on frozen ground DDF curves were developed using precipitation gage data over the period of record during the months of January and February, when frozen ground conditions will occur. Winter rain on frozen ground precipitation depths (in.) are shown in Table 2-3.

Table 2-3. Precipitation depths (in.) for winter rain on frozen ground design storms.

Winter Rain on Frozen Ground Depth Duration Frequency D=a*t^b										
Recurrence	a	b	5-min	15-min	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2-year	0.011	0.506	0.024	0.042	0.084	0.119	0.147	0.208	0.296	0.420
5-year	0.018	0.469	0.039	0.065	0.125	0.172	0.209	0.289	0.400	0.553
10-year	0.025	0.447	0.051	0.083	0.154	0.210	0.252	0.343	0.467	0.637
25-year	0.031	0.433	0.066	0.106	0.191	0.257	0.305	0.411	0.552	0.742
50-year	0.033	0.427	0.079	0.124	0.221	0.294	0.347	0.462	0.615	0.819
100-year	0.041	0.413	0.094	0.145	0.252	0.332	0.390	0.513	0.675	0.889

It should be noted that the data and procedures used in developing the DDF curves for the various seasonal events are standard meteorological methods used by the NWS and National Oceanographic and Atmospheric Administration (NOAA). Differences in the DDF statistics prepared for this study can be identified in precipitation depths associated with the various storm durations and return periods when compared to other DDF curves prepared for INEEL. The differences are the result of the specific seasonal periods used to develop the curves and judgment in best-fit curves for statistical representation of precipitation data.

In preparing the three different sets of DDF curves for this study, data were separated according to seasonal variations when summer, winter and winter frozen ground conditions exist. This separation of the data often results in lower precipitation depths and intensities used for modeling during the winter season as compared to summer and to the year as a whole. Winter storms typically have lower depths and rainfall intensity than other times of the year and separation of this data from the entire period of record provides a more accurate determination of DDF statistics when evaluating specific seasonal storm events.

2.3.2 Snowmelt

Snowmelt was incorporated into hydrologic models for the RWMC flood study in order to evaluate winter storm events. Data for snow depths and water content was developed from the winter precipitation statistics, and previous rain-on-snow events observed throughout the region surrounding INEEL. Several assumptions were made regarding contributing factors to the snowmelt including the following:

- Maximum daily temperature is 46° F and average daily temperature is 42° F.
- Wind speed of 20 miles per hour
- Constant snowmelt during the 24-hour storm period
- Little delay for snowmelt contribution to runoff.

Using equations presented in the USCOE snow hydrology manual, with a mean temperature of 42° F and wind speed of 20 mph, snowmelt was calculated as 0.06 in/hr. This constant snowmelt was added to the design storm precipitation for use in hydrologic modeling of the winter rain-on-snow and frozen ground event. This constant snowmelt adds 1.44 in. of water to the rainfall event throughout the duration of the 25- and 100-year, 24-hour winter storms.

2.3.3 Frozen Ground and Concrete Impermeable Frost

Frozen ground and concrete impermeable frost increase the runoff volume and associated peak flows during winter storms by limiting the infiltration capacity of the soil, and in the case of concrete impermeable frost, effectively increasing the amount of impervious surface within a watershed. Several climatological factors contribute to developing frozen ground and concrete impermeable frost including, but not limited to, the following:

- Wet fall and early winter season, sufficient to allow accumulation of water in the surface soil layers
- Continuous cold weather
- Little or no snow accumulation to insulate the ground.

For the purposes of this study, it is necessary to distinguish between frozen ground and concrete impermeable frost in order to estimate the impervious surface area in the watershed. Frozen ground occurs annually during the winter season as cold temperatures freeze moisture in surface and vadose zone soils. However, this condition does not preclude infiltration as cracks develop, porosity in the soil-ice structure still exists, and root structures provide additional pathways for water to enter the soil profile. To become a completely impervious frost layer, sufficient moisture must be present to saturate the soil and sustained freezing temperatures must develop sufficient frost and ice to eliminate all infiltration capability in the soil profile. This condition is described as concrete impermeable frost.

Previous investigations have been conducted to evaluate the presence and severity of concrete impermeable frost during winter rain-on-snow and frozen ground events (Humphrey 1994). During this study, known gage data were used to calibrate hydrologic models of the watershed contributing to Silver Bow Creek during winter storm events. It was determined through this study that although concrete impermeable frost existed in the watershed, it did not cover the entire surface area, was found to exist only in very narrow elevation ranges throughout the watershed, and that water infiltration occurs in areas where frozen ground (not impermeable frost) exists.

Results of the Silver Bow Creek investigation were used to develop a rating index to assign probability to the recurrence of concrete impermeable frost. This index is used to evaluate rainfall, temperatures, snow and other climatological factors that allow concrete impermeable frost to develop. Climatological data from the INEEL area were used evaluate the probability of concrete impermeable frost development as a part of this study. It was determined that concrete impermeable frost has the potential to develop in the INEEL area approximately every 5 to 10 years.

Additionally, an estimate of the percentage of the ground surface representing concrete impermeable frost was developed from site-specific conditions at INEEL and results of the Silver Bow Creek investigation. Vegetation, exposed surface soils, soil porosity and other factors contribute to the development of concrete impermeable frost. For the watershed surrounding the RWMC, vegetative cover was estimated to be 50% and exposed soils have fairly good water transmission properties (B group).

Concrete impermeable frost was estimated to represent 33% of the watershed area during this study, based on the following assumptions:

1. Exposed surface soils represent 50% of the natural watershed area. 67% of exposed surface soils are subject to developing concrete impermeable frost. Total concrete impermeable frost in the natural watershed is then 33%.

2. Concrete impermeable frost will not develop in the remaining 50% of the watershed area due to the presence of vegetative cover and root structures; shallow sedimentary soils over basalt and exposed basalt areas allowing infiltration and lack of saturated soil.

Review of previous studies conducted at INEEL further indicate that although concrete impermeable frost will exist in portions of the watershed, it is overly conservative to assume that the presence of frozen ground eliminates all infiltration. A report prepared in 1994 (Taylor et. al, 1994) states "..the assumption of frozen ground presumes zero infiltration of the surface...zero infiltration appears overly conservative...assumption of zero infiltration was used in order to obtain demonstrably conservative results." This previous study further supports the assumption that impermeable concrete frost does not exist over the entire watershed area. Natural watershed areas can have concrete impermeable frost, which occupies less than 100% of the natural watershed during winter.

There are no universally accepted methods for establishing recurrence interval or areal extent of concrete impermeable frost during winter seasons. Generally accepted methods include estimations of impervious surfaces using hydrologic models of watersheds with available stream gage data. In the absence of site-specific data, it is necessary to estimate concrete impermeable frost and resulting impervious surface area from climatological data, known watershed properties, experience with similar sites, and comparison to other studies. Representing 33% of the natural watershed area as concrete impermeable frost provides a reasonable estimate of expected impervious ground conditions during winter storm events for INEEL based on the hydrologic conditions of the watershed, available surface area for impermeable frost to develop, and experience with similar studies.

2.4 Summer and Winter Design Storm Parameters

Summer and winter design storm parameters were developed for subsequent hydrologic modeling of the contributing watershed to the RWMC and MCFS. The storm parameters were developed from the statistical analyses of the data collected primarily from the INEEL gage with additional supporting information as described in the previous sections. The following design storm parameters were used in hydrologic modeling of the various return period and seasonal conditions.

- 25- and 100-year Summer Thunderstorms (Cloudburst)
  - 25-and 100-year, 24-hour storm events
  - 1.70 and 2.10 in. of precipitation, respectively, from statistical analyses and data presented in Table 2-1.
  - Embedded peak 5- and 15-minute, 1-, 2-, 3-, 6-, 12- and 24-hour rainfall depths and intensities.
- 25-year, 24-hour Winter Precipitation (Rain or Rain-on-Snow) with frozen ground
  - 5-year, 24-hour storm event

- 5-year frozen ground conditions
- 0.553 in. of precipitation
- 0.06 in./hour constant snowmelt (1.44 in. total depth for 24 hours)
- Embedded peak 5- and 15- minute, 1-, 2-, 3-, 6-, 12- and 24-hour rainfall depths and intensities.

- 100-year Winter Precipitation (Rain on Snow) with Frozen Ground
  - 20-year, 24-hour storm event
  - 5-year frozen ground conditions
  - 0.72 in. of precipitation
  - 0.06 in./hour constant snowmelt (1.44 in. total depth for 24 hours)
  - Embedded peak 5- and 15-minute, 1-, 2-, 3-, 6-, 12- and 24-hour rainfall depths and intensities.

The design storm parameters for the various storms used in this hydrologic study are statistically equivalent or greater than the return frequencies for the 25- and 100-year events. The return interval for a particular storm event has a probability equal to the inverse of the return interval as shown in the following equation:

$$P = \frac{1}{return\ period}$$

Therefore, the probability of the 25- and 100-year events are 0.04 and 0.01, respectively. Additionally, the probability of different events can be multiplied to determine combined probabilities representing statistically equivalent, greater return period events. As described above, the 100-year rain on snow with frozen ground event has a combination of the 20-year precipitation and 5-year frozen ground conditions, therefore this combined probability of events is statistically equivalent to the 100-year event:

$$P_{100} = P_{20} * P_5 = \frac{1}{20} * \frac{1}{5} = \frac{1}{100} = 0.01$$

Review of available literature suggests that concrete impermeable ground conditions happen every 5 to 10 years. Therefore, the 20-year rainfall was combined with the 5-year frozen ground condition to determine the 100-year event.

The probabilities for the 20-year rainfall and 5-year frozen ground conditions are sufficiently independent to allow their combination in a joint probability distribution because the design storm precipitation is developed from rainfall gage data for the period of record for several different gages around the INEEL region, including the CFA and Idaho Falls gages. In some cases, the period of record is more than 50 years and provides sufficient data for separation of winter and summer thunderstorm precipitation depths and a thorough statistical analysis of the precipitation depths associated with various

storm durations, intensities and return periods for seasonal events. This statistical analysis is based on precipitation depths alone, and does not consider other environmental factors that may contribute to precipitation including temperature and other regional climatological conditions.

The frozen ground probability is developed from a variety of climatological factors including temperatures, wind speeds, freezing temperature duration, precipitation during winter months, and is based on an index developed by Dr. John H. Humphrey, PhD, PE (personal communication, 2001). The index was developed for frozen ground during the months of November through March, and is based on climatological data from the CFA and Idaho Falls gages.

The combined probability of the 20-year rainfall and 5-year frozen ground represents a 100-year return period probability. For the purposes of this hydrologic study, snowmelt has been added to the winter design storm events in order to provide additional runoff. Adding the snowmelt to the design storms increases the return period of the storms, as the presence of snow during the event has additional statistical probability which should be multiplied in the combined probabilities. However, the probability of snow during the design storms has been neglected to account for possible variations in truly frozen ground, design storm precipitation depths and other hydrologic parameters used to represent the watershed and sub areas. Neglecting the probability of snowmelt in the combined probabilities of the design storm events provides a conservative approach to estimating the peak flood flow by adding additional water without considering the probability of the presence of snow anticipated for the RWMC facility and the MCFS.

3. HYDROLOGIC MODELING

The HEC-1 computer program was selected for this hydrologic analysis because it provides the most flexibility in modeling methods and allows detailed input of watershed parameters, stage-storage-routing information, design storm precipitation, snowmelt and other hydrologic modeling parameters impacting storm water runoff. A comparison of commonly available computer modeling programs was conducted as a part of this study and included HEC-1, SCS TR-20 and SCS TR-55, resulting in the following conclusions:

1. The SCS TR-20 and TR-55 models have several limitations in defining watershed characteristics and storm water runoff flow paths, which may affect peak flow estimations for the contributing watershed area at INEEL. HEC-1/HMS allows input of several different parameters regarding land use, soil types, vegetative conditions, hydrologic connectivity and others affecting storm water runoff, which provides more reasonable runoff modeling results.

2. The SCS TR-55 model relies on standard design storm parameters (i.e., Types I, II, III etc.,) to develop rainfall hydrographs based on a given rainfall depth. Design storms were developed from site-specific data and produce more accurate results in flood modeling programs by eliminating geographic effects on rainfall (i.e., mountains, rain-shadow effects, etc.). Using the HEC-1/HMS modeling program allows entry of site-specific design storm data developed for the RWMC.

3. The TR-55 model was developed for Urban Hydrology. The RWMC is more representative of natural conditions, with a relatively limited developed area within the regional watershed boundary.

4. The HEC-1/HMS computer program provides flexibility in runoff evaluation methods used in sub areas within the watershed boundary. HEC-1/HMS provides the ability to use different runoff evaluation methods within the same model, which may be more applicable to varying conditions within the regional boundary (i.e., Kinematic wave, Muskingum, Muskingum-Cunge, SCS methods).

The hydrologic modeling for this study was conducted using ProHEC1 Plus, an enhanced version of the Hydrologic Engineering Center's HEC-1 program (Dodson and Associates, ProHEC1 Plus, 1995). This program generates rainfall/runoff hydrographs for watershed and sub basins based on several hydrologic parameters including, but not limited to, the following:

- Watershed and sub basin area
- Soil type and vegetative cover
- Impervious surfaces
- Surface features such as exposed bedrock and fractures
- Stream channel flow patterns
- Natural and constructed reservoirs or storm water retention areas
- Storm water runoff controls

- Unique hydrologic features.

Details of the hydrologic modeling parameters and processes are included in the following sections.

3.1 Hydrologic Characteristics and Modeling Parameters

Hydrologic characteristics of the watershed are discussed in the following sections and, where applicable, modeling parameters are discussed.

3.1.1 Watershed and Sub Area Delineation

Topographic mapping and field inspection of hydrologic and hydraulic features were used to delineate the contributing watershed and sub basins of the RWMC. Topographic mapping provided by INEEL and portions of a USGS quadrangle map were used to identify the outer boundary of the watershed. Sub basins were delineated within the outer watershed boundary based on several factors including the following:

- Major and minor surface water runoff drainage patterns and flow lengths
- Location of culverts, storm water runoff controls, local reservoir areas (storage)
- Key features and junctions in the MCFS
- General hydrologic regime and field conditions

The total contributing area to the RWMC facility and the MCFS up to the Adams Boulevard Bridge is 4.33 mi^2 (2771 acres). The total contributing area of the watershed investigated as a part of this study is 6.39 mi^2 (4090 acres). The total watershed area considered in this study includes the total area contributing to the RWMC and one additional sub-basin that contributes to the MCFS downstream of the Adams Boulevard Bridge. This larger area was evaluated in order to identify the presence or absence of backwater effects with the potential to influence the floodplain near the SDA and TSA boundaries. The major watershed boundary was divided into 40 sub basins for subsequent hydrologic modeling. The sub basins are identified on the RWMC watershed boundary map (see Appendix A).

3.1.2 Soil Type and Vegetation

Native soils in the area of the RWMC facility are primarily sandy silt loam, with sand fractions ranging in size from very fine to coarse. Soil depths range from very shallow to very deep and are intermixed with basalt flows. Soil cover placed over disposal area pits and within the SDA boundary were constructed using borrow materials from areas around the complex and have similar textures to those found within the contributing watershed area. Regional soils data indicate that soils are primarily loess, designated as a B hydrologic soil group. This soil group allows moderate infiltration and consist of silts, sands and to a lesser extent, clays.

The vegetation in the RWMC facility watershed is a sage-grass community consisting of sagebrush and primarily wheat grasses. Cover was estimated at approximately 50 percent during the field investigation conducted at the site.

The Soil Conservation Service (SCS) National Engineering Handbook provides estimates for curve numbers for forest-range complexes in the Western United States (SCS, 1972). The curve number is used

in hydrologic modeling to represent the soil and vegetation conditions within a watershed and accounts for precipitation losses and excesses. According to the SCS reference, curve numbers may range from 28 to 96 for sage-grass complexes, depending on soil group and vegetative cover. Low numbers indicate Group B soils with high percentage of vegetative cover and high numbers indicate Group D soils with little or no vegetative cover.

Curve numbers are adjusted from standard conditions to represent the conditions in a watershed prior to the rainfall-runoff event being modeled. Antecedent Moisture Condition I (AMC I) represents dry soil conditions typical of soil conditions preceding summer thunderstorms, with no precipitation prior to the model storm. AMC III represents wet soil conditions during winter and spring seasons, where it is likely that some moisture has been retained in the soils from previous storms and snowmelt. Curve numbers taken from the SCS handbook are shown in Table 3-1.

The curve numbers were selected from tables shown in the SCS National Engineering Handbook, Section 4, Hydrology, 1972, page 9.11. Curve numbers were selected to represent natural conditions identified in the field, with further support from SCS documentation, the infiltration test report, and experience with similar sites. Curve numbers were also selected accordingly to represent antecedent moisture conditions (AMC) anticipated in each storm. Saturated soils during winter storms used AMC-III. Normal soils during summer events used AMC-II, although dry conditions are more likely in the summer.

Soils in the RWMC area are generally a silty loam with a small fraction of clay, based on soil texturing during the field investigation. The SCS Engineering Handbook and other supporting documentation designate these soils in the Hydrologic Soil Group B (moderate infiltration rates). Additionally, infiltration rates presented in the Integrated Large-Scale Aquifer Test Report (Wood and Norrell, 1996) range from 0.14 to 0.23 in/hr. The results of the infiltration rate testing further support the use of Hydrologic Soil Group B curve numbers.

Other information used in selecting the curve numbers included vegetative cover and condition. During the field investigation, vegetative cover was estimated to be 50%, consisting of sagebrush and a bunchgrass understory.

Curve numbers for sage-grass complexes, B Group; Soil under normal AMC (II) range from 28 to 74 for 100 to 0% cover, respectively. These values are presented in Table 3-1 of the report.

Based on the vegetative conditions with a Hydrologic Soil Group B, a curve number of 52 was selected to represent the natural watershed conditions and areas where soils from the watershed have been used for constructing portions of the RWMC facility. This CN was used for the summer thunderstorm events, although it should more likely be adjusted accordingly for AMC I conditions (which would result in a lower CN).

The CN of 52 was adjusted to AMC II conditions (saturated soil condition) for the winter storm events. A CN of 71 was selected to represent the unfrozen portion of soils in the natural watershed during the winter rain-on-snow and frozen ground events.

A curve number of 99 was used for all impervious surfaces including building rooftops, parking lots, roads, and other paved and impervious surfaces in all design storm events. This curve number was also used to represent concrete impermeable ground portions of the watershed during winter storm events.

Table 3-1. SCS Curve Numbers[1] for sage-grass complexes.

Antecedent Moisture Condition II (Standard)			
Vegetative Cover (%)	Hydrologic Soil Group B	Hydrologic Soil Group C	Hydrologic Soil Group D
0	74	87	96
20	65	78	88
40	56	68	79
60	47	59	70
80	37	49	61
100	28	40	52
Antecedent Moisture Condition I (Summer Condition)			
0	55	73	89
20	45	60	75
40	36	48	62
60	28	39	51
80	20	30	41
100	14	22	32
Antecedent Moisture Condition III (Winter Condition)			
0	88	95	99
20	82	90	95
40	75	84	91
60	67	77	85
80	57	69	78
100	48	60	71
Frozen Ground	99	99	99

[1]Section 4, Hydrology, SCS National Engineering Handbook, 1972.

A curve number of 52 was used for modeling summer thunderstorms for natural conditions within the watershed and sub areas. A curve number of 71 was used to model unfrozen ground for natural conditions within the watershed and sub areas during winter storm events. A curve number of 82 was used to model unfrozen portions of sub areas with buildings and constructed roads where compaction may increase runoff potential during winter storm events. A curve number of 99 was used to represent frozen portions of the watershed during winter rain-on-snow and frozen ground events.

3.1.3 Impervious Surfaces

There are limited areas of impervious surfaces within the natural watershed around the RWMC facility. Existing natural impervious surfaces include exposed bedrock outcrops. Bedrock outcrops, where present, were estimated to cover 5 percent of the surface in sub basins. Man-made impervious surfaces include buildings and parking lots in the immediate vicinity of the TSA and SDA areas. The impervious surface area created by man-made features was estimated from topographic mapping and aerial photography of the site. A curve number of 99 was used for all impervious surface portions of the watershed during all storm events.

3.1.4 Natural Surface Channels

The topography of the watershed at the RWMC is generally low rolling hills and flat open areas. There are very few natural channels in the sub basins within the regional watershed, with very limited areas of scour and erosion damage resulting from storm water runoff. In general, incised channels do not form until the lower portions of the watershed, near the MCFS, where sufficient storm water runoff has been concentrated and directed through culverts and storm water control structures. Representative channel sections in the lower portions of the watershed were evaluated in the field to provide information to be used in the subsequent hydrologic modeling.

3.1.5 Storm Water Retention Areas

Several storm water retention areas exist within the watershed contributing to the RWMC and MCFS. Culverts exist in the railroad grade south of the facility which will limit storm water runoff peak flows coming from the area south of the railroad grade. A total of 7 culverts were identified within the RWMC watershed along the railroad grade, ranging in size from 1×1 ft to 2×2.5 ft and constructed of natural rock materials (basalt) near the base of the railroad embankment. The culverts were surveyed as a part of the field investigation to evaluate stage-storage-discharge for the areas to the south of the railroad grade. Additional storm water retention areas were identified on topographic mapping of the site and incorporated into the hydrologic models for this study.

The storm water retention areas used for stage-storage-routing in this hydrologic study will be subject to flooding during the 25 and 100-year storm events. These stage-storage areas were not incorporated into the 25-and 100-year floodplain boundary mapping for the RWMC facility for several reasons. The floodplain in the stage-storage-routing areas located south of the railroad embankment are not located in the vicinity of any buildings or construction areas and have no impact on the RWMC facility area. For modeling purposes, it was assumed that all storage areas were empty prior to the model storm events. This is representative of actual conditions.

3.1.6 Main Channel Flow System

The MCFS is a constructed channel that begins at the north side of the SDA, flows west, south, then east along the SDA boundary, north between the SDA and TSA, east along the northern border of the TSA, under Adams Boulevard and ultimately to the Big Lost River. The channel has undergone several modifications to prevent storm water runon from entering the SDA and TSA areas and to convey storm water runoff from the contributing watershed around the RWMC to the Big Lost River, away from facility buildings. The MCFS was surveyed during this investigation and is further discussed in Section 4.1.

3.2 Hydrologic Modeling and Analysis

The rainfall-runoff modeling was conducted using HEC-1, with input parameters based on the design storm statistics and hydrologic conditions of the watershed area. The SCS method for storm water loss and excess was used within the hydrologic models to generate storm water runoff hydrographs for selected locations in the watershed area. Specific parameters incorporated into the models created as a part of this study are discussed in the following sections.

3.2.1 SCS Curve Numbers and Precipitation Losses

The SCS curve numbers were selected to represent the watershed condition based on soils information, vegetative cover, impervious surfaces and frozen ground considerations (see Table 3-2). In order to represent frozen ground conditions during the winter storm events, the sub areas were separated into two portions, designated as A and B in the model. Two-thirds (67%) of the basin was considered as unfrozen ground with AMC III soil conditions. One-third (33%) of the basin was represented as concrete impermeable ground with a curve number of 99 for impervious surface as discussed in Section 2.3.3. Hydrographs for the two separate portions of each sub area were combined to determine peak flow from the whole sub area, prior to combining flows with other sub areas.

The SCS method accounts for precipitation losses from infiltration and evaporation and precipitation excess contributing to runoff within the curve number. Other methods including Kinematic wave, Muskingum, Muskingum-Cunge account for the losses using initial and constant loss parameters and were tested with variations of the HEC-1 models generated for this study. These other methods also allow evaluation of snowmelt separate from rainfall using climatological data to determine snowmelt rates. After evaluation of different methods for determining peak runoff, the SCS method was determined to be the most reasonable for the watershed, rainfall, snowmelt and frozen ground conditions. The Kinematic Wave, Muskingum, and Muskingum-Cunge methods utilize overland flow parameters, shallow concentrated flow conditions and channel flow parameters to determine time of concentration and peak flow within a sub area of the watershed. Input of the sub area parameters into the HEC-1 program generated widely varied results within the different sub areas due to long overland flow lengths anticipated at this site, variations in frozen ground and natural soil conditions, and a variety of other factors affecting the model results. Due to the variances in results and long overland flow paths, kinematic wave, Muskingum and Muskingum-Cunge methods were used only for estimating time of concentration and channel routing in the HEC-1 models.

Table 3-2. SCS Curve numbers used in hydrologic modeling.

	Winter Rain on Snow/Frozen Ground				Summer Cloudburst			
	Sub Area Portion A[1]		Sub Area Portion B[2]		Sub Area Portion A		Sub Area Portion B	
Sub Area(s)	CN	%	CN	%	CN	%	CN	%
1-19, 21, 24-35, 36-39	71	67	99	33	52	99	99	1
20, 22	82	40	99	60	52	40	99	60

1. Each Sub area was separated into two portions, A and B. Portion A represents that portion of the subarea that is not frozen during the winter events, and natural soil conditions during summer events.

2. Portion B represents that portion of the sub area considered concrete impermeable ground and impervious surface area in winter events, and impervious surface area during summer events.

3.2.2 Time of Concentration

The time of concentration is used to assist in the definition of runoff characteristics within the individual watershed. The time of concentration for a watershed is defined as the travel time of water from the hydraulically most distant point of the watershed to the point of interest (generally the most downstream point). The time of concentration for each watershed was estimated by measuring three components of storm water runoff flow paths including overland flow, shallow concentrated flow, and channel flow, and determining appropriate roughness coefficients and other parameters that influence water flow. A summary of the travel time associated with the three flow conditions (i.e., overland, shallow, and channel flow) and time of concentration for each basin is presented in Table 3-3. The equations used in evaluating total time of concentration are standard equations for the three different flow components as shown below.

$$t_{overland} = \frac{0.007 * (nL)^{0.8}}{\sqrt{P_2} S^{0.4}}$$

$$t_{shallow} = \frac{L}{V}, \; where\ V = 16.1345\sqrt{S}$$

$$t_{channel} = \frac{L}{V}, \; where\ V = \frac{CR^{0.667} S^{0.5}}{\eta}$$

Where:

η= manning's roughness coefficient

L = length of flow (ft)

P_2 = 2-year, 24-hour precipitation depth (in.)

S = slope (ft/ft)

R = hydraulic radius (ft)

V = velocity (ft/s)

C = 1.49 (constant)

Existing topographic maps were used to determine flow distances and slopes, and roughness coefficients were estimated using the aerial photography and observed field conditions. A summary of the travel time associated with the three flow conditions (i.e., overland, shallow, and channel flow) and time of concentration for each basin is presented in Table 3-3.

Table 3-3. Time of concentration (t_c) for sub basins.

Hydrologic Modeling, Sub Area Time of Concentration (t_c)				
Sub Area	Overland Flow	Shallow Conc. Flow	Channel Flow	t_c (minutes)
1	0.47	2.58	54.14	57.19
2	0.51	7.30	57.30	65.11
3	0.49	18.14	38.40	57.02
4	0.70	9.19	16.14	26.03
5	0.84	30.92	72.70	104.46
6	0.89	7.75	34.17	42.80
7	1.10	4.71	92.23	98.05
8	0.80	6.13	27.50	34.43
9	0.72	12.40	55.66	68.77
10	0.85	50.03	42.17	93.05
11	0.67	13.07	48.62	62.36
12	0.57	14.16	25.99	40.71
13	0.73	4.68	19.67	25.08
14	0.73	24.08	34.75	59.56
15	1.04	3.13	22.57	26.07
16	0.97	8.49	16.67	26.20
17	0.56	34.32	6.73	42.02
18	0.75	34.43	10.25	45.24
19	0.75	3.89	17.60	22.24
20	Channel reach only, no t_c evaluated.			
21	0.67	3.58	27.83	32.08
22	0.51	6.20	15.53	22.24
24	Closed sub area - non contributing			
25	0.89	5.84	8.79	15.51
26	0.63	2.98	15.05	18.66
27	Closed sub area - non contributing			
28	0.67	18.46	62.35	81.49

Table 3-3. (continued).

Hydrologic Modeling, Sub Area Time of Concentration (t_c)				
Sub Area	Overland Flow	Shallow Conc. Flow	Channel Flow	t_c (minutes)
29	0.56	3.58	23.51	27.65
30	0.75	8.91	53.25	62.91
31	0.60	23.76	84.92	109.28
32	0.55	6.20	33.50	40.25
33	0.49	4.53	23.45	28.46
34	0.56	9.84	7.42	17.82
35	0.28	1.66	19.03	20.97
36	0.39	14.61	26.36	41.35
37	0.67	5.41	103.95	110.03
38	0.57	1.85	26.92	29.34
39	0.85	8.94	22.92	32.70
40	Closed sub area - non contributing			

The time of concentration for sub area 1 is shown in the following equations.

Sub Area 1: Overland Flow: L= 300 ft, (η)= 0.13, P_2=0.873 in. (summer), S = 0.05 ft/ft

$$t_{overland} = \frac{0.007 * (0.13 * 300)^{0.8}}{\sqrt{0.873} * 0.05^{0.4}} = 0.47 \text{ min}$$

Sub Area 1: Shallow Concentrated Flow: L=500, S=0.04

$$t_{shallow} = \frac{500}{16.1345\sqrt{0.04}} = 154.9 \text{ sec} = 2.58 \text{ min}$$

Sub Area 1: Channel Flow: L=5150 ft, C=1.49, R=0.339, S=0.0097, η=0.045

$$t_{channel} = \frac{5150}{\frac{1.49 * 0.339^{0.667} * 0.0097^{0.5}}{0.045}} = 3{,}249.4 \text{ sec} = 54.14 \text{ min}$$

The total time of concentration is the sum of the three component times for each basin (for some basins, with more defined channels contributing to the main channel, two channel flow sections may be used). For Sub Area 1 the total time of concentration is shown below.

$$t_c = t_{overland} + t_{shallow} + t_{channel} = 0.47 \text{ min} + 2.58 \text{ min} + 54.14 \text{ min} = 57.19 \text{ min}$$

3.2.3 HEC-1 Model Input and Output

The hydrologic modeling was completed using the HEC-1 computer program with watershed and sub area properties incorporated into the models based on the parameters discussed in the previous sections. The models were used to generate peak flows at key locations contributing to the MCFS in order to evaluate the 25-and 100-year flood profiles.

HEC-1 input is completed using "cards" to represent different sub area parameters, rainfall statistics, reservoir and channel routing parameters, sub area connectivity and hydrograph combinations, as well as a wide variety of model controls and output parameters. The card identifier is the first two characters on the lines contained in the input file, which the HEC-1 program uses to perform the hydrologic modeling process. Limited information is included in text in the HEC-1 input files, identifying sub basins, routing reaches, hydrograph combinations and other significant steps within the models and can, to some degree, be used to follow the general modeling process. Complete descriptions of the "cards" used in the HEC-1 input files can be reviewed in HEC-1 User's Manuals available from the USCOE website or other HEC-1 resources on the internet.

The peak flow associated with each sub area within the contributing watershed was evaluated in the HEC-1 modeling program. These included the following:

- 25-year, 24-hour summer thunderstorm
- 25-year, 24-hour winter rain-on-snow with frozen ground
- 100-year, 24-hour summer thunderstorm

- 100-year, 24-hour winter rain-on-snow with frozen ground.

Combined hydrographs defining flow conditions throughout the MCFS were also evaluated in the HEC-1 models.

3.3 Hydrologic Modeling Results

The HEC-1 analysis of the different return period storm events indicate that the 25- and 100-year rain-on-snow and frozen ground events contribute the largest peak flow to the MCFS when considering the watershed as a whole. The HEC-1 analysis also identifies that the 25-year and 100-year summer storm event will generate the highest peak flow from the TSA sub area (sub area 22). These results are indicative of the low permeability of the frozen ground in the watershed and the imperviousness of the TSA.

A summary of the peak flow within each subbasin area for the various model storm events is provided in Table 3-4. A summary of peak flows for several key combinations of sub area hydrographs contributing to the MCFS is shown in Table 3-5. Representative hydrographs for peak flows are shown in Figures 3 (25-year, 24-hour summer storm hydrographs) through Figure 6 (100-year, 24-hour winter storm hydrographs). Discussion of specific results of the hydrologic modeling for each individual storm event is provided in the following.

1. The 25-year, 24-hour winter rain-on-snow with frozen ground event generates the highest peak flow in the contributing watershed as a whole for the RWMC facility, for storms with this return period. The 25-year, 24-hour winter rain-on snow and frozen ground event was used to identify the 25-year floodplain for the MCFS and surrounding areas. This event generates 104 cubic feet per second (cfs) at the Adams Boulevard Bridge and 177 cfs at the junction downstream of Adams Boulevard.

2. The 100-year, 24-hour winter rain-on-snow with frozen ground event generates the highest peak flow in the contributing watershed as a whole for the RWMC facility, for storms with this return period. This storm event was used to identify the 100-year floodplain for the MCFS and surrounding areas. This event generates 133 cfs at the Adams Boulevard Bridge and 232 cfs at the junction downstream of Adams Boulevard.

3. The 25-year and 100-year summer events generate the highest peak flow for the TSA sub area due to the amount of impervious surface in this basin. Rainfall intensity drives the peak flow conditions and during summer storm events rainfall intensity is significantly greater than winter events. The amount of impervious surface within the TSA boundary was estimated to be 60 %, and when combined with the short time of concentration for this basin, generates approximately 47 cfs during the 25-year summer event, and 61 cfs during the 100-year summer event. The 25-year summer event was used to evaluate the capacity of all storm drain system and culverts located near the buildings in the TSA. The 100-year summer event was used to evaluate the 100-year flood profile conditions within the TSA boundary.

Table 3-4. Peak flow for individual sub basins.

HEC-1 Model Analysis, Peak Flow (cfs)				
Sub Area	25-year Summer	25-year Winter	100-year Summer	100-year Winter
1	1	10	1	14
2	<1	3	<1	4
3	1	7	1	10
4	1	5	1	7
5	1	11	1	15
6	2	13	2	18
7	1	11	1	14
8	<1	2	<1	3
9	2	17	2	23
10	2	20	2	27
11	1	10	1	14
12	1	9	1	12
13	1	9	2	13
14	1	7	1	10
15	1	4	1	6
16	1	7	1	10
17	1	7	1	10
18	1	10	2	14
19	1	4	1	6
20	1	1	1	2
21	1	6	1	9
22	47	10	61	14
24	Closed sub area – non contributing			
25	<1	3	1	4
26	1	5	1	8
27	Closed sub area – non contributing			
28	3	33	4	45

Table 3-4. (continued).

HEC-1 Model Analysis, Peak Flow (cfs)				
Sub Area	25-year Summer	25-year Winter	100-year Summer	100-year Winter
29	2	11	2	17
30	1	6	1	9
31	2	20	2	27
32	1	5	1	8
33	1	8	2	12
34	<1	1	<1	2
35	<1	1	1	2
36	<1	1	<1	2
37	1	17	2	23
38	1	8	1	11
39	2	19	3	27
40	Closed sub area – non contributing			

Hydrographs from individual sub areas were combined in the HEC-1 models according to storm water runoff flowpaths as water from one sub area flows into the upper reach of the next downstream sub area or as several sub areas combine at their most downstream point. Combining the sub areas provides a representative model analysis of the entire watershed, allowing evaluation of peak storm water runoff flows at any location within the watershed. Eleven locations where hydrographs were combined in the HEC-1 model were selected for subsequent hydraulic (HEC-RAS) modeling of the MCFS to evaluate peak flows where significant flow changes occur. Significant flow changes were identified at channel junctions where combined sub area flows enter the MCFS. Combined hydrographs and significant changes in peak flow incorporated into subsequent hydraulic models of the MCFS are shown in Table 3-5.

Combined hydrographs for 5 of the cross-section locations used in hydraulic modeling are shown in Figures 3 through 6. The hydrographs are presented to provide a representation of the channel flows associated with cross section 300, 900, 2000, 2900 and 4200 (See Table 3-5 for sub area hydrograph combinations used to generate the graphs) throughout the duration of the 24-hour storms. Only 5 locations are shown in the following figures in order to better view the hydrographs for each location. The hydrographs for summer storms show a significant spike in the channel flow near hour 12 due to the rainfall distribution associated with summer storms. Rainfall intensity increases during a summer storm near hour 12 causing the peak runoff to occur shortly thereafter. The hydrographs for winter storms show a smaller spike near hour 12, with a more drawn-out flow condition. Rainfall intensity during a winter storm is more consistent throughout the duration of the storm, with a smaller peak intensity near hour 12. The winter storm rainfall distribution generates the longer storm water runoff hydrograph, with the peak occurring near hour 12 and sustained flows for the remainder of the storm.

Table 3-5. Peak flows input into HEC-RAS Models for each return period.

Subarea Hydrograph Combination	Cross-section location	25-year summer peak flow (cfs)	25-year winter peak flow (cfs)	100-year summer peak flow (cfs)	100-year winter peak flow (cfs)
17	4300	1	7	1	10
16,17	4200	2	14	2	19
16, 17, 38	3500	2	19	2	27
14, 15, 16, 17, 38	3400	2	25	3	36
5-7, 9-12, 14-17, 31, 38	2900	2	59	2	71
5-7, 9-12, 14-17, 21, 31, 38	2800	2	63	2	76
5-7, 9-17, 21, 31, 38	2200	7	63	10	76
5-7, 9-17, 20, 21, 31, 38	2100	7	69	10	85
5-7, 9-18, 20-22, 25, 31, 38	2000	47	83	62	104
1, 3-18, 20-22, 25, 26, 31, 33, 35, 36, 38	900 (Adams)	51	104	70	133
All	300	56	177	77	232

3.4 Comparison of Results to Historic Rain/Snow/Frozen Ground Floods

A detailed model calibration was not performed for this hydrologic analysis due to limited availability of documented flood flow conditions throughout the Snake River Plain. There are no identified stream gage records throughout the region surrounding INEEL, which are representative of the hydrologic and hydraulic conditions at the RWMC facility. Typically, with known watershed area, hydrologic parameters, stream channel parameters and climatological, precipitation and stream flow gage data, a model calibration can be conducted, comparing model results to measured data in order to verify modeling results. However, there are no data sources that would allow a calibration of the hydrologic models prepared for the RWMC facility. As an alternative, regional hydrology was used to compare results of this study to historic data, including documented estimations of peak flow expected in upper watershed areas for rain on snow and frozen ground events.

The 100-year peak flow associated with the watershed area contributing to the Adams Boulevard Bridge (Cross-section 900) is estimated at 133 cfs, according to the HEC-1 analysis for this study. The contributing area to the Adams Boulevard Bridge is 4.33 square miles, resulting in an average peak flow of 31 cfs/mi^2. The peak flow associated with the entire watershed modeled in this study is 232 cfs, with a total contributing area of 6.39 square miles, resulting in an average peak flow of 36 cfs/mi^2. These

average peak flows are consistent with those flows identified in the historic rain-on-snow and frozen ground events (~ 30-60 cfs/mi^2) documented throughout the region surrounding INEEL and the RWMC facility.

The consistency of the modeling results with documented flood events provides a measure of the reasonableness of watershed parameters, snowmelt and frozen ground parameters, and the overall model setup for the RWMC facility.

3.5 Discussion of Previous Hydrologic Studies and Reports

Several hydrologic and hydraulic studies have been performed at INEEL, including the RWMC facility, to evaluate various return period storms. Watershed characteristics, historic flood events, and precipitation statistics have been used in hydrologic modeling to identify floodplains and flood conditions during storms with return periods of 25 to 10,000 years and probable maximum events. A brief discussion of similarities and differences between previous reports and this investigation is provided in the following paragraphs. This discussion is provided for informative purposes only and is not intended to validate or discount the methods, procedures, analyses and results of other studies.

A site investigation report prepared by Taylor, et al., in 1994 discusses precipitation and snowmelt depths associated with various return period storms, frozen ground (impermeable concrete frost), hydrologic modeling parameters and previous flooding events for the INEEL area. The information contained in the Taylor report generally agrees with and affirms the analyses and results of this study. Specifically, the Taylor report indicates that the winter rain-on-snow with frozen ground is the most extreme 100-year event for INEEL, with comparable precipitation and snowmelt. The report references concrete permeable frost and states that "*the assumption of frozen ground presumes zero infiltration…everywhere*", however, that "*zero infiltration appears overly conservative*", providing support for representing only a reasonable portion of the watershed as concrete impermeable frost during winter storms. Additionally, the Taylor report references seven sources of gage data around INEEL during the 1962 flood event, measuring peak flows in the range of 10 to 76 cfs/mi^2, which indicates that the peak numbers identified in this report are consistent with the findings of the previous site investigation and historic gage data.

Another investigation of the RWMC was conducted by Dames and Moore (Dames and Moore, 1993) to prepare floodplain maps and to evaluate storms with various return periods up to a probable maximum event. Changes in topography and additional site developments since the time of the 1993 study prompted the need for updating the 100-year floodplain. The methods, procedures, and results of the Dames and Moore study are very similar to those of this study, with slight differences in specific hydrologic parameters and resulting peak flows for the watershed and RWMC facility. Results of the Dames and Moore study indicate that the peak flow for the subject watershed are approximately 40 cfs/mi^2, similar to the 31 to 36 cfs/mi^2 identified in this study. The results of the Dames and Moore analysis as well as this study are well within the range of the gage data identified for the 1962 event at INEEL and documentation of historic flooding on the Humboldt River, validating these results as well as previous studies.

It should be noted that flow gage data referenced in this study serves as a general calibration of the results of the hydrologic modeling conducted to delineate the 100-year floodplain. A wide range of flows are presented in this study for regional hydrologic conditions, including the 10 to 76 cfs/mi^2 experienced in watersheds throughout INEEL during the 1962 flood event (Taylor et. al, 1994) and the 30-60 cfs/mi^2 referred to from a historical flooding literature search (USCOE, 1975). However, these ranges provide only a limited measure of expected flows for comparison purposes. Calibration to a known gage site (as those identified around INEEL) requires analysis of the watershed condition where the gage is located,

including natural and man-made features which may impact storm water runoff, and knowledge of the gage construction and flow rating methods.

Results of this and other studies present similar conditions and peak flows associated with a 100-year return period storm and are well within the limits presented in historic flood documentation, indicating that these studies provide a reasonable measure of the magnitude of the floods anticipated at the RWMC.

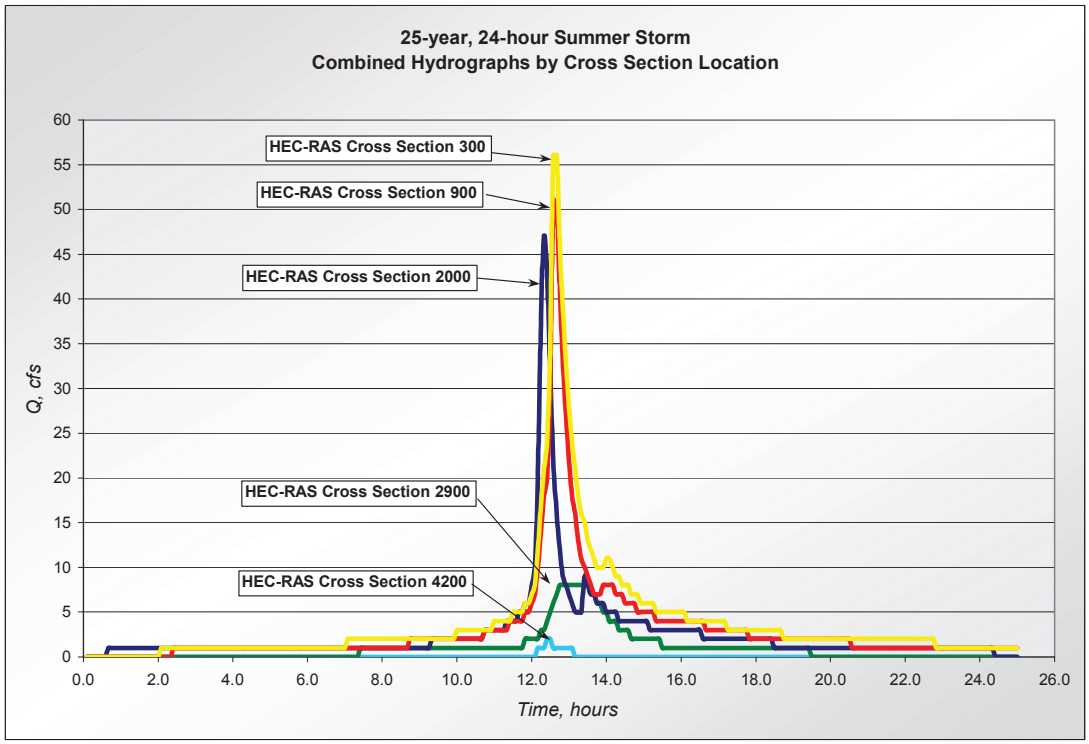


Figure 3. 25-year, 24-hour summer storm hydrographs.

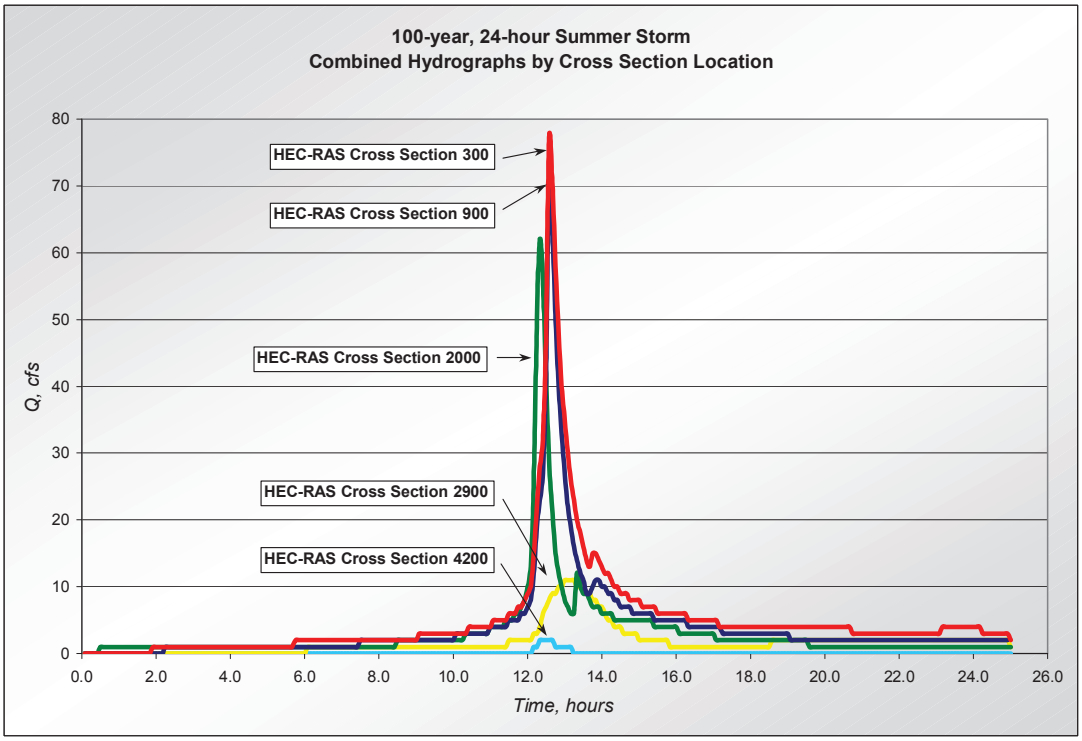


Figure 4. 100-year, 24-hour summer storm hydrographs.

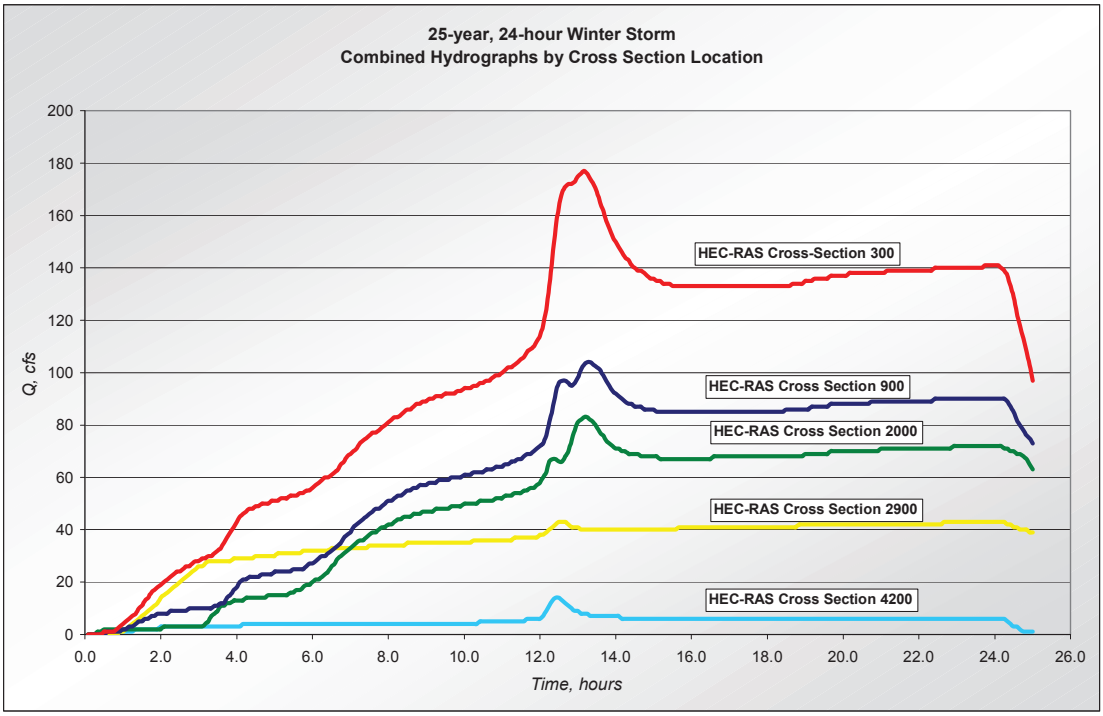


Figure 5. 25-year, 24-hour winter storm hydrographs.

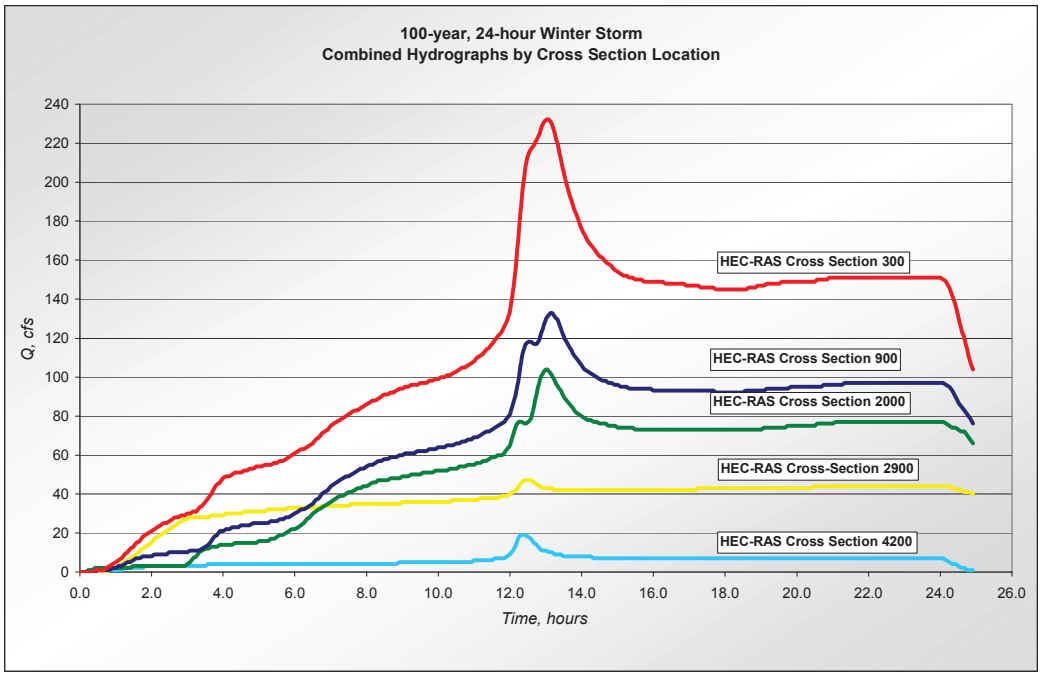


Figure 6. 100-year, 24-hour winter storm hydrographs.

4. HYDRAULIC ANALYSIS

The water surface profiles for the 25- and 100-year peak flood flow were developed using hydraulic models of the MCFS with all structures including bridges and culverts. The 100-year, 24-hour winter rain-on-snow event was used to identify the 100-year floodplain in this study. The methodology, assumptions and results of the hydraulic modeling of the MCFS are discussed in section 4.1. Water surface profiles and the storm water drainage system capacity in the TSA boundary were developed using hydraulic models of the inlets, pipes, culverts, and surface drainage channels for the 25-year event. The methodology, assumptions and results of the hydraulic modeling of the storm drain systems in the TSA are discussed in section 4.2

4.1 Main Channel Flow System

The MCFS was analyzed using the Hydrologic Engineering Center's River Analysis System (HEC-RAS, v. 3.0.1.). Field data collected during the course of this investigation was incorporated into a model of the channel and storm water runoff hydrographs resulting from HEC-1 simulations were input to determine the peak water surface profile during the storm event. Model parameters and assumptions used in generating the peak water surface profiles are described in the following paragraphs. Modeled cross section locations are identified in Figure 7 (Main channel flow system Modeled Cross Section Locations).

4.1.1 Channel Geometry

The MCFS was surveyed in the field during the course of this investigation using GPS and traditional instrumentation. Forty-two cross-sections were surveyed in the channel for the purposes of conducting the hydraulic analysis, beginning at the uppermost end of the channel and continuing west around the SDA. The MCFS has a subtle divide along the northern side of the SDA. One short portion of the channel flows east along the northern boundary and then south to its intersection with the main channel. To the west of the divide, the main channel begins and proceeds westward around the SDA, between the SDA and TSA, along the northern end of the TSA, under Adams Boulevard, and ultimately to the Big Lost River.

4.1.2 Bridges and Culverts

All hydraulic structures including bridges and culverts crossing the main channel were measured, surveyed and incorporated into hydraulic models of the channel. Additionally, all culverts and storm sewer system piping entering the main channel were measured to identify locations where significant flow changes in the main channel may occur. Measurements taken at each structure include opening widths, heights and/or diameters as applicable, channel geometry at the faces of the structure, number of culverts, entrance and exit geometry and other parameters that may influence hydraulic capacity. Several culverts entering the MCFS are equipped with valves. For the purpose of this study, all culverts were modeled with valves open in order to represent the maximum potential peak flow.

4.1.3 Roughness Coefficients

Roughness coefficients, or Manning's η, were estimated from field observations of conditions in the channel and overbank areas. The roughness coefficients vary greatly within the main channel ranging from 0.058 for rough, rocky segments, 0.042 for vegetated segments and 0.025 for constructed concrete segments. Areas outside of the channel, in the overbank segments were modeled using roughness coefficients ranging from 0.05 to 0.075, depending on surface and vegetation conditions observed in the field. These values were taken from the range of values identified in various engineering resource handbooks including the HEC-RAS User's Manual, with specific roughness values selected based on professional engineering judgment and experience with similar channel conditions. Values for the

channel and overbank reaches were varied accordingly to the conditions observed in the channel bottom, on side-slopes and areas outside of the constructed channel.

4.1.4 Hydraulic Modeling Process and Equations

The HEC-RAS computer program is used to model water surface profiles in a channel and incorporates channel and overbank geometry, channel length and slope (profile), roughness coefficients, and hydraulic structure data. Channel and flow properties modeled in HEC-RAS are used to evaluate a wide variety of flow conditions including flow depth, velocity, critical depths, and backwater effects from hydraulic structures. The program provides flow property solutions based on three equations; the energy equation, Manning's equation, and where necessary the momentum equation. The primary equation used to relate channel geometry, profile and roughness is Manning's equation:

$$Q = \frac{1.49}{\eta} A \left(\frac{A}{WP} \right)^{0.667} S^{0.5}$$

Where: Q = discharge, cfs

η = Manning's roughness coefficient

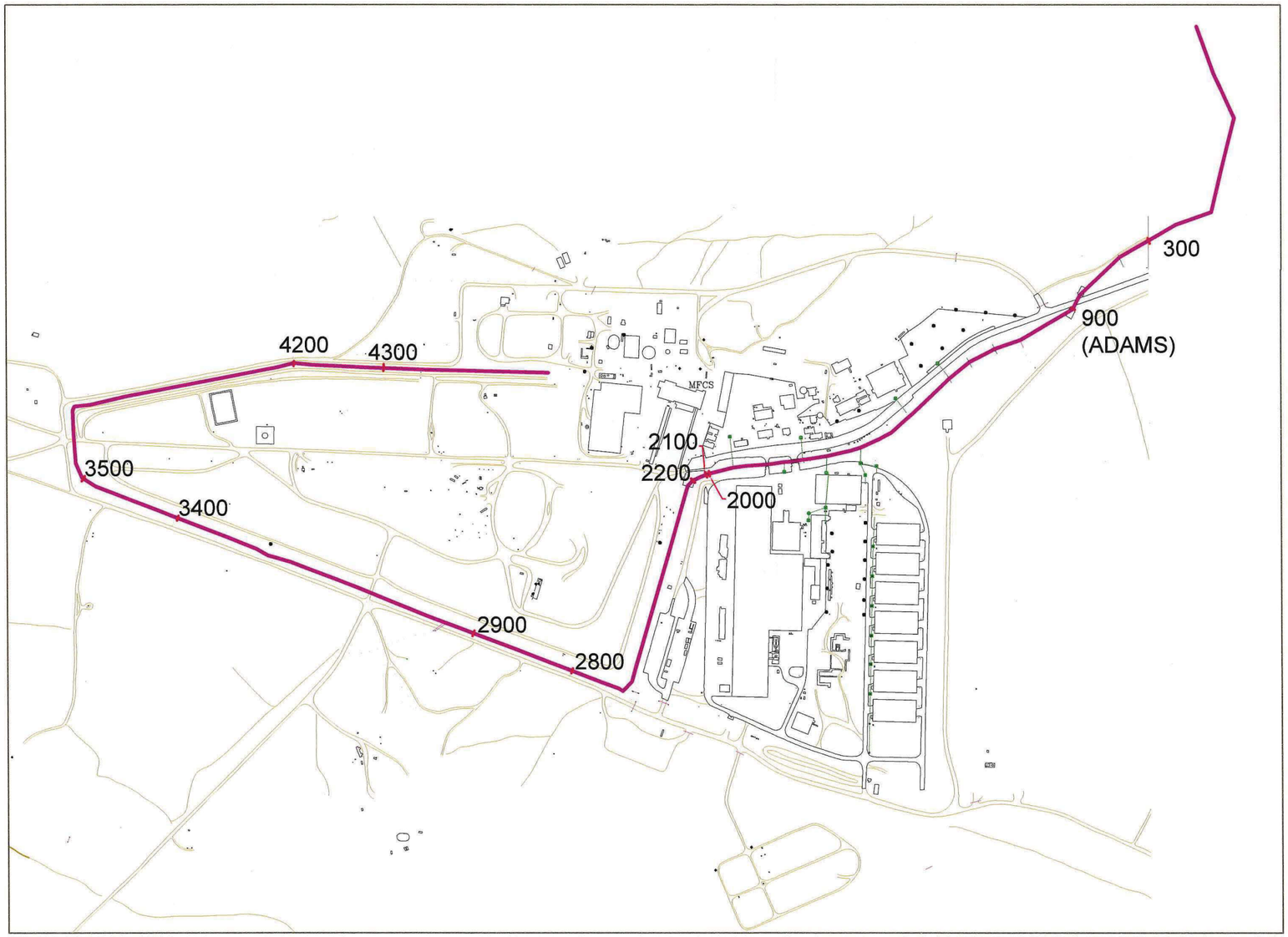
A = flow area, ft^2

WP = wetted perimeter,ft

S = channel slope, ft/ft

This equation relates the discharge and channel geometry to evaluate the flow area and wetted perimeter, which, in turn, determines the flow depth and water surface elevation at each cross-section within the model. Using an iterative process of solving the energy equation, Manning's equation and where necessary, the momentum equation, HEC-RAS provides a detailed analysis of the flow conditions in the modeled stream channel.

Figure 7. Main channel flow system modeled cross-section numbers.



LEGEND

- PAVED ROAD
- DIRT ROAD
- CONCRETE
- BUILDING
- TANKS
- CATCH BASIN
- 6835.7 SPOT ELEVATION
- U14 CONTROL POINT

N

SUBCONTRACT NO. 00000088, Rel. #3	INEEL
REQUESTER: Neil Hutten	Figure 7: Main Channel Flow System Modeled Cross Section Numbers
REPORT ID#: INEEL/EXT-02-00093	
DRAWN: Tim Funderburg	
PROJECT NO. NA	
SPEC CODE NA	
FOR REVIEW/APPROVAL SIGNATURES SEE DAR NO.	SIZE / CAGE CODE / INDEX CODE NUMBER (AREA, TYPE, CL, ORIG) / DWG- Figure-7 / REV 0
EFFECTIVE DATE: 12-13-2001	SCALE: / Figure-7

4.1.5 HEC-RAS Model Simulations

Peak flows from the 25- and 100-year hydrographs were taken from the HEC-1 hydrologic simulations and input into the HEC-RAS model of the main channel to identify the water surface profile during the simulated storm events. A total of 11 hydrographs, as identified in Table 3-5, were incorporated into the HEC-RAS model to accurately model channel junctions with major contributing sub area combinations.

The HEC-RAS model simulations indicate two general locations where the channel has insufficient capacity to convey both the 25-year and 100-year peak flows. Cross-sections in the uppermost reach of the MCFS on the north side of the SDA in sub basins 16, 17 and 18 identify water surface elevations above the channel banks. Additionally, water outside of the defined channel is shown in areas above and below the Adams Boulevard Bridge where the channel becomes shallow with a flat slope. The areas where 100-year peak flows exceed the capacity of the MCFS are shown on Sheet 1 (Main channel flow system 100-year floodplain). The remainder of the MCFS has sufficient capacity to convey the peak flood flow anticipated during the 25- and 100-year events.

The portions of the main channel with insufficient capacity during the peak 100-year flow have the potential to cause flooding in the area north of the SDA (an equipment laydown area) and in the area down gradient of the Adams Boulevard Bridge. Although this flooding potential exists, it is not expected to impact any buildings in the administrative area, buildings in the TSA perimeter, or buildings in the SDA boundary because the ground surface elevation is greater than the 100-year flood elevation predicted by the model. Further discussion of the areas subject to flooding during the 25- and 100-year events is presented in the following section.

4.2 TSA Surface/Subsurface Drainage Network Modeling

The surface drainage channels and subsurface drainage piping system in the Transuranic Storage Area were modeled using the Environmental Protection Agency's Storm Water Management Model (SWMM; USEPA 1994). This model provides a detailed analysis of storm drain system piping networks including pipe and inlet flow conditions, water surface elevations, flow velocities, and design capacities of pipe system components. The program generates detailed flow hydrographs resulting from storm water runoff input into the model, and simultaneously solves for flow conditions in all pipes and components using the energy equation, Manning's equation and the momentum equation to evaluate the storm drain system as a whole. The program can be used in conjunction with water surface profile data from HEC-RAS to evaluate backwater effects at storm drain system outfall locations, and to input additional storm water flow from storm drain systems into channels modeled in HEC-RAS.

It should be noted that the SWMM modeling for the TSA storm drain piping networks was conducted for the 25-year peak storm event in order to identify any flooding that may occur and to delineate the associated floodplain for the storm drain systems. The 25-year peak storm event is required to meet RCRA guidelines and requirements. RCRA guidelines do not require analysis of a 100-year peak flow for storm drain facilities such as the one serving the TSA area of the RWMC. Discussion of the SWMM program and modeling parameters used in this analysis are discussed in the following sections.

4.2.1 SWMM Program Input Parameters

The SWMM program combines storm water drainage system parameters including piping and inlet characteristics and configurations and storm water runoff hydrographs to generate a flow model of the drainage network during a design storm event. All connected components of the storm drainage system can be modeled together in order to identify backwater influences and pipes with insufficient capacity.

Input parameters for the SWMM program include the following:

- Pipe diameter, shape, length depths in the inlets or basins and roughness
- Surface channel shapes, lengths and roughness (where combinations of surface and subsurface drainage exist)
- Inlet type, surface and invert elevations
- Pipe and inlet connectivity data
- Storm water runoff hydrographs for the duration of the runoff event
- Outfall type and water surface elevation at the outfall during the runoff event (to identify backwater effects on the drainage system where outlet elevations are located near the bottom of surface channels).

The storm water drainage network inlets and culvert locations were surveyed during the field investigation at the RWMC. All necessary data to complete a storm water management model of this system was collected for the basins and culverts in the TSA area. Field data were incorporated into the SWMM input files and used to determine pipe capacities and peak flow during the runoff event.

4.2.2 Storm Water Runoff Hydrographs

A detailed storm water runoff hydrograph was developed from the HEC-1 model of the 25-year summer storm analysis and used to evaluate the drainage system. The runoff hydrograph for the TSA (sub area 22) was proportioned to various inlets throughout the drainage system according to their respective contributing areas and surface runoff flow paths. In each major segment of the drainage network, runoff is input into end of line inlets in order to evaluate all pipes and channels in the segment. A summary of the pipe capacities with the ratio of anticipated peak flow during the 25-year summer event is shown in Table 4-1.

4.2.3 SWMM Analysis

The SWMM program analysis provides detailed information regarding peak flows, pipe capacity, and pipe surcharge depths in and above the catch basins (inlets). During the modeling process, the SWMM program computes the flow and velocity in each pipe throughout the duration of the storm based on pipe size, roughness, slope, length and catch basin connections. The program also computes water surface elevations in the catch basins, including surcharge (water surface above pipe) due to insufficient pipe capacity. The surcharge elevation at the inlets indicates where insufficient pipe capacity may cause surface flooding. A detailed description of the information input to and output from the SWMM program and used in evaluating any surface flooding resulting from insufficient capacity is provided in the following:

Input information:

- Pipe segment describes upstream and downstream catch basin locations for each pipe segment modeled in the program. Inlet information in the model includes ground elevation and basin invert elevation.
- Pipe diameter and roughness (based on pipe material).

- Pipe slope, based on upstream and downstream basin invert elevations and pipe length.

Output information:

- Pipe capacity (design capacity) and peak flow.

- Ratio of design capacity to peak flow. This parameter, shown in the following table may indicate pipes where insufficient capacity can cause surface flooding. A ratio less than 1 shows sufficient capacity in the pipe segment for the storm water runoff input into the model. A ratio greater than 1 indicates pipe segments where the upstream junction is surcharged, providing additional head to drive storm water runoff through the pipe.

- Junction surcharge elevation above ground elevation indicates inlets where surcharge water in the basin has reached the surface and can cause flooding. Values of zero for this output parameter indicate that, although surcharge water may be present in the basin, the water surface elevation does not rise above the ground elevation and cause flooding.

A summary of the pipe capacities, ratio of design to peak flow, and junction surcharge above ground elevation for the anticipated peak flow during the 25-year summer event is shown in Table 4-1.

4.2.4 SWMM Modeling Results

In general, all pipes and surface channels within the TSA storm water drainage systems have sufficient capacity to convey the 25-year peak runoff event. The TSA storm drain system will safely pass the 25-year 24-hour peak flow. No surface flooding was identified in the SWMM program, however, some basins become surcharged during the peak flow, causing the ratio of design to peak flow to exceed a value of 1. Although some basins do have surcharge water providing additional head on the downstream pipe segments, this surcharge is not expected to cause any surface flooding beyond the ground elevation at the inlets.

4.3 25- and 100-year Floodplain Mapping

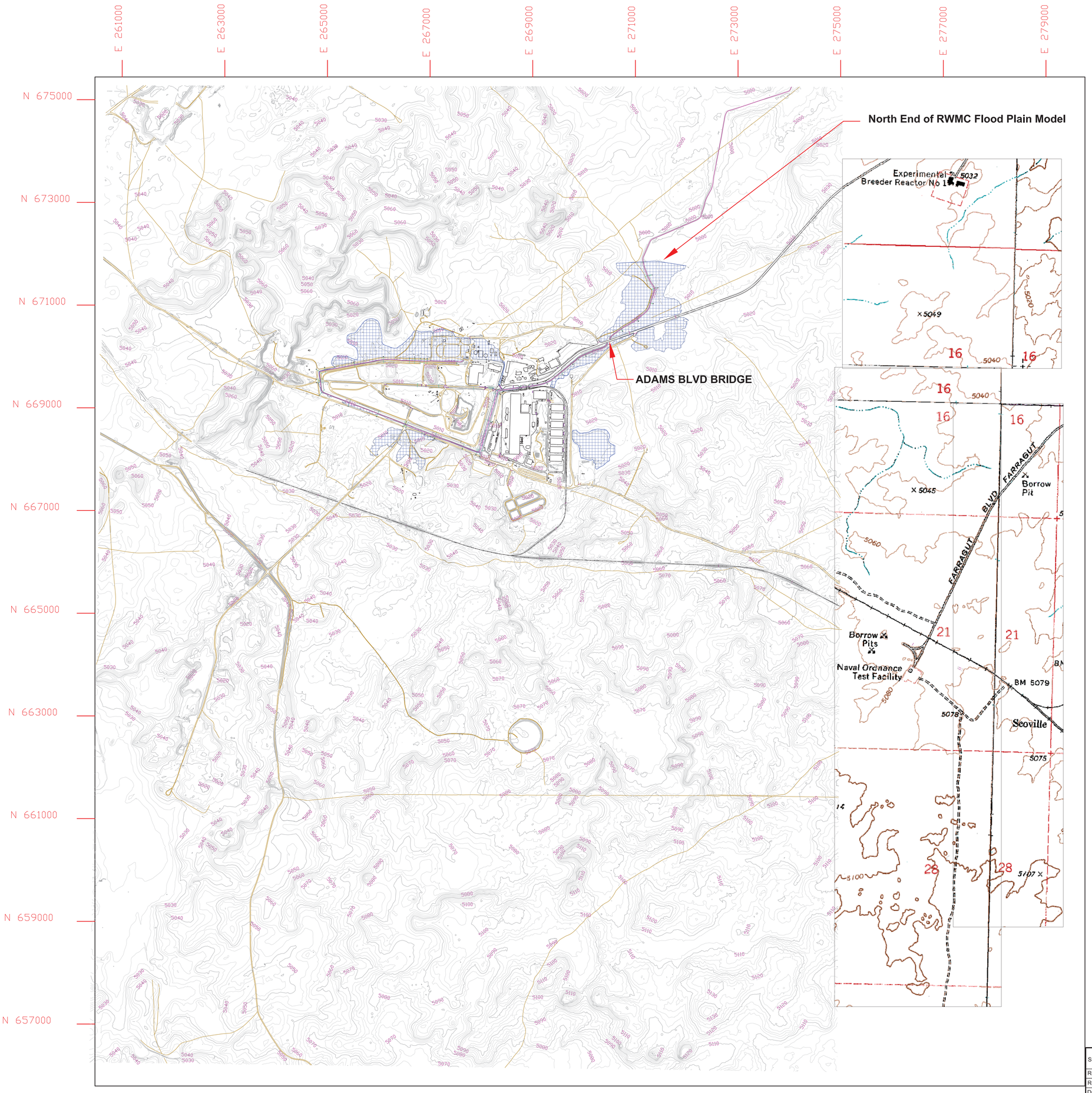
The 25- and 100-year floodplains were identified on topographic mapping of the RWMC facility using results of the HEC-RAS model simulations. The water surface elevations resulting from the 25-and 100-year flow were plotted at each cross-section used in the HEC-RAS model and a map of the associated floodplain area drawn in between the points and sections. In locations where the channel capacity was exceeded, the water surface was extended away from the channel to all points where the water surface elevation was contained. Surface water flow paths away from the main channel were also considered within the areas subject to flooding in order to identify all areas associated with the 25- and 100-year floodplains (i.e., culverts, surface channels, storm drains, etc.). The overall 100-year floodplain boundaries are identified in Sheet 1 (Main Channel Flow System 100-year floodplain) located at the end of this section.

Table 4-1. Basin 22 TSA Perimeter Storm Water Management Modeling, 25-Year Summer Cloudburst.

Pipe Segment (upstream and downstream junction)	Pipe Size (in.)	Pipe Type	n	Slope	Pipe Length (ft)	Design Capacity (DC) CFS	Ratio of DC to Computed Peak Flow	Junction Surcharge Elevation Above Ground Elevation
cb010→cb011	12	CMP	0.022	0.0230	161	3.19	1.17	0.0
cb011→cb007	12	CMP	0.022	0.0283	166	3.54	0.97	0.0
cb007→cb008	12	CMP	0.022	0.0102	166	2.13	1.49	0.0
cb008→cb009	15	CMP	0.022	0.0088	159	3.58	0.89	0.0
cb009→cb010	15	CMP	0.022	0.0090	166	3.63	0.94	0.0
cb010→cb011	18	CMP	0.022	0.0096	166	6.09	1.23	0.0
cb011→cb012	18	CMP	0.022	0.0102	166	6.28	1.18	0.0
cb012→out12	24	CMP	0.022	0.0068	163	11.0	0.67	0.0
cb016→cb16x	12	CMP	0.022	0.0180	39	2.82	1.25	0.0
cb16x→cb005	12	CMP	0.022	0.0180	100	2.82	1.25	0.0
in005→cb005	dual 12×18 elliptical	CMP	0.022	0.0094	85	12.1	0.39	0.0
cb005→cb004	dual 12×12	CPVC	0.015	0.0239	117	11.9	0.69	0.0
cb004→out04	dual 12×18 elliptical	CMP	0.022	0.0106	85	12.9	0.63	0.0
in013→cb013	24	CMP	0.022	0.0104	48	13.6	0.53	0.0
cb013→cb014	24	CMP	0.022	0.0226	71	20.1	0.36	0.0
in006→cb006	18	CMP	0.022	0.0046	43	4.23	1.11	0.0
cb006→cb014	18	CMP	0.022	0.0231	91	9.43	0.48	0.0
cb014→out14	dual 13×16 elliptical	CMP	0.022	0.0091	88	11.4	1.06	0.0

*cb110 included in model although not currently connected to system

**There is no threshold value that would indicate whether the DC to Computed Flow ratio is a concern. A DC to Computed Flow ratio greater than one is not a concern as long as the junction's ground elevation is not exceeded. For the conditions utilized in the analysis of the TSA storm drain system (25-year storm) no supplemental pumping should be needed in the TSA area.



LEGEND

- Main Channel Flow System
- Paved Road
- Dirt Road
- Concrete
- Building
- Tanks
- Fence
- Rail Road
- Guard Rail
- Catch Basin
- Index Contour
- Intermediate Contour
- 100-Year Flood
- 21 USGS Quad Section Number

General Notes

The watershed contributing to the main channel flow system immediately downstream (north) of the Adams Blvd. bridge was included in this study so that backwater effects could be evaluated at the Adams Blvd. bridge box culvert. This watershed area was added to this map by scaling a portion of the digital USGS quadrangle map to fit the topographic map produced by the October 17, 2000 aerial photography.

1000 500 0 500 1000

Scale: 1" = 1000'
Contour Interval: 2 foot

Base Map: Planimetric and 2 ft. contour layers are derived from 200 ft. aerial photogrammetric imagery collected on 10/17/2000 by Aero-Graphics, Inc., Salt lake City, UT.

Horizontal Datum NAD 27, ID East Zone, State Plane Coord
Vertical Datum NGVD 29
Units: U.S. Survey Foot

Subcontract No. 00000088, Rel. #3	INEEL
Requester: Neil Hutten	
Report ID#: INEEL/EXT-02-00093	Sheet 1: Main Flow Control System 100-Year Flood Plain
Drawn: Tim Funderburg	
Project No. NA	
Spec Code NA	
For review/approval signatures See DAR No.	Size E; Cage Code; Index Code Number (Area, Type, CL, Orig); DEQ_SHEET_1.dwg; Rev 0
Effective Date: 12-13-2001	Scale: 1"=1000'; Sheet 1

5. CONCLUSIONS

The conclusions of this hydrologic and hydraulic study at the RWMC facility are presented below:

1. The extent of the 100-year floodplain, as determined in this study, is shown in Sheet 1. Based on this analysis, there are no RCRA treatment, storage, or disposal facilities located within the 100-year floodplain at the RWMC. The floodplain is primarily contained within the MCFS in the SDA and TSA areas. As a result of this study, these facilities are outside of the 100-year floodplain and there will be no "washout" of hazardous waste as a result of the 100-year event.

2. The hydrologic and hydraulic modeling indicates that there are areas around the SDA and TSA perimeters subject to some degree of flooding during the 100-year flood. In general, the areas immediately around the SDA and TSA perimeters within 100-year floodplain are low-lying areas acting as small storage reservoirs that will fill prior to discharging water to the main channel. This flooding around the SDA and TSA perimeters does not impact any administrative buildings, buildings inside the SDA perimeter dike, or structures within the TSA complex.

3. The 100-year floodplain encompasses the fenced construction lay-down area north of the SDA perimeter. This flooding is the result of excess storm water runoff in sub-areas 16, 17 and 18 which will combine in shallow surface storage and cross over the sub area boundaries, ultimately discharging west through basins 17 and 16, and east through basin 18, where the lay-down area is located. The area surrounding the lay-down area has been encompassed in the 100-year floodplain because of limited topographic relief in this vicinity.

4. The 100-year floodplain encompasses the area around the Adams Boulevard Bridge. A downstream junction provides additional storm water runoff to the main channel in a channel reach with little or no slope combined with shallow channel geometry. This combination of additional flow and limited channel capacity causes a significant amount of flooding around the Adams Boulevard Bridge, however, does not impact any buildings at the RWMC facility.

5. Backwater effects from hydraulic structures on the main channel were analyzed in the hydraulic models in order to identify any flooding potential created by bridges or culverts. The analysis of peak flows anticipated during the 100-year flood event indicates that all hydraulic structures on the main channel have sufficient capacity to convey the flood flow with little or no backwater effects.

6. Backwater effects on the storm drains located in the TSA perimeter and near the administrative buildings from the water surface elevation in the main channel resulting from the 100-year flood event were evaluated to determine any flooding potential resulting from the storm drain piping and inlets. Flood water from the MCFS will have minor effects on the storm drain function. The TSA storm drain system will safely pass the 25-year 24-hour peak flow.

7. The only facility area that would be inundated as a result of the 100-year flood is a construction/lay-down area north of Pit 9.

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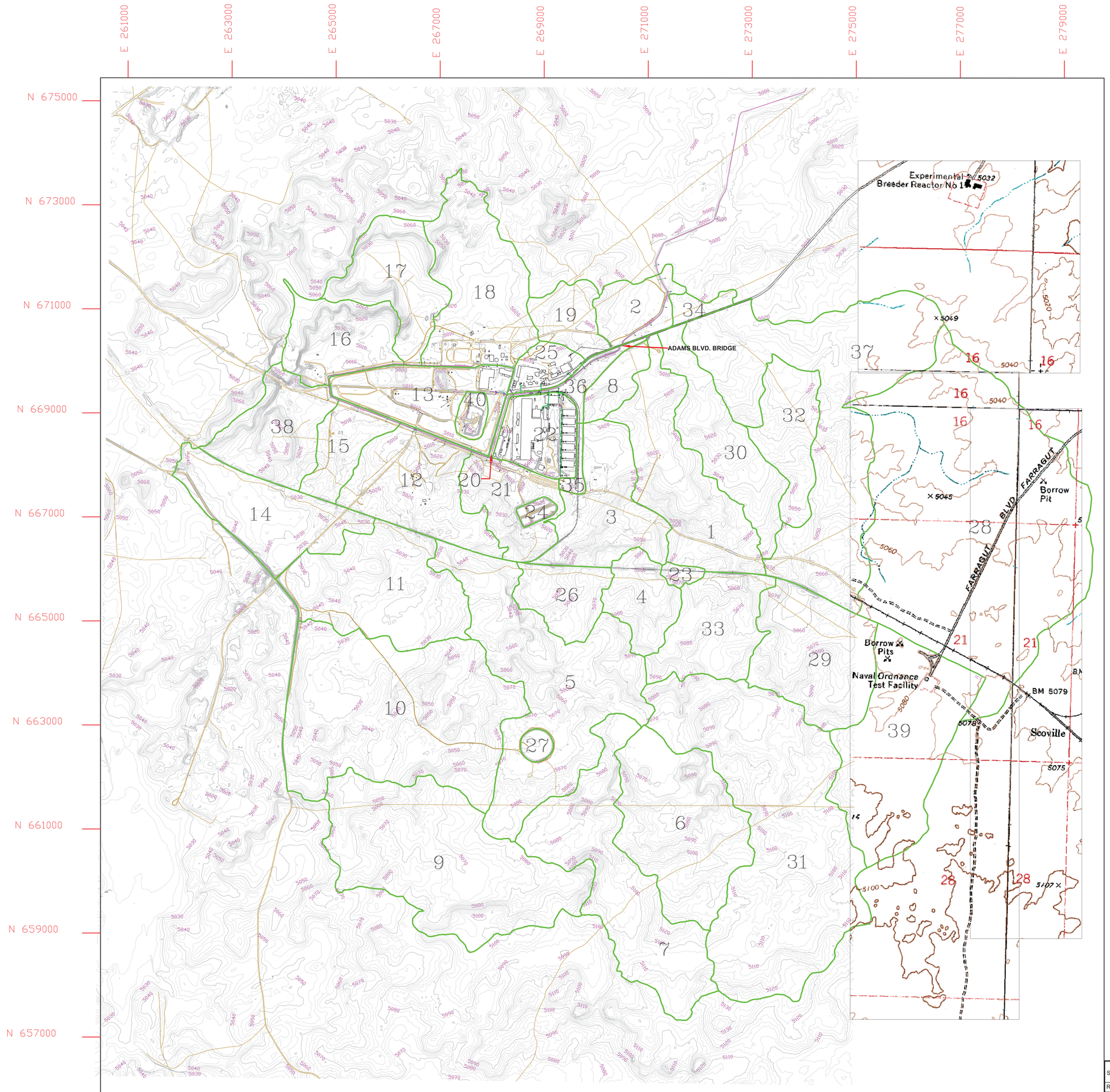
Appendix A

RWMC Watershed Boundary



LEGEND

- Main Channel Flow System
- Paved Road
- Dirt Road
- Concrete
- Building
- Tanks
- Fence
- Rail Road
- Guard Rail
- Catch Basin
- 7000 Index Contour
- Intermediate Contour
- Sub Watershed Boundary
- 28 Sub Watershed Number
- 21 USGS Quad Section Number

General Notes

The watershed contributing to the main channel flow system immediately downstream (north) of the Adams Blvd. bridge was included in this study so that backwater effects could be evaluated at the Adams Blvd. bridge box culvert. This watershed area was added to this map by scaling a portion of the digital USGS quadrangle map to fit the topographic map produced by the October 17, 2000 aerial photography.

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Base Map: Planimetric and 2 ft. contour layers are derived from 200 ft. aerial photogrammetric imagery collected on 10/17/2000 by Aero-Graphics, Inc., Salt lake City, UT.

Horizontal Datum NAD 27, ID East Zone, State Plane Coord
Vertical Datum NGVD 29
Units: U.S. Survey Foot

Subcontract No. 00000088, Rel. #3	INEEL
Requester: Neil Hutten	
Report ID#: INEEL/EXT-02-00093	Appendix A RWMC Watershed Boundary
Drawn: Tim Funderburg	
Project No. NA	
Spec Code NA	
For review/approval signatures See DAR No.	Size E; Cage Code; Index Code Number (Area, Type, CL, Orig); DEQ_APPENDIX_A.dwg; Rev 0
Effective Date: 12-13-2001	Scale: 1"=1000'; Sheet A

APPENDIX 3

CCP-AK-INL-005
CENTRAL CHARACTERIZATION PROJECT
ACCEPTABLE KNOWLEDGE SUMMARY REPORT
FOR ROCKY FLATS IMMOBILIZED ORGANIC LIQUIDS
STORED AT THE IDAHO NATIONAL LABORATORY
WASTE STREAMS: ID-RF-S3114 AND ID-RF-S3150-A

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CCP-AK-INL-005

Central Characterization Project
Acceptable Knowledge Summary Report
For

Rocky Flats Immobilized Organic Liquids
Stored at the Idaho National Laboratory

Waste Streams: ID-RF-S3114 and ID-RF-S3150-A

REVISION 5

August 24, 2011

Mark Pearcy

Printed Name

APPROVED FOR USE

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RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
0	06/13/2005	Initial issue.
1	01/04/2006	1. Clarified that there are only 2 layers of confinement in ID-RF-S3150-A even if more than 2 horsetails are present. 2. Updated waste stream volumes. 3. Added chlorobenzene to Tables 4-2 and 6-5, and added a paragraph in Section 6.4.3.3 explaining why D021 (chlorobenzene) was not assigned. 4. Revised Tables 5-4 and 6-4 to include relative weight percentages of each radionuclide. 5. Since IDC 003 drums with any amount of liquid are returned to the host site, the last paragraph in Section 5.4.4 is not necessary and was deleted. 6. Added plastic ties as a possible drum bag closure method to ID-RF-S3114. 7. Other editorial changes and corrections. 8. Added plastic waste to the waste stream description and waste material parameters. 9. Removed EPA hazardous waste number D043 from ID-RF-S3114 and D027 from ID-RF-S3150-A.

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RECORD OF REVISION (Continued)

Revision Number	Date Approved	Description of Revision
2	11/16//2006	1. Added a summary of waste material parameter weight percentages for both waste streams. 2. Added TRUCON Code SQ 154 to both waste streams. 3. Deleted footnote in Section 2.2 (CAR 06-025) 4. Updated waste stream volumes and generation dates for both waste streams to reflect the inventory of waste containers that have been retrieved from the TSA at AMWT. 5. Added trichlorofluoromethane as an F001- and F002-listed constituent to ID-RF-3114 based on an AK re-evaluation. 6. Added a paragraph describing the removal of EPA hazardous waste number D043 from ID- RF-S3114. 7. Added a paragraph describing the removal of EPA hazardous waste number D027 from ID- RF-S3150-A. 8. Moved two drums with significant quantities of uranium from ID-RF-S3150-A to ID-RF-S3114 based on an AK re-evaluation. 9. Made other editorial corrections and changes.

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RECORD OF REVISION (Continued)

Revision Number	Date Approved	Description of Revision
3	07/31/2008	1. Updated waste stream volumes and generation dates for Waste Stream ID-RF-S3114 to reflect the inventory of waste containers that have been retrieved from the Transuranic Storage Area (TSA) at Advanced Mixed Waste Treatment Project (AMWTP). 2. Revised Ignitibility and Corrosivity discussions for both waste streams to include more extensive descriptions of potential ignitable or corrosive liquids in the waste. 3. Added prohibited quantities of liquids as a prohibited item for Waste Stream ID-RF-S3150-A. 4. Updated Transuranic Waste Baseline Inventory Report reference to 2004 version. 5. Other editorial changes as required.
4	10/20/2009	1. Updated to add description of liquid remediation operations conducted by Advanced Mixed Waste Treatment Project (AMWTP) to Sections 4.3, 5.3, 5.5, 6.3, and 6.5 2. Added reference to Discrepancy Reports D013 and D014. 3. Other editorial changes as necessary.
5	08/24/2011	1. Updated to add description of liquid remediation operations conducted by Advanced Mixed Waste Treatment Project (AMWTP) to Sections 4.3, 5.3, 5.5, 6.3, and 6.5. 2. Revised to address permit modification changes in the November 30, 2010 *Waste Isolation Pilot Plant Hazardous Waste Facility Permit, Waste Analysis Plan* (WIPP-WAP). 3. Other miscellaneous changes incorporated as necessary. 4. Approximately 250 drums retrieved from Pits 11 and 12 in the Subsurface Disposal Area (SDA) were added to waste stream ID-RF-S3114.

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TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 9

2.0 WASTE STREAM IDENTIFICATION SUMMARY 10
2.1 Waste Stream ID-RF-S3114 10
2.2 Waste Stream ID-RF-S3150-A 11

3.0 ACCEPTABLE KNOWLEDGE DATA AND INFORMATION 12

4.0 REQUIRED PROGRAM INFORMATION 13
4.1 Facility Location and Description 13
4.1.1 Facility Location 13
4.1.2 Facility Description 13
4.2 Mission 14
4.2.1 Defense Waste Assessment 14
4.2.2 Spent Nuclear Fuel and High-Level Waste Assessment 15
4.3 Description of Waste Generating Process 15
4.3.1 Organic Liquid Waste Generation 15
4.3.2 Organic Liquid Waste Treatment 19
4.3.3 Waste Repackaging and Liquid Waste Remediation 19
4.4 TRU Waste Management 20
4.4.1 Types and Quantity of TRU Waste Generated 20
4.4.2 Correlation of Waste Streams Generated from the Same Building and Process 20
4.5 Waste Identification and Categorization Schemes 21
4.6 Waste Certification Procedures 22

5.0 REQUIRED WASTE STREAM INFORMATION – WASTE STREAM ID-RF-S3114 23
5.1 Area and Building of Generation 23
5.2 Waste Stream Volume and Period of Generation 23
5.3 Waste Generating Activities 23
5.4 Type of Wastes Generated 24
5.4.1 Material Input Related to Physical Form 24
5.4.2 Radiological Characterization 26
5.4.3 Chemical Content Identification – Hazardous Constituents 30
5.4.4 Prohibited Items 38
5.5 Waste Packaging 38
5.5.1 Filter Vents 39
5.5.2 Layers of Confinement 39

6.0 REQUIRED WASTE STREAM INFORMATION – WASTE STREAM ID-RF-S3150-A 40
6.1 Area and Building of Generation 40
6.2 Waste Stream Volume and Period of Generation 40
6.3 Waste Generating Activities 40

Controlled
Copy

6.4 Type of Wastes Generated 41
6.4.1 Material Input Related to Physical Form 41
6.4.2 Radiological Characterization 43
6.4.3 Chemical Content Identification – Hazardous Constituents 47
6.4.4 Prohibited Items 54
6.5 Waste Packaging 54
6.5.1 Filter Vents 55
6.5.2 Layers of Confinement 55

7.0 SUPPLEMENTAL WASTE STREAM INFORMATION 56

8.0 CONTAINER SPECIFIC INFORMATION 57

9.0 REFERENCE INFORMATION 58

LIST OF TABLES

Table 2-1. Immobilized Organic Liquids Waste Stream Summary 10
Table 4-1. Organic Liquid Wastes Identified in Building 774 Logbooks 16
Table 4-2. Organic Liquid Wastes Generation 17
Table 4-3. Waste Stream Volumes 20
Table 4-4. ATWIR Identification Numbers 21
Table 5-1a. Waste Stream ID-RF-S3114 Volume and Generation Dates 23
Table 5-1b. Waste Stream ID-RF-S3114 Waste Material Parameter Weights 26
Table 5-2. Radioassay Data for IDC 003 from the INL 3,100 m3 Project 28
Table 5-3. Isotopic Compositions of Rocky Flats Plutonium and Uranium 28
Table 5-4. Summary of Radionuclides in Waste Stream ID-RF-S3114 30
Table 5-5. EPA Hazardous Waste Numbers for Waste Stream ID-RF-S3114 31
Table 6-1a. Waste Stream ID-RF-S3150-A Volume and Generation Dates 40
Table 6-1b. Waste Stream ID-RF-S3150-A Waste Material Parameter Weights 43
Table 6-2. Radioassay Data for IDC 700 and 801 from the INL 3,100 m3 Project 45
Table 6-3. Isotopic Compositions of Rocky Flats Plutonium and Uranium 45
Table 6-4. Summary of Radionuclides in Waste Stream ID-RF-S3150-A 47
Table 6-5. EPA Hazardous Waste Numbers for Waste Stream ID-RF-S3150-A 48

LIST OF FIGURES

Figure 1. Rocky Flats Environmental Technology Site Map 66
Figure 2. Location of the INL Radioactive Waste Management Complex 67
Figure 3. Radioactive Waste Management Complex Map 68
Figure 4. Grease Plant 69
Figure 5. Organic and Sludge Immobilization System 70

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LIST OF ACRONYMS AND ABBREVIATIONS

AEC	U.S. Atomic Energy Commission
AK	Acceptable Knowledge
AMWTF	Advanced Mixed Waste Treatment Facility
AMWTP	Advanced Mixed Waste Treatment Project
ATWIR	Annual Transuranic Waste Inventory Report
CAS	Chemical Abstract Service
CCP	Central Characterization Project
CFR	Code of Federal Regulations
CH	Contact-Handled
Ci	Curie
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DTF	Drum Treatment Facility
EPA	U.S. Environmental Protection Agency
g	Gram
IDC	Item Description Code
INL	Idaho National Laboratory
MBA	Material Balance Account
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
nCi	Nano-curie
NDA	Nondestructive Assay
NGS	neutrons/gram/second
NWPA	Nuclear Waste Policy Act
OASIS	Organic and Sludge Immobilization System
PCB	Polychlorinated biphenyl
ppm	Parts-per-million
PRQL	Program Required Quantitation Limit
PVC	Polyvinyl chloride
R&D	Research and Development
RCRA	Resource Conservation and Recovery Act
RTL	Regulatory Threshold Limit
RTR	Real-Time Radiography
RWMC	Radioactive Waste Management Complex
SVOC	Semi-Volatile Organic Compound

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LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

TIC	Tentatively Identified Compound
TRU	Transuranic
TRUCON	TRUPACT-II Content Code
TSA	Transuranic Storage Area
TSCA	Toxic Substances Control Act
TWBIR	Transuranic Waste Baseline Inventory Report
UCL_{90}	90-percent Upper Confidence Limit
VE	Visual Examination
wt%	Weight Percent
WIPP	Waste Isolation Pilot Plant
WIPP-WAC	Contact Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant
WIPP-WAP	Waste Isolation Pilot Plant Hazardous Waste Facility Permit, Waste Analysis Plan
WTS	AMWTP Waste Tracking System
WWIS	WIPP Waste Information System

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1.0 EXECUTIVE SUMMARY

This Acceptable Knowledge (AK) Summary Report has been prepared for the Central Characterization Project (CCP) for contact-handled (CH) transuranic (TRU) immobilized organic liquid waste (Waste Streams ID-RF-S3114 and ID-RF-S3150-A) generated at the Rocky Flats Environmental Technology Site (formerly Rocky Flats Plant) in Golden, Colorado, and transferred to the Idaho National Laboratory (INL). The waste is stored at Radioactive Waste Management Complex (RWMC) Transuranic Storage Area (TSA) at the INL.

The CCP is tasked with certification of CH TRU waste for transportation to and disposal at the Waste Isolation Pilot Plant (WIPP). This document was developed in accordance with procedure CCP-TP-005, *CCP Acceptable Knowledge Documentation* (Reference 1), that directs how AK is collected, reviewed, and managed by the CCP. The CCP is responsible for AK development in accordance with CCP procedures and will review and approve this AK Summary Report and maintain this report and supporting AK source documentation as CCP quality assurance records. The CCP maintains responsibility for all referenced documentation stored at the CCP Records Center, Carlsbad, New Mexico.

This AK Summary Report includes information relating to Rocky Flats history, process operations, and waste management practices. Information contained in this report was obtained from numerous sources, including historical document archives, generator and storage facility waste records and documents, and interviews with cognizant personnel. Additionally, AK generated by the Rocky Flats, the 3,100 cubic meters (m^3) Project at INL, and the Advanced Mixed Waste Treatment Project (AMWTP) at INL, TRU waste certification programs for immobilized organic liquid wastes were compiled and incorporated into the CCP AK record for Waste Streams ID-RF-S3114 and ID-RF-S3150-A. This AK Summary Report includes original source documentation, AK reports, waste stream profiles, and confirmation data generated for Rocky Flats immobilized organic liquid wastes assessed by these programs.

This AK Summary Report, along with the referenced supporting documentation, provides a defensible and auditable record of the mandatory waste program and waste stream-specific information required by the *Waste Isolation Pilot Plant Hazardous Waste Facility Permit Waste Analysis Plan* (WIPP-WAP) (Reference 2), and DOE/WIPP-02-3122, *Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant* (WIPP-WAC) (Reference 3). The AK sources referenced within this report by alphanumeric designators (i.e., C001, P001, and U001) correspond to a unique CCP Source Document Tracking Number as defined in Section 3.0.

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2.0 WASTE STREAM IDENTIFICATION SUMMARY

Site Where TRU Waste Was Generated and Stored

Generation Location:
Rocky Flats Environmental Technology Site
10808 Highway 93
Golden CO, 80402
U.S. Environmental Protection Agency (EPA) ID No. CO7890010526

Storage Location:
INL RWMC
EPA ID No. ID4890008952

Facility Where TRU Waste Was Generated

This waste was generated at Rocky Flats in Building 774. Refer to Section 4.1.2.

Facility Mission

Rocky Flats had two primary missions: the production of triggers for nuclear weapons, and the processing of retired weapons for plutonium recovery. The triggers, also known as pits, were the first-stage fission bombs used to initiate the second-stage fusion reaction in hydrogen bombs. Plutonium metal was recovered from retired warheads and manufacturing residues for reuse. Refer to Section 4.2.

Table 2-1. Immobilized Organic Liquids Waste Stream Summary

Waste Stream Number	EPA Hazardous Waste Numbers	IDC/Description
ID-RF-S3114	D022, D026, D027, D028, D029, D030, D032, D034, D036, D037, F001, F002, F005	003, Organic Setups
ID-RF-S3150-A	D022, D028, D029, D030, D032, D034, D036, D043, F001, F002, F005	700, OASIS Waste
		801, Solidified Organics

2.1 Waste Stream ID-RF-S3114

Summary Category Group: S3000 – Homogeneous Solids

Waste Matrix Code Group: Solidified Organics

Waste Matrix Code: S3114, Absorbed Organic Liquids

TRUPACT-II Content (TRUCON) Code: ID 112/ID 212, SQ 154

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Waste Stream Annual Transuranic Waste Inventory Report (ATWIR) ID: IN-ID-RF-S3114

Layers of Confinement: Maximum of two (2) layers

Waste Stream Description:

This waste consists of various organic liquids that were transferred to Building 774 where they were immobilized using Micro-cel E® (a synthetic calcium silicate) to form a grease or paste-like material. The organic liquids were primarily a mixture of oils and chlorinated solvents. Small amounts of Oil-Dri® were sometimes added to the mixture as well. This waste is assigned Item Description Code (IDC) 003, Organic Setups. Refer to Section 5.4.1.

2.2 Waste Stream ID-RF-S3150-A

Summary Category Group: S3000 – Homogeneous Solids

Waste Matrix Code Group: Solidified Organics

Waste Matrix Code: S3150, Solidified Homogeneous Solids

TRUCON Code: ID 112/ID 212, SQ 154

ATWIR ID: IN-ID-RF-S3150-A

Layers of Confinement: Maximum of two (2) layers

Waste Stream Description:

This waste consists of various organic liquids immobilized into a solid monolith by the Organic and Sludge Immobilization System (OASIS) in Building 774. Oil and chlorinated solvent mixtures were the primary liquids treated by OASIS. The organic liquids were immobilized by mixing with water, ENVIROSTONE® emulsifier, accelerator, and gypsum cement. The emulsifier was a polyethylene glycol ether, and the accelerator contained gypsum and potassium sulfate. This waste may also include small amounts of metal and plastic wastes. This waste is assigned IDC 700, OASIS Waste, and IDC 801, Solidified Organics – Building 774. Refer to Section 6.4.1.

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3.0 ACCEPTABLE KNOWLEDGE DATA AND INFORMATION

TRU waste destined for disposal at the WIPP must be characterized prior to shipment. The WIPP-WAP (Reference 2) requires the use of knowledge of the materials and processes that generate and control the waste to provide a clear and convincing argument about the characteristics of each waste stream. The AK characterization documented herein complies with the requirements of the WIPP-WAP and was developed in accordance with CCP-PO-001, *CCP TRU Waste Characterization Quality Assurance Project Plan* (Reference 5), and CCP-TP-005 (Reference 1).

This AK Summary Report includes information relating to the facility's history, process operations, and waste management practices related to management and certification of the immobilized organic liquid Waste Streams ID-RF-S3114 and ID-RF-S3150-A. Information contained in this report was obtained from numerous sources, including historical reports, standard operating procedures, waste inventory information, historical confirmation results (visual examination [VE], real-time radiography [RTR], and headspace gas data), interviews with cognizant personnel, and waste packaging and shipping documentation. The references and AK sources used to prepare this report are listed in Section 9.0. The AK sources referenced within this report by an alphanumeric designator (i.e., C001, P001, and U001) correspond to the Source Document Tracking Number using the following convention:

- C – Correspondence (e.g., interview notes)
- D – Discrepancy reports
- P – Published documentation
- U – Unpublished documents and databases

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4.0 REQUIRED PROGRAM INFORMATION

This section provides the waste management program information required by the WIPP-WAP (Reference 2). Included are a brief history of Rocky Flats, a summary of the missions, a discussion of the operations associated with the generation of TRU immobilized organic liquid wastes, and descriptions of the TRU waste management programs at both Rocky Flats and INL. Attachment 1, Acceptable Knowledge Documentation Checklist, for each waste stream (created in accordance with procedure CCP-TP-005) provides a list of TRU waste management program information required to be developed as part of the AK record (Reference 1). This section satisfies those requirements.

4.1 Facility Location and Description

4.1.1 Facility Location

Rocky Flats Environmental Technology Site (formerly Rocky Flats Plant) is located in northern Jefferson County, Colorado, approximately 16 miles northwest of downtown Denver. The 6,550 acre government-owned and contractor-operated facility was part of the nationwide nuclear weapons production complex. A map of the plant highlighting Building 774 which generated immobilized organic liquid TRU waste is provided in Figure 1, Rocky Flats Environmental Technology Site Map, at the end of this report (References P004 and P053).

The drums of immobilized organic liquid waste from Rocky Flats are stored at the INL RWMC located approximately 51 miles west of Idaho Falls, Idaho. The TSA is a 58-acre area in the eastern section of the RWMC dedicated to the storage of TRU waste received at the RWMC after 1970. TRU waste received from Rocky Flats was placed in retrievable storage on asphalt pads and covered with earth. More recently, waste in drums and boxes was stored in metal buildings called storage modules. Maps showing the location of the RWMC and TSAs are provided in Figure 2, Location of the INL Radioactive Waste Management Complex and Figure 3, Radioactive Waste Management Complex Map (References P508 and P509).

4.1.2 Facility Description

Ground breaking for the first permanent buildings at Rocky Flats began in 1951. By 1954, approximately 700,000 square feet of building space had been completed. As the plant operations expanded, as much as 1.6 million square feet were occupied by manufacturing, chemical processing, plutonium recovery, and waste treatment operations. Plutonium operations were located primarily in the 384 acre high-security area (Reference P053).

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Building 774, Liquid Waste Processing Facility – When Building 774 was built in 1953, its primary purpose was to treat radioactive aqueous waste from Building 771. In 1965, the Building 774 Grease Plant began processing organic liquid wastes generated from plutonium machining and other operations. The Grease Plant shut down in 1985 and was replaced by a new treatment process called the Organic and Sludge Immobilization System, or OASIS (References P052 and P053).

4.2 Mission

Rocky Flats had two primary missions during the period of operations from 1952 through 1990: the production of triggers for nuclear weapons, and the processing of retired weapons for plutonium recovery. The triggers, also known as pits, were the first-stage fission bombs used to initiate the second-stage fusion reaction in hydrogen bombs. Plutonium (Pu) metal was recovered from retired warheads and manufacturing residues and was also imported from the Hanford Reservation in Washington State and the Savannah River Plant in South Carolina (References P053 and P004).

In general, the plant's primary mission changed little from 1952 until 1990 when plutonium operations were suspended. In the early 1960s, the U.S. Atomic Energy Commission (AEC) implemented the single mission concept to reduce redundant operations between AEC facilities. At that time, Rocky Flats became the primary manufacturer for nuclear weapons triggers. With the exception of periodic refinements, only three trigger configurations were manufactured at the plant. The first two trigger designs were solid units manufactured primarily of uranium, similar to the devices used during World War II. In 1957, the trigger design was changed to sealed hollow spheres which were manufactured with much less uranium and more plutonium. This design change resulted in lighter, smaller, and more powerful weapons (Reference P053).

The general design of the trigger has not changed dramatically since 1958, although modifications to the relative amounts of metals, dimensions, and other features of the parts were modified over the years. The plant also supported weapons development programs responsible for fabricating, testing, and assembling parts with new geometries or metal compositions. Because of the plant's metal manufacturing capabilities, Rocky Flats often fabricated other weapons parts, including components made of stainless steel and beryllium (Reference P053).

4.2.1 Defense Waste Assessment

The WIPP-WAC (Reference 3) requires generator sites to use AK to determine if the TRU waste streams to be disposed at WIPP meet the definition of TRU "defense" waste. Based on guidance from the U.S. Department of Energy (DOE), a TRU waste is eligible for disposal at WIPP if it has been generated in whole or part by one of the atomic energy defense activities listed in Section 10101(3) of the *Nuclear Waste Policy Act of 1982* (NWPA) (Reference 6). As previously described, the atomic energy defense activity that applies to the TRU wastes generated by Rocky Flats is weapons activities.

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4.2.2 Spent Nuclear Fuel and High-Level Waste Assessment

The *Waste Isolation Pilot Plant Land Withdrawal Act* bans the disposal of spent nuclear fuel and high-level waste, as defined by the NWPA, at WIPP. According to the NWPA, spent nuclear fuel is "fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing." High-level waste is defined by the NWPA as "the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations, and other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation (References 6 and 14)."

Rocky Flats did not have a reactor, and the waste does not contain irradiated fuel elements withdrawn from a reactor (References P004 and P053). Therefore, the waste is not spent nuclear fuel or high-level waste and is eligible for disposal at WIPP (References 3 and 6).

4.3 Description of Waste Generating Process

Organic liquid wastes from numerous buildings on site were transferred to Building 774 for treatment. The liquids were then treated as described in the following sections.

4.3.1 Organic Liquid Waste Generation

The organic liquids were transferred to Building 774 by pipeline or in containers. The organic liquids originated in Buildings 334, 371, 443, 444, 447, 559, 707, 776, 777, 778, 779, 865, 881, 883, and 991 (References U040 and U043). In about 1985, organic wastes were segregated into either low-level or TRU tank systems. Prior to this, low-level and TRU liquids were collected together (Reference U040).

Waste oils and solvents were generated primarily in Buildings 707 and 777. A cutting oil, usually Texaco Regal® A (a nonhazardous oil similar to Regal® R&O 32), flowed onto a part during machining (References P052, P077, and P518). After machining, the part was rinsed to remove residual oil. Various solvents were used to rinse machined parts and degrease tools. These included carbon tetrachloride, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, trichloroethylene, and tetrachloroethylene. Ultrasonic cleaner baths using 1,1,1-trichloroethane were used to clean parts. Metal turnings and scrap were cleaned in carbon tetrachloride baths before forming the turnings into briquettes (References P052, P053, and P077).

Trichloroethylene was replaced by 1,1,1-trichloroethane for vapor degreasing of plutonium parts beginning around 1973. By the end of 1974, trichloroethylene remained in use in only one plutonium operation, and by February 1975, was used only in

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research and analytical activities (Reference P023). Since 1985, the solidified organic waste was derived almost exclusively from Buildings 707 and 777 (Reference U040). A logbook was used in Building 774 to record the types of organic waste and generation source of the liquids that made up the immobilized organic liquids wastes. The date of treatment, generation location, waste description, and volume of waste were entered in the logbook. A description of the organic liquids and the buildings from which they originated are presented in Table 4-1, Organic Liquid Wastes Identified in Building 774 Logbooks (References U040 and U043). Information in parentheses does not appear in the logbook but is provided as clarification.

Table 4-1. Organic Liquid Wastes Identified in Building 774 Logbooks

Building	Organic Liquid Waste Description
334	Waste oil, PCBs (polychlorinated biphenyls), Zyglo (Zyglo is a dye penetrant compound containing fluoranthene, petroleum distillates, and kerosene) (Reference P142)
371	Oil
443	Oil
444	Oil, trichlor (assumed to be 1,1,1-trichloroethane), Freon
447	Oil
559	Pump oil, oil, toluene/H_3 (assumed to be tritium), silicon oil, organic waste (xylene/DHDECMP [dihexyl-n,n-diethylcarbamoyl methylphosphonate]) (References C032 and C086)
707	Oil samples, hydraulic oil
771	Oil, etch solution, Freon oil, oil/CCl_4, mixed organics, halocarbon oil, TBP (assumed to be tributyl phosphate), organic extract, Chlorothene (Chlorothene is a trade name for 1,1,1-trichloroethane)
776	Engine oil, tube oil, lathe cutting oil
777	Coolant oil/CCl_4, perc (assumed to be tetrachloroethylene), trichloroethylene
778	Oil, Pydraul oil (Pydraul products are hydraulic oils containing triphenyl phosphate, trialkylphenyl phosphates, and alkyl aryl phosphates) (Reference P091)
779	Hydraulic oil, equipment oil, H_3 (assumed to be tritium)/toluene, Freon
865	Beryllium waste oil
881	Oil, machine coolant, perchlor (assumed to be tetrachloroethylene), waste cocktail (assumed to be scintillation cocktail), Varsol oil (Varsol is a trade name petroleum solvent containing primarily saturated hydrocarbons and less than 2% toluene, xylene, and ethyl benzene) (Reference P084)
883	Oil, cooling solvent, D-38 (depleted uranium) oil, oil and perk (assumed to be tetrachloroethylene)
991	Coolant, band saw coolant

In addition to information obtained from treatment logbooks, other sources of information were reviewed to identify potential organic chemicals treated in Building 774. This information is presented in Table 4-2, Organic Liquid Wastes Generation.

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Table 4-2. Organic Liquid Wastes Generation

Chemical	Use
1,1,1-Trichloroethane	Plutonium fabrication (References P060, P079, and P520) Research and development (References P079 and P520) Analytical laboratory reagent (References P053 and P076) Metallography laboratory (Reference P520)
1,1,2-Trichloro-1,2,2-triflouroethane (Freon TF)	Plutonium fabrication (References P060 and P079) Depleted uranium fabrication (Reference P520) Beryllium fabrication (Reference P520) Stainless-steel fabrication (Reference P520) Research and development (Reference P520) Analytical laboratory reagent (References P052 and P076)
1,1-Dichloroethylene	Analytical laboratory reagent (Reference P052)
1,2-Dichloroethane	Analytical laboratory reagent (Reference P052)
2-Ethoxyethanol	Analytical laboratory reagent (Reference P052)
Acetone	Plutonium fabrication (Reference P520) Beryllium fabrication (Reference P520) Research and development (Reference P062) Analytical laboratory reagent (References P052 and P076)
Benzene	Plutonium fabrication (Reference P053) Analytical laboratory reagent (References P053 and P076)
Carbon disulfide	Analytical laboratory reagent (Reference P076)
Carbon tetrachloride	Plutonium fabrication (References P060 and P520) Analytical laboratory reagent (References P053 and P076)
Chloroform	Analytical laboratory reagent (References P053 and P076) Research and development (Reference P052)
Chlorobenzene	Analytical laboratory reagent (Reference P081)
Cyclohexane	Analytical laboratory reagent (Reference P081)
Decane	Analytical laboratory reagent (Reference P076)
Dodecane	Analytical laboratory reagent (Reference P076)
Ethanol	Plutonium fabrication (Reference P520) Beryllium fabrication (Reference P520) Research and development (References P062 and P520) Metallography laboratory (Reference P520)

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Table 4-2. Organic Liquid Wastes Generation (Continued)

Chemical	Use
Ethyl benzene	Depleted uranium fabrication (Reference P052) Research and development (Reference P052) Analytical laboratory reagent (Reference P052)
Ethyl ether	Analytical laboratory reagent (Reference P076)
Hexadecane	Analytical laboratory reagent (Reference P076)
Hexane	Analytical laboratory reagent (References P076 and P520)
Isooctane	Analytical laboratory reagent (Reference P076)
Isopropanol	Beryllium fabrication (Reference P520) Analytical laboratory reagent (References P052 and P076)
Methanol	Research and development (Reference P062) Analytical laboratory reagent (References P052 and P076)
Methyl ethyl ketone	Research and development (References P052 and P062) Analytical laboratory reagent (Reference P052)
Methylene chloride	Research and development (References P052 and P062) Analytical laboratory reagent (References P053 and P076)
Naphthalene	Analytical laboratory reagent (Reference P076)
Nitrobenzene	Analytical laboratory reagent; non-solvent use (Reference P052)
Oil	Plutonium fabrication (References P060, P078, and P079) Depleted uranium fabrication (Reference P520) Equipment lubrication (References P061, P077, P078, P082, and P520) Hydraulic equipment (References P060, P061, P078, and P079)
Petroleum ether	Analytical laboratory reagent (Reference P076)
Tetrachloroethylene	Plutonium fabrication (Reference P520) Depleted uranium fabrication (Reference P053) Stainless-steel fabrication (Reference P520) Analytical laboratory reagent (References P052 and P053)
Toluene	Analytical laboratory reagent (References P052 and P076)
Trichloroethylene	Plutonium fabrication (References P023 and, P052) Beryllium and uranium fabrication (Reference P053) Stainless-steel fabrication (Reference P520) Analytical laboratory reagent (References P053 and P076) Decontamination solvent (Reference P053)
Xylene	Analytical laboratory reagent (References P052 and P076)

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4.3.2 Organic Liquid Waste Treatment

In 1965, the Building 774 Grease Plant began processing organic liquid wastes generated from plutonium machining and other operations. In this process, the organic liquids were processed through an extruder with a synthetic calcium silicate called Micro-cel E® to form a grease or paste-like material (References P002, P024, and P517). A more detailed description of this process is provided in Section 5.3.

Although the calcium silicate was thought to produce an acceptable waste form, it was later determined to cause problems with water desorption. Beginning in 1983, the suitability of various other solidification media were investigated using simulated TRU organic waste (i.e., non-radioactive). The media investigated included ENVIROSTONE® gypsum cement, Type I Portland cement, Portland cement with Oil-Dri® clay absorbent, gypsum cement with Portland cement, and gypsum cement with clay absorbent. Evaluation of the various solidification media was based on suitability for immobilizing organic wastes, waste loading efficiency, required set time, production of a free-standing monolithic solid containing no free liquid, and the estimated cost of production-scale operation. ENVIROSTONE® gypsum cement proved most applicable to the organic wastes handled by the Building 774 Liquid Waste Processing Facility (References P002, P519, and U010).

The Grease Plant shut down in 1985 and was replaced by the new ENVIROSTONE® process called the OASIS. In this process, the liquids were immobilized by mixing with water, and ENVIROSTONE® emulsifier, accelerator, and gypsum cement to produce a solid monolith (References P016, P052, and P053). A more detailed description of this process is provided in Section 6.3.

4.3.3 Waste Repackaging and Liquid Waste Remediation

Drums of solidified organic waste containing liquids are remediated and or repackaged in the AMWTP Drum Treatment Facility (DTF), located in Building WMF-628, or the Advanced Mixed Waste Treatment Facility (AMWTF), Building WMF-676. In the DTF drums are processed to remove liquids as necessary by liquid absorption with Aquaset-IIG or Micro-cel E® or shaker table operations. As part of the processing, the rigid liner lids are cut out or removed and all layers of confinement are breached. Rigid liner lids may be replaced provided vent holes are visible by RTR. Other operations conducted may include drum liner removal and repackaging, replacing drum lids, and over packing or un-over packing 55-gallon drums in 83- or 85-gallon drums (References C515, P535, and P536).

Drums repackaged in the AMWTF will be characterized by VE to remove prohibited items including liquids through absorption as necessary with Micro-cel E® (References C518 and P536).

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4.4 TRU Waste Management

Waste materials contaminated with TRU radionuclides were generated during the fabrication, assembly, and processing of nuclear weapons components. The term "transuranic" refers to the man-made actinide elements with atomic numbers greater than uranium (atomic number 92). Plutonium and americium are the primary TRU actinides encountered in DOE weapons facilities, including Rocky Flats (Reference P020). Since the mid 1980s, the DOE has defined TRU waste as materials contaminated with greater than or equal to 100 nanocuries (nCi) of alpha-emitting TRU radionuclides with a half-life greater than 20 years per gram (g) of waste.

After containers were assayed, they were sent to Building 776 for inspection. Containers would undergo a physical inspection that included content verification, free liquid detection, and a waste packaging conformance check. Rejected waste packages were returned to the generator for corrective action (References P014 and P043). As a final quality assurance verification, RTR was performed on each container to verify correct contents and the absence of free liquids (Reference P001).

4.4.1 Types and Quantity of TRU Waste Generated

Waste Streams ID-RF-S3114 and ID-RF-S3150-A are characterized under the Resource Conservation and Recovery Act (RCRA) as hazardous waste. These wastes have been historically managed at Rocky Flats and INL as mixed waste. The physical, radiological, and chemical characteristics of these wastes are presented in Sections 5.4 and 6.4. The approximate number of 55-gallon drums by IDC in each waste stream is provided in Table 4-3, Waste Stream Volumes (References D005, P515, P539, and U092).

Table 4-3. Waste Stream Volumes

Waste Stream Number	Item Description Code	Number of 55-Gallon Drums
ID-RF-S3114	003	9,879
ID-RF-S3150-A	700	60
	801	798

4.4.2 Correlation of Waste Streams Generated from the Same Building and Process

The WIPP-WAP defines a waste stream as waste materials that have common physical form, that contain similar hazardous constituents, and that are generated from a single process or activity. Although IDCs 003, 700, and 801 were generated by organic liquid waste treatment operations in Building 774, the treatment process that produced IDC 003 was different from that of IDCs 700 and 801 resulting in two distinctly different waste forms. Therefore, two separate waste streams were delineated. The delineation of these waste forms as two separate waste streams is consistent with the Rocky Flats, AMWTP, and 3,100 m^3 TRU Waste Programs for the same IDCs (References P507,

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P516, P521, P522, and U099). CAO-95-1121, Revision 3, *Transuranic Waste Baseline Inventory Report* (TWBIR) and ATWIR Identification Numbers assigned to this waste are identified in Table 4-4, ATWIR Identification Numbers.

Table 4-4. ATWIR Identification Numbers

Waste Stream Number	1995 TWBIR (Reference 7)	2010 ATWIR (Reference 8)
ID-RF-S3114	IN-W167.149, IN-W167.926, IN-W309.609, IN-W309.610	IN-ID-RF-S3114
ID-RF-S3150-A	IN-W164.153, IN-W164.1060	IN-ID-RF-S3150-A

Container specific AK information has been reviewed for every drum in Waste Streams ID-RF-3114 and ID-RF-S3150-A to verify the physical composition (i.e., verify the assigned IDC) and area of generation (container prefix) assuring that each container was generated by the Rocky Flats operations described in this report. Each container evaluated will be incorporated into the most current *AK Containers List* (refer to Section 8.0).

4.5 Waste Identification and Categorization Schemes

When waste was initially packaged, it was segregated by the type of waste matrix and identified by an IDC. IDCs are a series of three-digit numbers used to identify nuclear material forms or process materials (References P004 and P063). The IDCs assigned to the waste in this waste stream are as follows (Reference P507):

- IDC 003, Organic Setups
- IDC 700, OASIS Waste
- IDC 801, Solidified Organics – Building 774

Refer to Sections 5.4.1 and 6.4.1 for a more detailed description of these IDCs.

Once a drum was full, a prefix and serial number were assigned by nuclear material accountability personnel. The prefix corresponds to a material balance account (MBA) used to control the transfer of nuclear material. The MBA can be correlated to an area within a particular building. The prefix is identified by the middle part of the container number (i.e., 0743 is the prefix for drum number IDRF074311598). The last five digits of the drum number are the serial number that indicate the sequence in which drums were packaged within a given prefix (References C170, C184, P090, P502, P505, U059, and U069).

Organic setups or “grease” historically generated prior to the development of IDC 003 (prior to 1971) are categorized as “743 series sludge” or “743 grease” (References C516, P532, and P537). Drums of the pre-IDC 003 grease assigned IDC RF-743 will be repackaged in the AMWTF. These RF-743 drums were retrieved from Pits 11 and 12 in the SDA (References C518, P536, and P539).

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4.6 Waste Certification Procedures

In the CCP program under which the subject waste streams will be certified for shipment to WIPP, CCP-TP-005 (Reference 1), directs compilation and confirmation of AK. CCP certifies TRU waste under the program described in CCP-PO-002, *CCP Transuranic Waste Certification Plan* (Reference 9).

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5.0 REQUIRED WASTE STREAM INFORMATION – WASTE STREAM ID-RF-S3114

This section presents the mandatory AK for Waste Stream ID-RF-S3114 required by the WIPP-WAP (Reference 2). Attachment 1 for this waste stream (created in accordance with procedure CCP-TP-005) provides a list of TRU waste stream information required to be developed as part of the AK record (Reference 1).

5.1 Area and Building of Generation

Waste Stream ID-RF-S3114 was generated by the Grease Plant in Building 774 (References P090, P502, P505, U059, U069, and U505).

5.2 Waste Stream Volume and Period of Generation

The volume and generation date range for the drums that have been evaluated for inclusion in Waste Stream ID-RF-S3114, as well as the projected volumes, are presented in Table 5-1a, Waste Stream ID-RF-S3114 Volume and Generation Dates (References C517, P515, P539, and U092). The specific container numbers are provided in the *AK Container List* (refer to Section 8.0).

Table 5-1a. Waste Stream ID-RF-S3114 Volume and Generation Dates

Item Description Code	Current Volume		Future Projections	Total
	Number of 55-Gallon Drums	Generation Date Range	Number of 55-Gallon Drums[1]	
003	7,440	6/1968 – 4/1998	2,439	9,879

1. These drums are either in accessible storage without filter vents or remain in retrievable storage on pads under earthen cover.

The waste inventory at the TSA was only generated through 1988 because shipments from Rocky Flats to INL ceased at that time. Waste stored at the TSA with closure dates later than 1988 are the result of waste characterization activities, such as VE (Reference P507).

5.3 Waste Generating Activities

Waste Stream ID-RF-S3114 consists of immobilized organic liquids produced in the Grease Plant. In this process, the organic liquids were processed through an extruder with Micro-cel E®, a synthetic calcium silicate (References P002 and P517). Small amounts of Oil-Dri® absorbent were sometimes added to the mixture as well (Reference P024). The amounts of materials added to the mixture were not metered; however, the operator would adjust the composition if the outgoing mixture did not have a paste-like consistency. The mixture would then drop into a polyvinyl chloride (PVC) O-ring bag contained in a 55-gallon drum (Reference P016). The composition of

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organic setups was approximately 30-gallons of liquid organic waste to 100 pounds of Micro-cel E® (Reference P024). The Grease Plant is illustrated in Figure 4, Grease Plant (Reference P052).

As described in Section 4.3.3 drums in this waste stream are remediated in the AMWTP DTF or AMWTF. The drums are processed in the DTF to breach layers of confinement, segregate prohibited items, and remove liquids as necessary by liquid absorption and/or shaker table operations. Other operations conducted may include rigid liner removal and repackaging, and drum over packing and un-over packing. Secondary waste items, such as leather, latex, and Silver Shield gloves, knives, cutters, drum filters, and plastic sleeving and aprons, may be packaged in the remediated drums (References C515, P535, and P536).

Drums repackaged in the AMWTF will be characterized by VE to remove prohibited items including liquids through absorption as necessary (References C518 and P536).

5.4 Type of Wastes Generated

This section describes the process inputs, Waste Matrix Code assignment, radionuclide contaminants, and hazardous waste determinations for Waste Stream ID-RF-S3114.

5.4.1 Material Input Related to Physical Form

Waste Stream ID-RF-S3114 consists of organic liquids that have been mixed with an absorbent material. The following is a description of this waste:

IDC 003, Organic Setups: This waste consists of various organic liquids that were transferred to Building 774 where they were immobilized using Micro-cel E® (a synthetic calcium silicate) to form a grease or paste-like material (References P002, P024, and P517). The organic liquids were primarily oil and chlorinated solvent mixtures (References P016, P024, P052, and P518). Small amounts of Oil-Dri® were sometimes added to the mixture as well (Reference P024).

5.4.1.1 Waste Matrix Code

As described in Section 5.4.1, this waste stream is comprised of organic liquids that have been mixed with an absorbent material. Therefore, Waste Matrix Code S3114, Absorbed Organic Liquids, is applied to Waste Stream ID-RF-S3114. The definition of this Waste Matrix Code is provided in DOE/LLW-217, *DOE Waste Treatability Group Guidance* (Reference 10). This category includes waste that is at least 50 percent, by volume, inorganic particulate absorbent with absorbed organic liquids (Reference D004).

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5.4.1.2 Waste Material Parameters

The waste material parameters associated with Waste Stream ID-RF-S3114 are:

- Organic matrix (absorbent and organic liquid mixture)
- Other inorganic materials (Oil-Dri® or vermiculite)[1]
- Steel (packaging materials)
- Plastic (packaging materials)

To estimate the waste material parameter weight percentages for Waste Stream ID-RF-S3114, data were obtained from the WIPP Waste Information System (WWIS) database as of October 3, 2006. The WWIS data were derived from RTR and VE of Rocky Flats absorbed organic liquid wastes by the CCP TRU waste certification program at INL and the Rocky Flats TRU waste certification program.

The number of containers from the Rocky Flats TRU waste certification program that were evaluated is 11. The number of containers from the CCP TRU waste certification program that were evaluated is 156. The current volume of Waste Stream ID-RF-S3114 is 7,440 containers. Therefore, these 156 containers represent only 2.0 percent of the current CCP waste stream volume. The original closure dates for the 7,440 containers in this waste stream range from October 1969 to September 1988. The closure dates for the drums in WWIS for the CCP waste stream range from August 1975 to February 1986. There are more than 2,000 containers in the waste stream generated before August 1975, but only 17 containers generated after February 1986. Even though RTR or VE has not been performed on 97 percent of the waste stream, including the waste generated before August 1975, the Grease Plant was a waste treatment process that produced a consistent sludge-like material, and that process did not change during this time period. It is not expected that the waste generated prior to 1975 would be dissimilar to the wastes that have undergone RTR and VE. Therefore, the WWIS data for these 167 containers are representative of Waste Stream ID-RF-S3114 as a whole.

A statistical analysis of the data was performed using the WWIS data, the results of which are presented in Table 5-1b, Waste Stream ID-RF-S3114 Waste Material Parameter Weights. This evaluation is documented in a memorandum (included with Attachment 6) as required by CCP-TP-005 (Reference 1).

[1] Additional absorbents (e.g., Oil-Dri® or vermiculite) were sometimes added on top and bottom of the waste inside and outside the plastic bag. These absorbents may not be distinguishable from the organic matrix.

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Table 5-1b. Waste Stream ID-RF-S3114 Waste Material Parameter Weights

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-Based Metals/Alloys	0.01%	0.0 – 0.92%
Other Inorganic Materials	0.84%	0.0 – 16.10%
Cellulosics	<0.01%	0.0 – 2.79%
Plastics (waste materials)	0.39%	0.0 – 3.53%
Organic Matrix	98.75%	83.90 – 100%
Total Inorganic Waste Average	**0.85%**	
Total Organic Waste Average	**99.14%**	

5.4.2 Radiological Characterization

Historical assay values for waste drums were obtained from radiochemical analyses of batch treatments or analysis results of individual bottles and drums that were received for processing. Average values were usually assigned to waste drums (References P016 and P024). Documented assay results and treatment logbook descriptions for this waste indicate the presence of plutonium, americium-241, tritium, uranium-235, and uranium-238 (References P016, P024, P033, and U040).

TRU waste oils and solvents were generated primarily in Buildings 707 and 777. Radionuclide contamination in waste from Building 707 primarily consisted of weapons-grade plutonium from fabrication operations (References P052 and P053). Building 777 performed disassembly of site-return parts and fabrication operations (References C184, P052, and P079). Waste from fabrication operations will be contaminated with weapons-grade plutonium and enriched uranium. Wastes generated by disassembly operations will be contaminated with site-return plutonium (higher americium-241 decay product) and enriched uranium (References C184 and P079). Tritium may also be present from disassembly and subsequent processing of site-return components (Reference P053). The isotopic compositions of weapons-grade plutonium and enriched uranium are presented in Section 5.4.2.2.

Waste oils or solvents contaminated with depleted uranium were generated from fabrication operations in Buildings 444, 447, 865, and 883 (Reference P053). The isotopic composition of depleted uranium is presented in Section 5.4.2.2.

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Research and Development (R&D) and analytical support operations also generated waste oils and solvents (References U040 and U043). In addition to supporting production operations, these R&D and analytical activities used several other radioisotopes that may be present in trace quantities, including (References C134, C137, C154, C159, C171, C185, P053, P164, P167, P178, P179, P180, P181, P182, P183, P184, P185, P186, P187, P188, P189, P190, P191, P192, P193, P194, P195, P196, P197, P198, P199, P200, P201, P202, P507, and U064):

- Americium-240, -241, -243
- Californium-252
- Curium-244
- Neptunium-237
- Plutonium-238, -241, -242 (non-weapons-grade material)
- Plutonium (12 weight percent [wt%] Plutonium-238 and ~6 wt% Plutonium-240)
- Plutonium-Low (NGS) neutrons/gram/second (97.7 wt% Plutonium-239 and 2.2 wt% Plutonium-240)
- Thorium-228
- Uranium-232, -233, -235, -236, -238

5.4.2.1 Estimated Radionuclide Quantities

During the INL 3,100 m^3 Project, containers of IDC 003 were assayed for radionuclide content. Table 5-2, Radioassay Data for IDC 003 from the INL 3,100 m^3 Project, contains a summary of these radioassay data (Reference P507).

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Table 5-2. Radioassay Data for IDC 003 from the INL 3,100 m^3 Project

Radionuclide/Calculation	Average	Range		Events
		Low	High	
Americium-241 (g)	5.367E-03	-2.458E-04	2.616E-01	152
Plutonium-238 (g)	1.776E-04	-1.212E-05	1.123E-03	152
Plutonium-239 (g)	1.361E+00	-1.086E-01	7.032E+00	152
Plutonium-240 (g)	8.367E-02	-6.603E-03	4.394E-01	152
Plutonium-241 (g)	2.317E-03	-1.997E-04	1.234E-02	152
Plutonium-242 (g)	5.202E-04	-4.963E-05	3.066E-03	152
Uranium-233 (g)	3.430E-02	3.430E-02	3.430E-02	1
Uranium-234 (g)	2.585E-04	-4.622E-06	5.926E-03	48
Uranium-235 (g)	1.341E-01	-3.477E-02	3.023E+00	66
Uranium-238 (g)	7.027E+01	2.988E-02	8.058E+02	21
Plutonium Equivalent Curies (Ci)	1.263E-01	-9.391E-03	1.146E+00	152
Plutonium Fissile Gram Equivalents (g)	1.427E+00	-1.092E-01	7.066E+00	152
TRU Alpha Activity Concentration (nCi/g)	7.751E+02	-5.440E+01	6.287E+03	152

As can be seen in the above table, uranium-238 may be present in less than 15 percent of the drums but will be in relatively large quantities in those few drums.

5.4.2.2 Use of Radionuclide Isotopic Ratios

The primary radionuclides processed at Rocky Flats included weapons-grade plutonium, enriched uranium, and depleted uranium. The approximate isotopic compositions of these materials are presented in Table 5-3, Isotopic Compositions of Rocky Flats Plutonium and Uranium (References C039, C130, P069, P152, P161, P166, P169, P210, P227, and U064).

Table 5-3. Isotopic Compositions of Rocky Flats Plutonium and Uranium

Weapons-Grade Plutonium	Enriched Uranium	Depleted Uranium
Plutonium-238 0.01 – 0.05%	Uranium-234 0.1 – 1.02%	Uranium-234 0.0006%
Plutonium-239 92.8 – 94.4%	Uranium-235 90 – 94%	Uranium-235 0.2 – 0.3%
Plutonium-240 4.85 – 6.5%	Uranium-236 0.4 – 0.5%	Uranium-238 99.7 – 99.8%
Plutonium-241* 0.3 – 1.0%	Uranium-238 5.3 – 5.5%	
Plutonium-242 0.005 – 0.60%		

* includes americium-241 daughter product

For waste containers where direct measurement does not yield useable isotopic ratio information, AK may be used to supplement direct measurement data in accordance

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with the WIPP-WAC (Reference 3). The specific ratios that may be used, and the use and confirmation of AK related to WIPP-certified assay measurements of containers in this waste stream, is documented in the Nondestructive Assay (NDA) Memorandum.

There are certain radionuclides (i.e., uranium-234, plutonium-242, and strontium-90) that cannot be measured by NDA equipment. Uranium-234 will be calculated based on ratios with detected uranium isotopes. Determination of plutonium-242 will be based on its mass fraction in weapons-grade plutonium. Although plutonium-242 was used in R&D and special order work, these activities were small in comparison of the weapons-grade stream. And the specific drums, if any, that include waste contaminated with this plutonium-242 are not known.

Fission products, including cesium-137 and strontium-90, were not expected components of any of the Rocky Flats TRU waste streams. Cs-137 was not detected during radioassay by the INL 3,100 m^3 Project. Sr-90, because its presence was predicated on the presence of Cs-137 (as a fission product), has never been reported for any of the Rocky Flats wastes analyzed to date (Reference P507). The AMWTP had previously written an AK Discrepancy Resolution to add cesium-137 and strontium-90 to Rocky Flats waste streams. However, physicists from Rocky Flats and the AMWTP completed a review of spectra for several waste streams and concluded that Cs-137 and Sr-90 were not present in those wastes in detectable quantities (References C502 and D009).

Based on previous assay data and other information, a summary of the potential radionuclides in Waste Stream ID-RF-S3114 has been compiled and provided in Table 5-4, Summary of Radionuclides in Waste Stream ID-RF-S3114. To determine isotopic ratios for Waste Stream ID-RF-S3114 as a whole, the average gram values for each radionuclide from the 3,100 m^3 Project data were first multiplied by the number of events to obtain the total gram value for each individual radionuclide. These totals were then divided by the total mass of all radioactive constituents in the waste stream and converted to a percentage. These results are listed as “Relative Weight %.” As shown in Table 5-4, the two most prevalent radionuclides are U-238 and Pu-239. Radiological AK will be confirmed by the method specified in the NDA Memorandum as required by CCP-TP-005 (Reference 1).

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Table 5-4. Summary of Radionuclides in Waste Stream ID-RF-S3114

Radionuclide	Average Weight (g)	Events	Total Weight (g)	Relative Weight %	Expected Present
WIPP Required Radionuclides					
Americium-241	5.37E-03	152	8.16E-01	0.05%	Yes
Plutonium-238	1.78E-04	152	2.70E-02	<0.01%	Yes
Plutonium-239	1.36E+00	152	2.07E+02	12.13%	Yes
Plutonium-240	8.37E-02	152	1.27E+01	0.75%	Yes
Plutonium-242	5.20E-04	152	7.91E-02	<0.01%	Yes
Uranium-233	3.43E-02	1	3.43E-02	<0.01%	Yes
Uranium-234	2.59E-04	48	1.24E-02	<0.01%	Yes
Uranium-238	7.03E+01	21	1.48E+03	86.53%	Yes
Cesium-137	N/A	N/A	N/A	N/A	No
Strontium-90	N/A	N/A	N/A	N/A	No
Other Measured Radionuclides					
Plutonium-241	2.32E-03	152	3.52E-01	0.02%	Yes
Uranium-235	1.34E-01	66	8.85E+00	0.52%	Yes
Other Potentially Present Radionuclides					
Americium-240	Californium-252	Neptunium-237	Thorium-228	Uranium-232	
Americium-243	Curium-244	Tritium (H-3)		Uranium-236	

5.4.2.3 TRU Alpha Activity Concentration

Prior to 1982, TRU waste was defined as containing greater than 10 nCi/g TRU alpha contamination. In 1982, the DOE redefined TRU waste as materials contaminated with greater than or equal to 100 nCi/g TRU alpha. Much of the TRU wastes (based on these definitions) were shipped to the INL. This entire population has been managed as TRU waste since receipt at the INL (Reference P513). Based on historical assay data from the waste generator, the percentage of IDC 003 drums above 100 nCi/g is 36 percent, and the percentage of the drums below 100 nCi/g is 64 percent (Reference P512). Each payload container shipped to WIPP will be certified in accordance with CCP-PO-002 (Reference 5) as containing more than 100 nCi/g of alpha emitting isotopes with half-lives greater than 20 years.

5.4.3 Chemical Content Identification – Hazardous Constituents

Available AK documentation was reviewed for Waste Stream ID-RF-S3114 to identify organic chemical usage and potentially hazardous organic liquids that may have been treated in Building 774. The primary solvents treated in Building 774 were carbon tetrachloride, 1,1,1-trichloroethane, and 1,1,2-trichloro-1,2,2-trifluoroethane, which is supported by past sampling and analysis (References P052, P077, P507, and P520). Numerous other organic liquids were also identified as previously shown in Tables 4-1 and 4-2. Table 5-5, EPA Hazardous Waste Numbers for Waste Stream

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ID-RF-S3114 summarizes the potential hazardous chemical contaminants and associated EPA hazardous waste numbers applicable to this waste stream.

Table 5-5. EPA Hazardous Waste Numbers for Waste Stream ID-RF-S3114

EPA Hazardous Waste Number	Constituent
Toxicity Characteristic Organic Compounds	
D022	Chloroform
D026	Cresol
D027	1,4-Dichlorobenzene
D028	1,2-Dichloroethane
D029	1,1-Dichloroethylene
D030	2,4-Dinitrotoluene
D032	Hexachlorobenzene
D034	Hexachloroethane
D036	Nitrobenzene
D037	Pentachlorophenol
F-Listed Organic Solvents	
F001	Carbon tetrachloride
F001 and F002	1,1,1-Trichloroethane
F001 and F002	Trichlorofluoromethane
F002	1,1,2-Trichloro-1,2,2-trifluorethane (Freon 113)
F002	1,2-Dichlorobenzene (ortho-dichlorobenzene)
F002	Methylene chloride
F002	Tetrachloroethylene
F002	Trichloroethylene
F005	2-Ethoxyethanol
F005	Benzene
F005	Carbon disulfide
F005	Methyl ethyl ketone
F005	Pyridine
F005	Toluene

The waste described in this report has been historically managed in accordance with INL waste management practices in compliance with the requirements imposed by the Idaho Department of Environment Quality. As indicated in Section 4.4, this waste has been historically managed as TRU mixed waste. In addition, this waste stream has been characterized by several different TRU waste programs. For this reason, the assignment of EPA Hazardous Waste Numbers (HWNs) to waste stream ID-RF-S3114

considered the HWNs assigned by these programs in addition to the review of the AK record described in this section (References D005, P052, P507, and P521).

5.4.3.1 Toxicity Characteristic Metals

Waste Stream ID-RF-S3114 does not exhibit the characteristic of toxicity for metal compounds as defined in Title 40 of the Code of Federal Regulations (CFR), Part 261, Subpart C (40 CFR 261.24). EPA hazardous waste codes for metals were assigned to organic liquid wastes that may have been treated in Building 774, but have never been assigned to organic setups (IDC 003). Analysis of the organic setups waste conducted by the Rocky Flats and INL 3100 m^3 TRU Waste Programs demonstrates that the 90-percent Upper Confidence Limit (UCL_{90}) does not exceed the regulatory threshold limit (RTL) for any of the RCRA-regulated metals (References P507, P521, and U098).

5.4.3.2 Toxicity Characteristic Organics

Waste Stream ID-RF-S3114 exhibits the characteristic of toxicity for organic compounds as defined in 40 CFR 261, Subpart C (40 CFR 261.24). As shown in Tables 4-1 and 4-2, chloroform (D022); 1,2-dichloroethane (D028); 1,1-dichloroethylene (D029); and nitrobenzene (D036) were identified as potential organic constituents in organic setups waste. Therefore, EPA hazardous waste numbers D022, D028, D029, and D036 are assigned to Waste Stream ID-RF-S3114 (Reference D005).

Homogeneous solids sampling and analysis of organic setups was previously conducted by both the Rocky Flats and INL 3,100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the RTL for carbon tetrachloride (D019/F001), chloroform (D022), 1,2-dichloroethane (D028), 1,1-dichloroethylene (D029), tetrachloroethylene (D039/F002), and trichloroethylene (D040/F002) in the organic setups waste, confirming AK. In addition, the UCL_{90} for hexachloroethane (D034) exceeded the RTL in both Rocky Flats and INL 3,100 m^3 data. Therefore, EPA hazardous waste number D034 is also assigned to Waste Stream ID-RF-S3114 (References P507, P521, and U098).

Although carbon tetrachloride, tetrachloroethylene, and trichloroethylene are present in this waste above the RTL, these compounds were used as solvents (i.e., for cleaning and degreasing); and therefore, the F-listed EPA hazardous waste number is applied. The toxicity characteristic EPA hazardous waste numbers are not assigned (refer to Section 5.4.3.3).

During the analytical data review of the “non-detect” observations for homogeneous solids data, Rocky Flats determined that the method detection limit (MDL) exceeded the program required quantification limit (PRQL) for cresols (D026), 1,4-dichlorobenzene (D027), 2,4-dinitrotoluene (D030), hexachlorobenzene (D032), nitrobenzene (D036), and pentachlorophenol (D037) due to dilution. The dilution was due to high hydrocarbon content in the waste matrix that caused difficulties in analysis per the required methodology. Subsequent review of the solid sampling data and

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reconsideration of process knowledge confirms that cresols, 1,4-dichlorobenzene, 2,4-dinitrotoluene, hexachlorobenzene, and pentachlorophenol were not expected contaminants in this waste stream (potential sources for nitrobenzene have been identified as previously described). Where a constituent has been identified and there is no or limited quantitative data available to demonstrate that the concentration of a constituent is below regulatory threshold levels, the applicable EPA HWN is applied to the waste stream. Therefore, EPA hazardous waste numbers D026, D027, D030, D032, and D037 are also assigned to Waste Stream ID-RF-S3114 (Reference P521).

Headspace gas sampling and analysis of organic setups was also conducted by the Rocky Flats and INL 3,100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the PRQL for carbon tetrachloride (D019/F001), chloroform (D022), and 1,1-dichloroethylene (D029) in the organic setups waste, confirming AK (References P507 and P521).

Organic laboratory solutions containing vinyl chloride were generated at Rocky Flats, but these laboratory operations did not use vinyl chloride until after TRU waste shipments to INL ceased. For this reason, EPA hazardous waste number D043 has been removed from Waste Stream ID-RF-S3114 (Reference D005).

5.4.3.3 F-Listed Constituents

Waste Stream ID-RF-S3114 was derived from the treatment of hazardous wastes from non-specific sources as listed in 40 CFR 261, Subpart D (40 CFR 261.31). As shown in Tables 4-1 and 4-2, carbon tetrachloride, 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluorethane, methylene chloride, tetrachloroethylene, trichloroethylene, 2-ethoxyethanol, benzene, carbon disulfide, methyl ethyl ketone, and toluene were used for their solvent properties, and therefore meet the definition of an F-listed waste. Therefore, EPA hazardous waste numbers F001, F002, and F005 are assigned to Waste Stream ID-RF-S3114 (Reference D005).

Homogeneous solids sampling and analysis of organic setups was previously conducted by both the Rocky Flats and INL 3,100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the RTL for 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluorethane, carbon tetrachloride, tetrachloroethylene, and trichloroethylene in the organic setups waste, confirming AK (References P507, P521, and U098).

Pyridine (F005) was detected in several samples of organic setups from the INL 3,100 m^3 Project, and although the UCL_{90} for pyridine is below the RTL, the maximum concentration of pyridine was well above the RTL (References P507 and U098). Pyridine was not specifically identified as a contaminant of organic setups waste by AK; however, it was used at Rocky Flats as a solvent in analytical laboratory operations (Reference P076). For that reason, EPA hazardous waste number F005 for pyridine is included in Waste Stream ID-RF-S3114.

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During the analytical data review of the "non-detect" observations for homogeneous solids data, Rocky Flats determined that the MDL exceeded the PRQL for 1,2-dichlorobenzene (F002) due to dilution. The dilution was due to high hydrocarbon content in the waste matrix that caused difficulties in analysis per the required methodology. Subsequent review of the solid sampling data and reconsideration of process knowledge confirms that 1,2-dichlorobenzene was not an expected contaminant in this waste stream. Where a constituent has been identified and there is no or limited quantitative data available to demonstrate that the concentration of a constituent is below regulatory threshold levels, the applicable EPA HWN is applied to the waste stream. Therefore, EPA hazardous waste number F002 for 1,2-dichlorobenzene is included in Waste Stream ID-RF-S3114 (Reference P521).

Headspace gas sampling and analysis of organic setups was also conducted by the Rocky Flats and INL 3,100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the PRQL for 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluorethane, carbon tetrachloride, and methylene chloride in the organic setups waste, confirming AK (References P507 and P521).

Based on headspace gas results for Waste Stream ID-RF-S3114, trichlorofluoromethane is present as a tentatively identified compound. This compound is a component of Kester Residue Remover – Formula 5211, and was identified as an F001-listed constituent in combustibles and plastics. Therefore, trichlorofluoromethane will be added as an F001- and F002-listed constituent to this waste stream (refer to Acceptable Knowledge Re-evaluation Checklist, 3/28/06).

As shown in Tables 4-1 and 4-2, the flammable F003-listed solvents, acetone, ethyl benzene, ethyl ether, methanol, and xylene were used at Rocky Flats and are potential contaminants of the organic setups waste. Homogeneous solids and/or headspace gas data from the Rocky Flats and/or INL 3,100 m^3 TRU Waste Programs detected acetone, butanol, methanol, and xylene in the organic setups waste. However, F003-listed solvents are listed solely for ignitability, and this waste stream does not exhibit the characteristic of ignitability because the solvents are not in liquid form. Therefore, this waste stream is not an F003-listed hazardous waste (References P052, P077, P507, and P521).

Nitrobenzene, an F004-listed constituent, was used for its solvent properties at Rocky Flats in 1967; however, this pre-dates the containers in this waste stream. Other documentation also identifies nitrobenzene as potentially present in IDC 003, but its specific use was not identified (References C517, D022, P052, and P538). Therefore, this waste stream is assigned EPA hazardous waste number D036 as described in Section 5.4.3.2 and is not an F004-listed hazardous waste.

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5.4.3.4 U- and P- Listed Wastes

There is no documentation indicating that Waste Stream ID-RF-S3114 contains discarded commercial chemical products, off-specification species, container residues, or spill residues thereof (References P052, P077, P507, P521, and U099). This waste stream is therefore not a P- or U-listed hazardous waste as defined in 40 CFR 261, Subpart D (40 CFR 261.33).

Beryllium is regulated as a P-listed waste, but only as the commercial chemical product beryllium powder. Most of the beryllium used on site, primarily in Buildings 444 and 883, was in the form of metal (not powder). The exception is experimental work in Building 865 that involved pressing of the powder into shapes; however, only beryllium-contaminated oil from Building 865 was solidified (refer to Table 4-1). Therefore, Waste Stream ID-RF-S3114 is not a P015-listed waste (References P052 and P053).

Beryllium may be present in the organic setups waste but only in particulate form as a trace contaminant. Analysis conducted by Rocky Flats shows that the UCL_{90} for beryllium in IDC 003 is 3.4 milligrams per kilogram (mg/kg) (Reference P521). Therefore, beryllium concentrations will be less than one percent by weight of the waste in each drum and less than 18.14 kilograms in any payload container, including ten drum overpacks.

The constituent 1,2-benzenedicarboxylic acid, bis (2-ethylhexyl) ester (Chemical Abstract Service [CAS] No. 117-81-7), also known as bis (2-ethylhexyl) phthalate, was detected as a tentatively identified compound (TIC) in Rocky Flats semi-volatile organic compound (SVOC) analysis of IDCs 003 and 801. An evaluation to compare the TIC identification with AK was performed by Rocky Flats to determine if this TIC is a U-listed hazardous waste in this waste stream. This evaluation (which included the onsite use of bis [2-ethylhexyl] phthalate for filter testing and in vacuum pump oil) determined that this constituent was not present as an unused commercial chemical product. There is no evidence that bis (2-ethylhexyl) phthalate used on site for filter testing would have contributed to this waste stream; however, AK does indicate that the vacuum pump oil used in mass spectrometers in Buildings 707 and 777 may have been composed of this constituent and this oil may have been disposed of in the oil/solvent mixture feed to the Grease Plant process, but not as an unused product. Bis (2-ethylhexyl) phthalate is also a common plasticizer used in plastic, including the plastic bags/packaging used to package this waste. Accordingly, this waste stream is not a U028-listed hazardous waste (Reference P521).

5.4.3.5 Ignitables, Corrosives, and Reactives

<u>Ignitability</u>

The materials in this waste stream do not meet the definition of ignitability as defined in 40 CFR 261.21. The materials are not liquid but the waste may contain some free

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liquids (Reference P015). Absorbents were added to wastes having the potential of generating free liquids (i.e., dewatering of wastes) (References P015, P024, P501, and P503). VE identified drums of organic setup waste (IDC 003) containing free liquid. Since oils and chlorinated solvents (e.g., carbon tetrachloride, 1,1,1-trichloroethane) were the predominant liquid wastes treated (refer to Section 4.3.1), the liquids discovered during RTR and/or VE are not likely ignitable. However, solvents such as alcohols and acetone were also treated so the possibility exists that the liquids are ignitable. Refer to Tables 4-1 and 4-2 for a more complete listing of organic liquids treated in Building 774 (Reference P015). The waste is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change (References P012, P016, P024, and P501). The materials are not compressed gases, nor do the wastes contain compressed gases, and the waste is not an oxidizer (References P012, P013, P015, P016, P022, P024, and P501). Waste Stream ID-RF-S3114 is therefore not an ignitable waste (D001).

RTR and/or VE are performed to ensure no amount of liquid is present in the IDC 003 waste, and to verify the absence of compresses gases. Any drum that contains any amount of liquid or compressed gases will be segregated from the waste stream during confirmation and will not be eligible for disposal at WIPP until further characterization and/or processing is conducted. The basis for not allowing residual liquids in this waste stream is described in Section 5.4.4.

Corrosivity

The materials in this waste stream do not meet the definition of corrosivity as defined in 40 CFR 261.22. The materials are not liquids but the waste may contain some free liquids (Reference P015). Absorbents were added to wastes having the potential of generating free liquids (i.e., dewatering of wastes) (References P015, P024, P501, and P503). VE identified drums of organic setup waste (IDC 003) containing free liquid (Reference P015). The liquids potentially consist of any of the organic liquids identified in Tables 4-1 and 4-2 which are not corrosive. However, hydrochloric acid may also be present. The hydrochloric acid is formed from the radiolytic and/or chemical decay of chlorinated hydrocarbons, such as carbon tetrachloride, in the presence of moisture (References C514, P534).

RTR and/or VE are performed to ensure no amount of liquid is present in the IDC 003 waste. Any drum that contains any amount of liquid will be segregated from the waste stream during confirmation and will not be eligible for disposal at WIPP until further characterization and/or processing is conducted. The basis for not allowing residual liquids in this waste stream is described in Section 5.4.4. Waste Stream ID-RF-S3114 is, therefore, not a corrosive waste (D002).

Reactivity

The materials in this waste stream do not meet the definition of reactivity as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change.

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The materials will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. The materials do not contain cyanides or sulfides and are not capable of detonation or explosive reaction. The materials are not explosive, nor do the drums contain any explosives (References P012, P013, P015, P016, P022, and P024). Explosives were not handled or used around radioactive material. Waste Stream ID-RF-S3114 is therefore not a reactive waste (D003).

RTR and/or VE are performed to ensure the waste does not contain explosive materials. Any drum suspected of containing explosives will be segregated from the waste stream during confirmation and will not be eligible for disposal at the WIPP until further characterization and/or processing is conducted.

5.4.3.6 Polychlorinated Biphenyls (PCBs)

Waste Stream ID-RF-S3114 contains greater than 50 parts-per-million (ppm) polychlorinated biphenyls (PCBs) and is regulated as a Toxic Substances Control Act (TSCA) waste under 40 CFR 761. Based on written communications with the EPA, this waste is categorized as PCB Remediation Waste (References C505 and C506).

From 1962 to 1977, radioactively-contaminated oils containing PCBs (e.g., vacuum pump and hydraulic press oils) were solidified with calcium silicate (i.e., Micro-cel E®) and shipped to INL for disposal. According to a Building 774 treatment logbook that dates back to mid-1976, there are two instances (8/27/76 and 1/26/78) of PCB contaminated oils from Building 334 being processed (References C207, P024, and U040).

In 1977, preparations were started by Rocky Flats to retrofill several transformers known to contain a total of nearly 10,000 gallons of PCB fluid. The fluids were to be taken to Building 774 for solidification and disposal as radioactive waste. When the EPA regulations for PCBs were first published May 31, 1979, approximately 894 gallons of PCB fluids had been drained, leaving a total of 8,601 gallons. In June 1979, all action to solidify the PCB fluids was suspended by DOE pending approval by the EPA of a disposal method. These transformer oils were eventually incinerated off site and were never solidified (Reference C207).

However, sampling events at Rocky Flats in late-1984 and July 1985 identified several mineral oil-filled transformers that were not previously identified as containing PCB fluid. No documentation has been identified that indicates the PCB-contaminated mineral oil was investigated by Rocky Flats. Therefore, IDC 003 waste generated after 1977 and up to the 1985 sampling event are suspect for PCB contamination (Reference C207).

Sampling and analysis of organic setups (IDC 003) was conducted by the INL 3,100 m^3 Project. Analytical results for IDC 003 solid samples collected from waste generated through 1984 had a UCL_{90} exceeding 50 ppm PCBs (References P507 and U099).

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5.4.4 Prohibited Items

Prohibited items potentially in this waste stream based on VE and RTR are sealed containers greater than four liters, drums containing lead, and free liquids.

Based on a review of several waste packaging and inspection procedures, the drum and rigid liner lids were not vented, nor did the rigid liner lid contain a vent hole when the waste was shipped from Rocky Flats to INL (References P008, P026, P063, P064, P501, P502, P503, and P505). As the drums are retrieved for characterization, they are vented and aspirated to ensure equilibration of any gases that may have accumulated in the closed container (Reference 11).

Three drums in this waste stream were found to contain predominantly (greater than 50 volume percent) debris materials during characterization activities. This is not consistent with the physical form of the waste stream and the drums were segregated and removed from the waste stream (References D013 and D014).

Several drums in this waste stream were found to contain lead items including tape, scrap lead, leaded rubber gloves, and lead seals during characterization activities. Lead is not consistent with the waste stream and drums containing lead will be segregated and removed from the organic setups waste stream (Reference D018). Any drum with lead identified will be processed in the AMWTF where lead will be removed (Reference P536).

Since this waste stream contains greater than 50 ppm PCBs, any residual liquids identified during RTR and/or VE are assumed to contain greater than 50 ppm PCBs. Residual liquids containing PCBs are prohibited by the WIPP-WAC (Reference 3). Therefore, any amount of liquid in a drum of IDC 003 must be segregated from the waste stream during confirmation and will not be eligible for disposal at the WIPP.

5.5 Waste Packaging

Depending on waste packaging requirements at the time, several combinations of bags and liners were used to prepare 55-gallon drums for shipment. From 1970 to 1972, waste drums were lined with two polyethylene drum bags. About four pounds of Oil-Dri® was placed in the bottom of the drum and in the bottom of each drum bag. Organic setup (IDC 003) waste was then placed in the drum. Use of the 90-mil rigid polyethylene liner began in 1972. The rigid liner was placed in each drum and lined with one polyethylene round bottom drum liner or a polyethylene drum bag. A PVC O-ring bag and a polyethylene bag were used if the drum was attached to the glovebox. The polyethylene drum bag was not required from a packaging standpoint but would aid in contamination control. About four pounds of Oil-Dri® was placed in the bottom of the rigid liner, the round bottom liner or drum bag, and the O-ring bag. The organic setup waste (IDC 003) was then placed in the O-ring bag. When a drum was full, the drum liners were twisted and taped closed, the lid was secured with a bolted ring, and a tamper indicating device was attached to the drum (References P012, P016, P024,

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P063, P064, and P503). Plastic ties ("zip-ties") have also been used to seal the plastic drum bags. Hydrogen diffusion rate testing of this supplemental sealing device indicates that it is an acceptable closure method in accordance with Appendix 3.8 of the CH-TRU Payload Appendices (References 13, C510, and P524).

Prior to 1972, absorbent material Oil-Dri® may have been added to the top of the sealed drum bag, which contained the organic setup waste (IDC 003). Since approximately 1972, after drums were inspected, one to two quarts of Oil-Dri® was placed on the top of the outer, sealed polyethylene drum bag. This procedure changed in February 1982 when vermiculite was used to fill the space between the outer, sealed polyethylene drum bag and the top of the 90-mil rigid liner. The quantity of vermiculite varied from 3-12 pounds according to the amount of waste contained in each drum (Reference P024).

5.5.1 Filter Vents

Based on a review of several waste packaging and inspection procedures, the drum and rigid liner lids were not vented, nor did the rigid liner lid contain a vent hole when the waste was shipped from Rocky Flats to INL. Carbon composite filter vents were not used until the late 1980s (References C057, P008, P026, P063, P064, P501, P502, P503, P504, and P505). As the drums are retrieved for characterization, they are vented and aspirated to ensure equilibration of any gases that may have accumulated in the closed container.

5.5.2 Layers of Confinement

Based on the discussion in Section 5.5, several packaging configurations are possible. There may be various combinations of polyethylene round bottom drum liners, polyethylene drum bags, and PVC O-ring bags. The maximum number of confinement layers, however, is expected to be two. The rigid liner must be vented and, therefore, is not considered a layer of confinement.

Drums processed in the AMWTP DTF have the rigid liner lids cut out or removed or holes cut and confinement layer bag closures and/or plastic ties cut. Horsetails (i.e. twist and tape bag closure) cut during these operations may be placed on top of the waste (References C514 and P535).

Drums processed in the AMWTF will have a rigid liner without a lid and one layer of confinement (Reference P536).

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6.0 REQUIRED WASTE STREAM INFORMATION – WASTE STREAM ID-RF-S3150-A

This section presents the mandatory AK for Waste Stream ID-RF-S3150-A required by Attachment B4 of the WIPP-WAP (Reference 2). Attachment 1 for this waste stream (created in accordance with procedure CCP-TP-005) provides a list of TRU waste stream information required to be developed as part of the AK record (Reference 1).

6.1 Area and Building of Generation

Waste Stream ID-RF-S3150-A was generated by the OASIS in Building 774 (References P090, P502, P505, U059, U069, and U505).

6.2 Waste Stream Volume and Period of Generation

The volume and generation date range by IDC for the drums that have been evaluated for inclusion in Waste Stream ID-RF-S3150-A are presented in Table 6-1a, Waste Stream ID-RF-S3150-A Volume and Generation Dates (References P515 and U092). The specific container numbers are provided in the *AK Container List* (refer to Section 8.0).

Table 6-1a. Waste Stream ID-RF-S3150-A Volume and Generation Dates

Item Description Code	Current Volume		Future Projections[1]	Total
	Number of 55-Gallon Drums	Generation Date Range	Number of 55-Gallon Drums	
700	57	3/1986 – 5/1986	3	60
801	797	2/1986 – 11/1998	1	798
				858

1. These drums are in 85-gallon overpacks and are not currently included in this waste stream.

The waste inventory at the TSA was only generated through 1988 because shipments from Rocky Flats to INL ceased at that time. Waste stored at the TSA with closure dates later than 1988 are the result of waste characterization activities, such as VE (Reference P507).

6.3 Waste Generating Activities

Solidified organics (IDCs 700 and 801) were produced by the OASIS process, which began operating in November 1985. IDC 700 was assigned to the waste generated by the experimental prototype OASIS process in Building 774 that would later generate IDC 801 (References P016, P052, and P077).

OASIS was a batch type process generating one drum per run. Waste oil and solvent mixtures were pumped into a PVC O-ring bag inside a 55-gallon drum attached to the bottom of the OASIS glovebox. ENVIROSTONE® emulsifier and water were then

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added to the mix. An agitator was lowered into the drum and run for two minutes. ENVIROSTONE® gypsum cement was then added to the mix for approximately two minutes. A 90-second mix time allowed dispersement of cement throughout the matrix. Mix time was kept to a minimum because of the fast initial set time resulting from addition of ENVIROSTONE® accelerator. The accelerator was added to the gypsum cement in the cement transfer station before transport into cement storage bins. Figure 5, Organic and Sludge Immobilization System, illustrates the OASIS process (References P002, P016, P052, P077, and P089).

The typical composition of solidified organic waste is 170 pounds of organic liquid waste, 250 pounds of gypsum cement, 25 pounds of emulsifier, 10 pounds of accelerator, and 42 pounds of water (Reference U010).

As described in Section 4.3.3, drums in this waste stream are remediated and/or repackaged in the AMWTP DTF. The drums are processed to breach layers of confinement, segregate prohibited items, and remove liquids as necessary by liquid absorption. Other operations conducted may include rigid liner removal and repackaging, and drum over packing and un-over packing. Secondary waste items, such as leather, latex, and Silver Shield gloves, knives, cutters, drum filters, aspirator/siphon pumps, and plastic sleeving and aprons, may be packaged in the remediated drums (References C515 and P535).

6.4 Type of Wastes Generated

This section describes the process inputs, Waste Matrix Code assignment, radionuclide contaminants, and hazardous waste determinations for Waste Stream ID-RF-S3150-A.

6.4.1 Material Input Related to Physical Form

Waste Stream ID-RF-S3150-A consists of solidified organic liquids. The following is a description of this waste.

IDC 700, OASIS Waste: This waste consists of various organic liquids cemented to form a solid monolith. IDC 700 was assigned to the waste generated by the experimental prototype OASIS process in Building 774 that would later generate IDC 801. The organic liquids solidified as well as the solidifying agents are the same for both IDCs 700 and 801 (Reference P016). See the description for IDC 801 for more information about this waste.

IDC 801, Solidified Organics – Building 774: This waste consists of various organic liquids immobilized into a solid monolith in the OASIS process in Building 774. Oils and chlorinated solvents were the primary liquids treated by the OASIS process (References P016, P052, P077, and P518). The organic liquids were immobilized by mixing with water, ENVIROSTONE® emulsifier, accelerator, and gypsum cement. The emulsifier was a polyethylene glycol ether, and the accelerator contained gypsum and potassium sulfate (Reference P066). Based on RTR by the INL 3,100 m^3 Project, some

IDC 801 drums will contain small amount of metal (Reference P507). This waste may also contain plastic bag stubs remaining from previous bag cuts that were placed on top of the waste in subsequent runs (Reference C511).

6.4.1.1 Waste Matrix Code

As described in Section 6.4.1, this waste stream is comprised of organic liquid wastes that have been mixed with water and solidification agents to form a solid monolith. Therefore, Waste Matrix Code S3150, Solidified Homogeneous Solids, is applied to Waste Stream ID-RF-S3150-A. The definition of this Waste Matrix Code is provided in the DOE Waste Treatability Group Guidance (Reference 10). This category includes waste that is at least 50 percent, by volume, solidified waste forms such as a particulate or sludge that has been immobilized with cement and cured into a solidified form (Reference D004).

6.4.1.2 Waste Material Parameters

The waste material parameters associated with Waste Stream ID-RF-S3150-A are:

- Organic matrix (solidification agents, water, and organic liquid mixture)
- Other inorganic materials (Oil-Dri® or vermiculite)[2]
- Plastic (waste materials)
- Iron-based metals (small quantities of metal items)
- Steel (packaging materials)
- Plastic (packaging materials)

To estimate the waste material parameter weight percentages for Waste Stream ID-RF-S3150-A, data were obtained from the WWIS database as of October 3, 2006. The WWIS data were derived from RTR and VE of Rocky Flats solidified organics waste by the CCP TRU waste certification program at INL and the Rocky Flats TRU waste certification program.

The number of containers from the Rocky Flats TRU waste certification program that were evaluated is 499. The number of containers from the CCP TRU waste certification program that were evaluated is 516. The current volume of Waste Stream ID-RF-S3150-A is 854 containers. Therefore, these 516 containers represent 60 percent of the current CCP waste stream volume. The original closure dates for the 854 containers in this waste stream range from February 1986 to September 1988. The closure dates for the drums in WWIS for the CCP waste stream also range from

[2] Additional absorbents (e.g., Oil-Dri® or vermiculite) were sometimes added on top and bottom of the waste inside and outside the plastic bag. These absorbents may not be distinguishable from the organic matrix.

February 1986 to September 1988. Therefore, the WWIS data for these 1,015 containers are representative of Waste Stream ID-RF-S3150-A as a whole. A statistical analysis of the data were performed using the WWIS data, the results of which are presented in Table 6-1b, Waste Stream ID-RF-S3150-A. This evaluation is documented in a memorandum (included with Attachment 6) as required by CCP-TP-005 (Reference 1).

Table 6-1b. Waste Stream ID-RF-S3150-A Waste Material Parameter Weights

Waste Material Parameter	Average Weight Percent	Weight Percent Range
Iron-Based Metals/Alloys	<0.01%	0.0 – 0.44%
Other Inorganic Materials	0.32%	0.0 – 3.09%
Cellulosics	<0.01%	0.0 – 2.79%
Plastics (waste materials)	0.32%	0.0 – 3.53%
Organic Matrix	99.35%	99.35 – 100%
Total Inorganic Waste Average	**0.32%**	
Total Organic Waste Average	**99.67%**	

6.4.2 Radiological Characterization

Historical assay values for waste drums were obtained from radiochemical analyses of batch treatments or analysis results of individual bottles and drums that were received for processing. Average values were usually assigned to waste drums (References P016 and P024). Documented assay results and treatment log book descriptions for this waste indicate the presence of plutonium, americium-241, tritium, uranium-235, and uranium-238 (References P016, P024, P033, and U040).

TRU waste oils and solvents were generated primarily in Buildings 707 and 777. Radionuclide contamination in waste from Building 707 primarily consisted of weapons-grade plutonium from fabrication operations (References P052 and P053). Building 777 performed disassembly of site-return parts and fabrication operations (References C184, P052, and P079). Waste from fabrication operations will be contaminated with weapons-grade plutonium and enriched uranium. Wastes generated by disassembly operations will be contaminated with site-return plutonium (higher americium-241 decay product) and enriched uranium (References C184 and P079). Tritium may also be present from disassembly and subsequent processing of site-return components (References P053). The isotopic compositions of weapons-grade plutonium and enriched uranium are presented in Section 6.4.2.2.

Most of the waste oils or solvents contaminated with depleted uranium were generated from fabrication operations in Buildings 444, 447, 865, and 883 (Reference P053). However, these oils have been segregated from TRU oils since 1985, and therefore, were not processed by the OASIS. There is documentation however that indicates waste oil 238 (assumed to be uranium-238) from Building 771 was introduced into

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solidified organic waste in 1986. There were also organic liquids processed by the OASIS that originated in other facilities that potentially included depleted uranium, such as Buildings 559 and 881 (Reference U040). Therefore, there is a potential for depleted uranium contamination in the solidified organics waste. The isotopic composition of depleted uranium is presented in Section 6.4.2.2.

R&D and analytical support operations also generated waste oils and solvents (References U040 and U043). In addition to supporting production operations, these R&D and analytical activities used several other radioisotopes that may be present in trace quantities, including (References C134, C137, C154, C159, C171, C185, P053, P164, P167, P178, P179, P180, P181, P182, P183, P184, P185, P186, P187, P188, P189, P190, P191, P192, P193, P194, P195, P196, P197, P198, P199, P200, P201, P202, P507, and U064):

- Americium-240, -241, -243
- Californium-252
- Curium-244
- Neptunium-237
- Plutonium-238, -241, -242 (non-weapons-grade material)
- Plutonium (12 wt% Plutonium-238 and ~6 wt% Plutonium-240)
- Plutonium-Low NGS (97.7 wt% Plutonium-239 and 2.2 wt% Plutonium-240)
- Thorium-228
- Uranium-232, -233, -235, -236, -238

CCP radioassay identified two drums of IDC 801 with large quantities of uranium. Based on historical liquid waste segregation practices (i.e., plutonium from uranium) as well as the weight and fill percent of these drums compared to typical IDC 003 waste, it is believed that these drums are misidentified. These two drums will be moved to Waste Stream ID-RF-S3114 (refer to Acceptable Knowledge Re-evaluation Checklist, 1/6/06 and 1/9/06).

6.4.2.1 Estimated Radionuclide Quantities

During the INL 3,100 m^3 Project, containers of IDC 700 and 801 were assayed for radionuclide content. Table 6-2, Radioassay Data for IDC 700 and 801 from the INL 3,100 m^3 Project, contains a summary of these radioassay data (Reference P507).

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Table 6-2. Radioassay Data for IDC 700 and 801 from the INL 3,100 m^3 Project

Radionuclide/Calculation	Average	Range		Events
		Low	High	
Americium-241 (g)	1.178E-02	5.282E-04	1.485E-01	65
Plutonium-238 (g)	6.141E-04	2.536E-05	7.972E-03	65
Plutonium-239 (g)	4.989E+00	2.272E-01	7.141E+01	65
Plutonium-240 (g)	3.054E-01	1.382E-02	4.343E+00	65
Plutonium-241 (g)	8.760E-03	4.178E-04	1.313E-01	65
Plutonium-242 (g)	2.053E-03	1.039E-04	3.265E-02	65
Uranium-233 (g)	2.120E-02	2.120E-02	2.120E-02	1
Uranium-234 (g)	3.390E-04	2.269E-05	5.892E-03	33
Uranium-235 (g)	2.728E-01	2.110E-02	5.481E+00	39
Uranium-238 (g)	4.411E+01	4.437E+00	9.516E+01	3
Plutonium Equivalent Curies (Ci)	4.346E-01	1.970E-02	6.131E+00	65
Plutonium Fissile Gram Equivalents (g)	5.179E+00	2.284E-01	7.332E+01	65
TRU Alpha Activity Concentration (nCi/g)	2.133E+03	8.900E+01	3.195E+04	65

As can be seen in the above table, uranium-238 may be present in less than five percent of the drums but will be in relatively large quantities in those few drums.

6.4.2.2 Use of Radionuclide Isotopic Ratios

The primary radionuclides processed at Rocky Flats included weapons-grade plutonium, enriched uranium, and depleted uranium. The approximate isotopic compositions of these materials are presented in Table 6-3, Isotopic Compositions of Rocky Flats Plutonium and Uranium (References C039, C130, P069, P152, P161, P166, P169, P210, P227, and U064).

Table 6-3. Isotopic Compositions of Rocky Flats Plutonium and Uranium

Weapons-Grade Plutonium	Enriched Uranium	Depleted Uranium
Plutonium-238 0.01 – 0.05%	Uranium-234 0.1 – 1.02%	Uranium-234 0.0006%
Plutonium-239 92.8 – 94.4%	Uranium-235 90 – 94%	Uranium-235 0.2 – 0.3%
Plutonium-240 4.85 – 6.5%	Uranium-236 0.4 – 0.5%	Uranium-238 99.7 – 99.8%
Plutonium-241* 0.3 – 1.0%	Uranium-238 5.3 – 5.5%	
Plutonium-242 0.005 – 0.60%		

* includes americium-241 daughter product

For waste containers where direct measurement does not yield useable isotopic ratio information, AK may be used to supplement direct measurement data in accordance

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with the WIPP-WAC (Reference 3). The specific ratios that may be used, and the use and confirmation of AK related to WIPP-certified assay measurements of containers in this waste stream, is documented in the NDA Memorandum.

There are certain radionuclides (i.e., uranium-234, plutonium-242, and strontium-90) that cannot be measured by NDA equipment. Uranium-234 will be calculated based on ratios with detected uranium isotopes. Determination of plutonium-242 will be based on its mass fraction in weapons grade plutonium. Although plutonium-242 was used in R&D and special order work, these activities were small in comparison of the weapons-grade stream. And the specific drums, if any, that include waste contaminated with this plutonium-242 are not known.

Fission products, including cesium-137 and strontium-90, were not expected components of any of the Rockly Flats TRU waste streams. Cs-137 was not detected during radioassay by the INL 3,100 m^3 Project. Sr-90, because its presence was predicated on the presence of Cs-137 (as a fission product), has never been reported for any of the Rocky Flats wastes analyzed to date (Reference P507). The AMWTP had previously written an AK Discrepancy Resolution to add cesium-137 and strontium-90 to Rocky Flats waste streams. However, physicists from Rocky Flats and the AMWTP completed a review of spectra for several waste streams and concluded that Cs-137 and Sr-90 were not present in those wastes in detectable quantities (References C502 and D009).

Based on previous assay data and other information, a summary of the potential radionuclides in Waste Stream ID-RF-S3150-A has been compiled and provided in Table 6-4, Summary of Radionuclides in Waste Stream ID-RF-S3150-A. To determine isotopic ratios for Waste Stream ID-RF-S3150-A as a whole, the average gram values for each radionuclide from the 3,100 m^3 Project data were first multiplied by the number of events to obtain the total gram value for each individual radionuclide. These totals were then divided by the total mass of all radioactive constituents in the waste stream and converted to a percentage. These results are listed as “Relative Weight %.” As shown in Table 6-4, the two most prevalent radionuclides are Pu-239 and U-238. Radiological AK will be confirmed by the method specified in the NDA Memorandum as required by CCP-TP-005 (Reference 1).

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Table 6-4. Summary of Radionuclides in Waste Stream ID-RF-S3150-A

Radionuclide	Average Weight (g)	Events	Total Weight (g)	Relative Weight %	Expected Present
WIPP Required Radionuclides					
Americium-241	1.18E-02	65	7.66E-01	0.16%	Yes
Plutonium-238	6.14E-04	65	3.99E-02	0.01%	Yes
Plutonium-239	4.99E+00	65	3.24E+02	**66.36%**	Yes
Plutonium-240	3.05E-01	65	1.99E+01	4.06%	Yes
Plutonium-242	2.05E-03	65	1.33E-01	0.03%	Yes
Uranium-233	2.12E-02	1	2.12E-02	<0.01%	Yes
Uranium-234	3.39E-04	33	1.12E-02	<0.01%	Yes
Uranium-238	4.41E+01	3	1.32E+02	**27.08%**	Yes
Cesium-137	N/A	N/A	N/A	N/A	No
Strontium-90	N/A	N/A	N/A	N/A	No
Other Measured Radionuclides					
Plutonium-241	8.76E-03	65	5.69E-01	0.12%	Yes
Uranium-235	2.73E-01	39	1.06E+01	2.18%	Yes
Other Potentially Present Radionuclides					
Americium-240	Californium-252	Neptunium-237	Thorium-228	Uranium-232	
Americium-243	Curium-244	Tritium (H-3)		Uranium-236	

6.4.2.3 TRU Alpha Activity Concentration

Prior to 1982, TRU waste was defined as containing greater than 10 nCi/g TRU alpha contamination. In 1982, the DOE redefined TRU waste as materials contaminated with greater than or equal to 100 nCi/g TRU alpha. Much of the TRU wastes (based on these definitions) were shipped to the INL. IDC 700 and 801 wastes were all generated after 1982 and have been managed as TRU waste since receipt at the INL. Based on historical assay data from the waste generator, the percentage of this waste stream above 100 nCi/g is 93.1 percent, and the percentage of this waste stream below 100 nCi/g is 6.9 percent (Reference P513). Each payload container shipped to WIPP will be certified in accordance with CCP-PO-002 (Reference 5) as containing more than 100 nCi/g of alpha emitting isotopes with half-lives greater than 20 years.

6.4.3 Chemical Content Identification – Hazardous Constituents

Available AK documentation was reviewed for Waste Stream ID-RF-S3150 to identify organic chemical usage and potentially hazardous organic liquids that may have been treated in Building 774. The primary solvents treated in Building 774 were carbon tetrachloride; 1,1,1-trichloroethane; and 1,1,2-trichloro-1,2,2-trifluoroethane, which is supported by past sampling and analysis (References P052, P077, P507, and P520). Numerous other organic liquids were also identified as previously shown in Tables 4-1 and 4-2. Table 6-5, EPA Hazardous Waste Numbers for Waste Stream

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ID-RF-S3150-A, summarizes the potential hazardous chemical contaminants and associated EPA hazardous waste numbers applicable to this waste stream.

Table 6-5. EPA Hazardous Waste Numbers for Waste Stream ID-RF-S3150-A

EPA Hazardous Waste Number	Constituent
Toxicity Characteristic Organic Compounds	
D022	Chloroform
D028	1,2-Dichloroethane
D029	1,1-Dichloroethylene
D030	2,4-Dintrotoluene
D032	Hexachlorobenzene
D034	Hexachloroethane
D036	Nitrobenzene
D043	Vinyl chloride
F-Listed Organic Solvents	
F001	Carbon tetrachloride
F001 and F002	1,1,1-Trichloroethane
F002	1,1,2-Trichloro-1,2,2-trifluorethane (Freon 113)
F002	Chlorobenzene
F002	Methylene chloride
F002	Tetrachloroethylene
F002	Trichloroethylene
F005	2-Ethoxyethanol
F005	Benzene
F005	Carbon disulfide
F005	Methyl ethyl ketone
F005	Toluene

The waste described in this report has been historically managed in accordance with INL waste management practices in compliance with the requirements imposed by the Idaho Department of Environment Quality. As indicated in Section 4.4, this waste has been historically managed as TRU mixed waste. In addition, this waste stream has been characterized by several different TRU waste programs. For this reason, the assignment of EPA HWNs to waste stream ID-RF-S3150-A considered the HWNs assigned by these programs in addition to the review of the AK record described in this section (References D005, P052, P077, P507, P522, and U099).

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6.4.3.1 Toxicity Characteristic Metals

Waste Stream ID-RF-S3150-A does not exhibit the characteristic of toxicity for metal compounds as defined in 40 CFR 261.24. EPA hazardous waste codes for metals were assigned to organic liquid wastes that may have been treated in Building 774, but have never been assigned to solidified organics (IDCs 700 and 801). Analysis of the solidified organics waste conducted by the Rocky Flats and INL 3,100 m^3 TRU Waste Programs demonstrates that the UCL_{90} does not exceed the RTL for any of the RCRA-regulated metals (References P507, P522, and U099).

6.4.3.2 Toxicity Characteristic Organics

Waste Stream ID-RF-S3150-A exhibits the characteristic of toxicity for organic compounds as defined in 40 CFR 261.24. As shown in Tables 4-1 and 4-2, chloroform (D022); 1,2-dichloroethane (D028); 1,1-dichloroethylene (D029); and nitrobenzene (D036) were identified as potential organic constituents in solidified organics waste. Therefore, EPA hazardous waste numbers D022, D028, D029, and D036, are assigned to Waste Stream ID-RF-S3150-A (Reference D005).

Although nitrobenzene (D036) is also an F004-listed constituent, solvent use has not been identified (References C517, D022, P052, P507, and P538).

Homogeneous solids sampling and analysis of solidified organics waste was previously conducted by both the Rocky Flats and INL 3,100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the RTL for carbon tetrachloride (D019/F001), chloroform (D022), 1,1-dichloroethylene (D029), nitrobenzene (D036), and tetrachloroethylene (D039/F002) in the solidified organics waste, confirming AK. In addition, the UCL_{90} for hexachloroethane (D034) exceeded the RTL in the Rocky Flats data. Therefore, EPA hazardous waste number D034 is also assigned to Waste Stream ID-RF-S3150-A (References P507, P522, and U099).

Although carbon tetrachloride and tetrachloroethylene are present in this waste above the RTL, these compounds were used as solvents (i.e., for cleaning and degreasing), and therefore, the F-listed EPA hazardous waste number is applied. The toxicity characteristic EPA hazardous waste numbers are not assigned (refer to Section 6.4.3.3).

During the analytical data review of the “non-detect” observations for homogeneous solids data, both the Rocky Flats and INL 3,100 m^3 Project determined that the MDL exceeded the PRQL for 2,4-dinitrotoluene (D030) and hexachlorobenzene (D032) due to dilution. The dilution was due to high hydrocarbon content in the waste matrix that caused difficulties in analysis per the required methodology. Subsequent review of the solid sampling data and reconsideration of process knowledge confirms that 2,4-dinitrotoluene and hexachlorobenzene were not expected contaminants in this waste stream. Where a constituent has been identified and there is no or limited quantitative data available to demonstrate that the concentration of a constituent is

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below regulatory threshold levels, the applicable EPA HWN is applied to the waste stream. Therefore, EPA hazardous waste numbers D030 and D032 are also assigned to Waste Stream ID-RF-S3150-A (References P522 and U099). This same problem occurred with the INL 3,100 m^3 Project analytical data review for hexachloroethane (D034), nitrobenzene (D036), and vinyl chloride (D043); therefore, these EPA hazardous waste numbers are assigned to this waste stream (Reference U099).

Headspace gas sampling and analysis of solidified organics waste was also conducted by the Rocky Flats and INL 3100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the PRQL for carbon tetrachloride (D019/F001), chloroform (D022), 1,2-dichloroethane (D028), and 1,1-dichloroethylene (D029) in the solidified organics waste, confirming AK (References P507, P522 and U099).

Organic laboratory solutions containing 1,4-dichlorobenzene were generated at Rocky Flats, but these laboratory operations did not use 1,4-dichlorobenzene until after TRU waste shipments to INL ceased. For this reason, EPA hazardous waste number D027 has been removed from Waste Stream ID-RF-S3150-A (Reference D005).

6.4.3.3 F-Listed Constituents

Waste Stream ID-RF-S3150-A was derived from the treatment of hazardous wastes from non-specific sources as listed in 40 CFR 261.31. As shown in Tables 4-1 and 4-2, carbon tetrachloride, 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluorethane, methylene chloride, tetrachloroethylene, trichloroethylene, 2-ethoxyethanol, benzene, carbon disulfide, methyl ethyl ketone, and toluene were used for their solvent properties, and therefore meet the definition of an F-listed waste. Therefore, EPA hazardous waste numbers F001, F002, and F005 are assigned to Waste Stream ID-RF-S3150-A (Reference D005).

Homogeneous solids sampling and analysis of solidified organics waste was previously conducted by both the Rocky Flats and INL 3100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the RTL for 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluorethane, carbon tetrachloride, and tetrachloroethylene in the solidified organics waste, confirming AK (References P507, P522, and U099).

Headspace gas sampling and analysis of solidified organics waste was also conducted by the Rocky Flats and INL 3,100 m^3 TRU Waste Programs. Based on the analytical data from one or both programs, the UCL_{90} exceeded the PRQL for 1,1,1-trichloroethane, 1,1,2-trichloro-1,2,2-trifluorethane, carbon tetrachloride, and methylene chloride in the solidified organics waste, confirming AK (References P507, P522, and U099).

EPA hazardous waste number D021 (chlorobenzene) was assigned to the INL 3,100 m^3 Project solidified organics waste stream because during the analytical data review of the

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"non-detect" observations for headspace gas data, it was determined that the MDL exceeded the PRQL for chlorobenzene (Reference U099). However, chlorobenzene is also an F002-listed hazardous waste and has been used in analytical laboratory operations as a solvent (Reference P081). Therefore, the more specific EPA hazardous waste number F002 for chlorobenzene is assigned to this waste stream.

As shown in Tables 4-1 and 4-2, the flammable F003-listed solvents acetone, ethyl benzene, ethyl ether, methanol, and xylene were used at Rocky Flats and are potential contaminants of the solidified organics waste. Homogeneous solids and/or headspace gas data from the Rocky Flats and/or INL 3,100 m^3 TRU Waste Programs detected acetone and methanol in the solidified organics waste. However, F003-listed solvents are listed solely for ignitability, and this waste stream does not exhibit the characteristic of ignitability because the solvents are not in liquid form. Therefore, this waste stream is not an F003-listed hazardous waste (References P052, P077, P507, P521, and U099).

Nitrobenzene, an F004-listed constituent, was used at Rocky Flats but not for its solvent properties (References C517, D022, P052, and P538). Therefore, this waste stream is not an F004-listed hazardous waste.

6.4.3.4 U- and P- Listed Wastes

There is no documentation indicating that Waste Stream ID-RF-S3150-A contains discarded commercial chemical products, off-specification species, container residues, or spill residues thereof (References P052, P077, P507, P522, and U099). This waste stream is therefore not a P- or U-listed hazardous waste as defined in 40 CFR 261, Subpart D (40 CFR 261.33).

Beryllium is regulated as a P-listed waste, but only as the commercial chemical product beryllium powder. Most of the beryllium used on site, primarily in Buildings 444 and 883, was in the form of metal (not powder). The exception is experimental work in Building 865 that involved pressing of the powder into shapes; however, only beryllium-contaminated oil from Building 865 was solidified (refer to Table 4-1). Therefore, Waste Stream ID-RF-S3150-A is not a P015-listed waste (References P052 and P053).

Beryllium may be present in solidified organics waste but only in particulate form as a trace contaminant. Analysis conducted by the INL 3,100 m^3 Project indicates that the UCL_{90} for beryllium in this waste is 0.296 mg/kg. Analysis performed by the Rocky Flats TRU Waste Program shows that the UCL_{90} for beryllium in this waste is 0.1 mg/kg (References U099 and P522). Therefore, beryllium concentrations will be less than one percent by weight of the waste in each drum and less than 18.14 kilograms in any payload container, including ten drum overpacks.

The constituent 1,2-benzenedicarboxylic acid, bis (2-ethylhexyl) ester (CAS No. 117-81-7), also known as bis (2-ethylhexyl) phthalate, was detected as a TIC

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in Rocky Flats SVOC analysis of IDCs 003 and 801. An evaluation to compare the TIC identification with AK was performed by Rocky Flats to determine if this TIC is a U-listed hazardous waste in this waste stream. This evaluation (which included the onsite use of bis [2-ethylhexyl] phthalate for filter testing and in vacuum pump oil) determined that this constituent was not present as an unused commercial chemical product. There is no evidence that bis (2-ethylhexyl) phthalate used on site for filter testing would have contributed to this waste stream; however, AK does indicate that the vacuum pump oil used in mass spectrometers in Buildings 707 and 777 may have been composed of this constituent and this oil may have been disposed of in the oil/solvent mixture feed to the Grease Plant process, but not as an unused product. Bis (2-ethylhexyl) phthalate is also a common plasticizer used in plastic, including the plastic bags/packaging used to package this waste. Accordingly, this waste stream is not a U028-listed hazardous waste (Reference P522).

The constituent 1,4-dioxane (CAS No. 123-91-1) was detected as a TIC in Rocky Flats headspace gas analysis of IDC 801. An evaluation to compare the TIC identification with AK was performed by Rocky Flats to determine if this TIC is a U-listed hazardous waste in the waste stream. This evaluation revealed that 1,4-dioxane was added by the manufacturer to chlorinated solvents, particularly 1,1,1-trichloroethane, as a stabilizer and corrosion inhibitor; however, there is no indication that 1,4-dioxane is present as an unused commercial chemical product. Accordingly, this waste stream is not a U108-listed hazardous waste (Reference P522).

6.4.3.5 Ignitables, Corrosives, and Reactives

Ignitability

The materials in this waste stream do not meet the definition of ignitability as defined in 40 CFR 261.21. The materials are not liquid, and absorbents were added to wastes having the potential of generating free liquids (i.e., dewatering of wastes) (Reference P501). The waste is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change (References P012, P016, and P501). The materials are not compressed gases, nor do the wastes contain compressed gases, and the waste is not an oxidizer (References P012, P013, P015, P016, P022, and P501).

RTR and VE identified drums of solidified organics containing liquid wastes (References D019, P507, U099). Since oils and chlorinated solvents (e.g., carbon tetrachloride, 1,1,1-trichloroethane) were the predominant liquid wastes treated (refer to Section 4.3.1), the liquids discovered during RTR and/or VE are not likely ignitable. However, solvents such as alcohols and acetone were also treated so the possibility exists that the liquids are ignitable. Refer to Tables 4-1 and 4-2 for a more complete listing of organic liquids treated in Building 774. RTR and/or VE are performed to ensure liquids do not exceed the amount allowed by the WIPP-WAP and to verify the absence of compresses gases. Any drum that contains liquids in excess of the amount allowed by the WIPP-WAP or compressed gases will be segregated from the waste

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stream during confirmation and will not be eligible for disposal at WIPP until further characterization and/or processing is conducted. Waste Stream ID-RF-S3150-A is, therefore, not an ignitable waste (D001).

Corrosivity

The materials in this waste stream do not meet the definition of corrosivity as defined in 40 CFR 261.22. The materials are not liquid, and absorbents were added to wastes having the potential of generating free liquids (i.e., dewatering of wastes) (Reference P501).

RTR and VE identified drums of solidified organics containing liquid wastes (References D019, P507, P534, U099). The liquids potentially consist of any of the organic liquids identified in Tables 4-1 and 4-2 which are not corrosive. However, hydrochloric acid may also be present. The hydrochloric acid is formed from the radiolytic and/or chemical decay of chlorinated hydrocarbons, such as carbon tetrachloride, in the presence of moisture (Reference P534). RTR and/or VE are performed to ensure liquids do not exceed the amount allowed by the WIPP-WAP. Any drum that contains liquids in excess of the amount allowed by the WIPP-WAP will be segregated from the waste stream during confirmation and will not be eligible for disposal at WIPP until further characterization and/or processing is conducted. Waste Stream ID-RF-S3150-A is therefore not a corrosive waste (D002).

Reactivity

The materials in this waste stream do not meet the definition of reactivity as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change. The materials will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. The materials do not contain cyanides or sulfides, and are not capable of detonation or explosive reaction. The materials are not explosive, nor do the drums contain any explosives (References P012, P013, P015, P016, and P022). Explosives were not handled or used around radioactive material. Waste Stream ID-RF-S3150-A is, therefore, not a reactive waste (D003).

RTR and/or VE are performed to ensure the waste does not contains explosive materials. Any drum suspected of containing explosives will be segregated from the waste stream during confirmation and will not be eligible for disposal at the WIPP until further characterization and/or processing is conducted.

6.4.3.6 Polychlorinated Biphenyls

Waste Stream ID-RF-S3150-A is not regulated as a TSCA waste under 40 CFR 761. Treatment of PCB-contaminated oils in Building 774 did occur prior to 1985; however, solidified organic wastes (IDCs 700 and 801) were not generated until February 1986

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(also refer to Section 5.4.3.6). Therefore, PCB-containing fluids would not have been processed by the OASIS (References C207, P507, and U099).

6.4.4 Prohibited Items

Prohibited items potentially in this waste stream based on VE and RTR are sealed containers greater than four liters, drums containing lead, and free liquids.

Based on a review of several waste packaging and inspection procedures, the drum and rigid liner lids were not vented, nor did the rigid liner lid contain a vent hole when the waste was shipped from Rocky Flats to INL (References P008, P026, P063, P064, P501, P502, P503, and P505). As the drums are retrieved for characterization, they are vented and aspirated to ensure equilibration of any gases that may have accumulated in the closed container (Reference 11).

One drum in this waste stream was found to contain leaded rubber aprons during characterization activities. Lead is not consistent with the waste stream and drums containing lead will be segregated and removed from the solidified organics waste stream (Reference D017).

Prohibited quantities of residual liquids have been identified by VE or RTR in drums of solidified organics. These drums will be segregated and the liquids removed or immobilized prior to re-characterization and certification for shipment to the WIPP (Reference D019).

6.5 Waste Packaging

Depending on waste packaging requirements at the time, several combinations of bags and liners were used to prepare 55-gallon drums for shipment. A rigid liner was placed in each drum and lined with one polyethylene round bottom drum liner or a polyethylene drum bag. A PVC O-ring bag and a polyethylene bag were used if the drum was attached to the glovebox. The polyethylene drum bag was not required from a packaging standpoint but would aid in contamination control. When a drum was full, the drum liners were twisted and taped closed, the lid was secured with a bolted ring, and a tamper indicating device was attached to the drum (References P002, P012, P016, P063, P064, and P501). During the INL 3100 m^3 Project, several combinations of drum bags, poly bags, and O-ring bags used as packaging were identified for the IDC 700 and IDC 801 wastes (Reference U099).

Since February 1982, vermiculite was used to fill the space between the outer, sealed polyethylene drum bag and the top of the 90-mil rigid liner. The quantity of vermiculite varied from 3-12 pounds according to the amount of waste contained in each drum (Reference P024). During the INL 3,100 m^3 Project, it was determined during RTR examinations of IDC 700 and IDC 801 wastes that quantities of absorbent can vary significantly from expected quantities, and some drums may contain no absorbent. In addition, both Oil-Dri® and vermiculite may have been used (Reference U099).

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6.5.1 Filter Vents

Based on a review of several waste packaging and inspection procedures, the drum and rigid liner lids were not vented, nor did the rigid liner lid contain a vent hole when the waste was shipped from Rocky Flats to INL. Carbon composite filter vents were not used until the late 1980s (References C057, P008, P026, P063, P064, P501, P502, P503, P504, and P505). As the drums are retrieved for characterization, they are vented and aspirated to ensure equilibration of any gases that may have accumulated in the closed container.

6.5.2 Layers of Confinement

Based on the discussion in Section 6.5, several packaging configurations are possible. There may be various combinations of polyethylene round bottom drum liners, polyethylene drum bags, and PVC O-ring bags. The maximum number of confinement layers however is expected to be two. The rigid liner must be vented and therefore is not considered a layer of confinement.

In some instances, a drum may appear to contain three horsetails (i.e., twist and tape bag closure) because in addition to the two plastic bags that were twisted and taped closed, a bag stub remaining from a previous bag cut was put on top of the waste in the subsequent run. In some cases, only two horsetails may be present because two or three bag stubs were collected in the glovebox before adding them to the top of the waste. This resulted in some drums with what may appear to be four or five horsetails (two plastic bags that were twisted and taped closed plus two or three bag stubs). When the OASIS process first started, sometimes there were problems with the agitator tearing into the inner plastic bag. In this instance, another plastic bag was put around the waste. There will be very few drums like this because the problem was quickly fixed by attaching Tygon tubing to a vacuum pump and inserting the tubing between the rigid liner and the polyethylene drum liner bag which kept the agitator from contacting the plastic bag. With any of these conditions, only the two plastic bags that were twisted and taped closed are considered layers of confinement (Reference C511).

Drums processed in the AMWTP DTF have the rigid liner lids cut out or removed or holes cut and confinement layer bag closures and/or plastic ties cut. Horsetails (i.e., twist and tape bag closure) cut during these operations may be placed on top of the waste (References C514and P535).

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7.0 SUPPLEMENTAL WASTE STREAM INFORMATION

Sources of supplemental AK information collected for this waste stream are referenced throughout this document and listed in Section 9.0. The supplemental AK sources are also categorized on the Attachment 1 checklists (created in accordance with CCP-TP-005 for each waste stream [Reference 1]) and include the following types:

- Standard operating procedures
- Test plans or research project reports
- Site databases (e.g., AMWTP Waste Tracking System [WTS] database)
- Information from site personnel (e.g., documented interviews)
- Analytical data relevant to the waste stream (e.g., homogeneous solids, headspace gas, and radioassay data from the Rocky Flats and INL 3,100 m^3 TRU Waste Programs)
- Material Safety Data Sheets, product labels, or other product information
- Inventory records or waste disposal logs providing special nuclear material or nuclear material information (e.g., liquid waste treatment logbooks)

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8.0 CONTAINER SPECIFIC INFORMATION

Container specific information for immobilized organic liquid waste drums in Waste Streams ID-RF-S3114 and ID-RF-S3150-A has been provided to the CCP by the AMWTP. This information originated from the WTS database. The data have been compiled and included in the *AK Containers List* which is maintained as a quality record as required by procedure CCP-TP-005 (Reference 1). The information includes:

- Container ID
- Historical Container ID
- IDC
- Generation Date
- Vent Date

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9.0 REFERENCE INFORMATION

1. CCP-TP-005, *CCP Acceptable Knowledge Documentation*, Carlsbad, New Mexico, Washington TRU Solutions, LLC.

2. NM4890139088-TSDF, *Waste Isolation Pilot Plant Hazardous Waste Facility Permit,* New Mexico Environment Department, Santa Fe, New Mexico

3. DOE/WIPP-02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, Carlsbad, New Mexico, U.S. Department of Energy

4. DOE/WIPP 01-3194, *CH-TRU Waste Content Codes (CH-TRUCON)*, U.S. Department of Energy

5. CCP-PO-001, *CCP TRU Waste Characterization Quality Assurance Project Plan*, Carlsbad, New Mexico, Washington TRU Solutions, LLC.

6. 42 U.S.C 10141, *Nuclear Waste Policy Act*

7. CAO-95-1121, Revision 3, *Transuranic Waste Baseline Inventory Report (TWBIR)*, U.S. Department of Energy Carlsbad, 1995

8. DOE/TRU-10-3425, *Annual Transuranic Waste Inventory Report – 2010,* Carlsbad, New Mexico, U.S. DOE

9. CCP-PO-002, *CCP Transuranic Waste Certification Plan*, Carlsbad, New Mexico, Washington TRU Solutions, LLC.

10. DOE/LLW-217, *DOE Waste Treatability Group Guidance*, Idaho Falls, Idaho, INEL-Lockheed Idaho Technologies

11. CCP-PO-003, *CCP Transuranic Authorized Methods For Payload Control (CCP CH-TRAMPAC)*, Carlsbad, New Mexico, Washington TRU Solutions, LLC.

12. McCoy's RCRA Compliance CD. 2004 Edition. McCoy and Associates, Inc. Golden, Colorado

13. CH-TRU Payload Appendices, Waste Isolation Pilot Plant

14. *Waste Isolation Pilot Plant Land Withdrawal Act* (as amended), Public Law 102-579

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AK Source Documents

Source Document Number	Title	Document Number	Date
C032	External letter from J. K. Paynter to J. N. Davis, Idaho National Engineering Laboratory. Data Package Information Change for Drum D40197-0743-18283.	88-RF-2813	9/9/88
C039	Internal Correspondence from J. K. Paynter to B. C. Barrett	WCP8-20	3/23/89
C057	Drum, gasket, liner usage at RFP compiled by Larry Bearly		1989
C086	Memorandum from Jeff Paynter to Pamela of IT Corporation. Use of the Complexing Agent DHDECMP.		2/7/89
C130	Fax from Steve Cunningham, Rocky Flats, to Jeff Paynter		2/18/92
C134	Interview Record and associated documentation of several former Rocky Flats employees		Undated
C137	Interview Record of E. Putzier and E. Vejvoda by D. Herrick and J. Lamb		9/5/91
C154	Interview Record of W. V. Conner by T Widner and D. Lamb		8/13/91
C159	Interview Record of R. Hoffman by D. Herrick and J. Lamb		9/4/91
C170	Telecon between Al Morgan of Rocky Flats (retired) and Jeff Harrison		2/17/97
C171	Telecon between Bill Connor of Kaiser-Hill LATO and Jeff Harrison		2/13/97
C184	Interview Record of Al Morgan by Jeff Harrison		3/19/97
C185	Telecon between Bill Connor of LAPO and Jeff Harrison		3/20/97
C207	Summary of Review of PCB AK Sources.		9/5/01
C502	Letter from John A. Ciucci to Joseph A. Legare. Resolution of Cesium-137 AK Discrepancy Between Rocky Flats Environmental Technology Site and Idaho National Engineering and Environmental Laboratory	04-RF-01306, Rev.2	12/27/04
C505	Letter from Cynthia Zvonar, Department of Energy Carlsbad Field Office, to Lou E. Roberts, Environmental Protection Agency.		6/21/01
C506	Letter from John H. Smith, Environmental Protection Agency, to Lynne Smith, Department of Energy WIPP Office Director, EM-23.		2/28/02
C510	E-mail Correspondence from Murthy Devarakonda to Michael Rivera. Subject: IDC 003 Packaging		8/3/05

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Source Document Number	Title	Document Number	Date
C511	Record of Communication with Mark Crocker. Subject: OASIS Waste Packaging,		12/06/05
C514	Email from Mike Rivera to Kathy Leonard, “WMF-633 ARP Drums”		8/16/2007
C515	Email from Whitney St Michel to Barbara Broomfield, Vince Medina, Bill Verlanic, "RF-003 Treated Drums"		9/2/2009
C516	Letter to Vincent C. Vespe, "Request for Approval - Shipments of Radioactive Waste in 55-Gallon Steel Drums"	1191-67PE	8/21/1967
C517	Earliest Pack Date for Rocky Flats Waste Retrieved From Pits 11 and 12	RCM-001-10	7/5/2010
C518	Email from Jason P. Lance to Jim Vernon, "RF-743 Summary"		6/1/2011
D004	Discrepancy Resolution for Waste Matrix Code Assignments for Waste Streams ID-RF-S3114 and ID-RF-S3150-A		6/05
D005	Discrepancy Resolution for EPA Hazardous Waste Number Assignments for Waste Streams ID-RF-S3114 and ID-RF-S3150-A, Rev. 1		12/05
D009	Discrepancy Resolution for Cs-137 and Sr-90 in Rocky Flats TRU Waster		9/29/05
D013	Discrepancy Resolution. Incorrect Waste Matrix Code.		10/1/2007
D014	Discrepancy Resolution. Incorrect Waste Matrix Code.		2/8/2011
D017	Discrepancy Resolution. Incorrect EPA Hazardous Waste Number.		03/11/2008
D018	Discrepancy Resolution. Incorrect EPA Hazardous Waste Number.		07/14/2011
D019	Discrepancy Resolution. Liquids Identified During Characterization.		4/16/2008
D022	Discrepancy Resolution. Solvent Use of Nitrobenzene		TBD
P001	TRU Waste Compliance Program for WIPP-WAC (U). WO-4500-H		1989
P002	Organic and Sludge Immobilization System.	RFP-4095	7/27/87
P004	Rocky Flats Plant Waste Management Site Plan		12/87
P008	Packaging and Handling Line- and Nonline-Generated Materials (U)	1-1002-C/O	1988
P012	TRUPACT-II Content Codes (TRUCON)	89-004	1992

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Source Document Number	Title	Document Number	Date
P013	EG&G Sampling Program Results FY1987.	PSD87-059	1987
P014	TRU Waste Certification Program for WIPP-WAC (U).	CO-4500-A	5/24/83
P015	TRU Waste Sampling Program: Volume I-Waste Characterization	EGG-WM-6503	1985
P016	Idaho National Engineering Laboratory Code Assessment of the Rocky Flats Transuranic Waste	INEL-95/0281	1995
P020	Characteristics of Transuranic Waste at Department of Energy Sites.	RFP-3357	5/83
P022	EG&G Sampling Program Results FY1989	PSD89-011	2/1/89
P023	(Task 5 Draft Report) Estimating Historical Emissions from Rocky Flats		1992
P024	Content Code Assessments for INEL Contact-Handled Stored Transuranic Wastes	WM-F1-82-021	10/1/82
P026	Transuranic Solid Waste Inspection (U)	WC-4003-A	11/11/85
P033	Summary of Transuranic Waste Characterization Programs at the INEL (1979-Present)	INEL-95/0397	1995
P043	TRU Waste Compliance Program for WIPP-WAC (U)	WO-4500-F	1/19/87
P052	Backlog Waste Reassessment Baseline Book, Organics.	WF19	5/3/04
P052	Backlog Waste Reassessment Baseline Book, Solidified Organics.	WF47	11/10/04
P053	(Tasks 3&4 Final Draft Report) Reconstruction of Historical Rocky Flats Operations and Identification of Release Points.		8/92
P060	Waste Stream and Residue Identification and Characterization Building 707	707-V3.2	2/19/93
P061	Waste Stream and Residue Identification and Characterization Building 771	771-V3.2	9/13/93
P062	Waste Stream and Residue Identification and Characterization Building 779	779-V3.2	6/24/93
P063	Packaging Wastes for Shipment Offsite (U)	WO-4034-C	10/13/86
P064	Waste Packaging Requirements	WO-4034-F	7/8/88
P066	Material Safety Data Sheet for ENVIROSTONE (and related data).		5/12/86
P069	Nuclear Materials Control Elements printout. SAN Database Report	6016-01	6/1/84
P076	Waste Stream and Residue Identification and Characterization Building 559	559-V3.2	1991

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Source Document Number	Title	Document Number	Date
P077	Waste Stream Residue Identification and Characterization Building 774	774-V3.2	1993
P078	Waste Stream Residue Identification and Characterization Building 776	776-V3.2	1991
P079	Waste Stream Residue Identification and Characterization Building 777	777-V3.2	1991
P081	Waste Stream Residue Identification and Characterization Building 371	371-V3.2	1992
P082	Waste Stream Residue Identification and Characterization Building 374.	374-V3.2	1992
P084	Material Safety Data Sheet for Varsol 1.		8/25/86
P089	Waste Systems Progress Report March 1984 through February 1985.	RFP-3871	4/11/86
P090	History of Rocky Flats Waste Streams	RFP-3186	1982
P091	Materials Hazards Manual.		8/1/76
P142	Material Safety Data Sheet for ZL-22A Zyglo Penetrant		6/14/93
P152	Plutonium Metal Feed Specification for Use in the Weapons Program. Volume 1		3/22/85
P161	Dose Reconstruction Project Task 5		11/92
P164	A History of The Rocky Flats Plutonium/Actinide Recovery Plant 1952-1991	RT92-003	2/3/92
P166	Rocky Flats Risk Assessment Guide	RF/03/00/85/0/5	3/85
P167	Neptunium Processing at the Rocky Flats Plant	RFP-2899	9/20/81
P169	Plutonium Isotopic Ratios at Rocky Flats		11/16/90
P178	Research and Development Quarterly Progress Report. October, November, and December 1968	RFP-1311-A	1/31/69
P179	Research and Development Quarterly Progress Report. April, May, and June 1969	RFP-1406-A	7/31/69
P180	Research and Development Quarterly Progress Report. July, August, and September 1969	RFP-1436-A	10/31/69
P181	Research and Development Quarterly Progress Report. January, February, and March 1970	RFP-1519-A	4/30/70
P182	Research and Development Quarterly Progress Report. April, May, and June 1970	RFP-1579-A	9/16/70
P183	Research and Development Quarterly Progress Report. July, August, and September 1970	RFP-1602-A	10/30/70

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Source Document Number	Title	Document Number	Date
P184	Research and Development Quarterly Progress Report. October, November, and December 1970	RFP-1638-A	1/31/71
P185	Research and Development Quarterly Progress Report. January, February, and March 1971	RFP-1691-A	4/30/71
P186	Research and Development Quarterly Progress Report. April, May, and June 1971	RFP-1748-A	7/30/71
P187	Research and Development Quarterly Progress Report. July, August, and September 1971	RFP-1790-A	10/29/71
P188	Research and Ecology Annual Report. Chemistry Research and Development	RFP-1837-A	4/14/72
P189	Research and Ecology Semi-Annual Progress Report January – June 1972	RFP-1921-A	8/30/72
P190	Research and Ecology Semi-Annual Progress Report. Chemistry Research and Development. July through December 1972	RFP-2004-A	5/16/73
P191	Research and Ecology Semi-Annual Progress Report. Chemistry Research and Development. January-June 1973	RFP-2102-A	8/13/73
P192	Research and Ecology Semi-Annual Progress Report. Chemistry Research and Development. July-December 1973	RFP-2200-A	3/18/74
P193	Research and Development Semi-Annual Progress Report for July through December 1994	RFP-2360-A	2/24/75
P194	Research and Development Semi-Annual Progress Report for January through June 1975	RFP-2417-A	8/29/75
P195	Research and Development Semi-Annual Progress Report for January through June 1977	RFP-2680-A	10/21/77
P196	Chemistry Research and Development Annual Progress Report November 1, 1979 through October 31, 1980	RFP-3180	8/4/81
P197	Chemistry Research and Development Annual Progress Report November 1, 1980 to September 30, 1981	RFP-3324	8/11/82
P198	Chemistry Research and Development Annual Progress Report. October 1, 1981 to September 30, 1982	RFP-3511	9/16/83
P199	Chemistry Research and Development Annual Progress Report October 1, 1982 to September 30, 1983	RFP-3654	9/24/84
P200	Chemistry Research and Development Annual Progress Report October 1, 1983 to September 30, 1984	RFP-3825	6/13/86
P201	Chemistry Research and Development Annual Progress Report October 1, 1984 through September 30, 1985	RFP-3931	8/18/86
P202	Chemistry R&D Monthly Progress Report	R&D 86-012	1/86

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Source Document Number	Title	Document Number	Date
P210	Default Plutonium Mass Fractions for Rocky Flats Plant Waste	EDF-1242	9/99
P227	Plutonium Mass Fractions Derived from SGRS Data	EDF-1609	12/00
P501	Packaging Waste for Shipment Offsite	WO-4034-A	8/16/85
P502	Packaging and Handling Plutonium Wastes and Residues	CO-1073-A	8/8/77
P503	Packaging Wastes for Shipment Off-Site	CO-4034-A	9/2/77
P504	Packaging Waste for Shipment Offsite	WO-4034-B	1/21/86
P505	Procedure for Packaging and Handling Pu Waste and Residue Drums	9250 (50)	3/29/74
P507	Acceptable Knowledge Document for INEEL Stored Transuranic Waste – Rocky Flats Plant Waste	INEL-96/0280, Rev. 3	2/28/03
P508	Radioactive Waste Management Complex Map Drawing	Ref. AC1876	7/99
P509	Radioactive Waste Management Complex – Idaho Completion Project		Undated
P512	Waste Description Information for Transuranically Contaminated Wastes Stored at Idaho National Engineering Laboratory.	INEL-95/0412	12/95
P513	Determination of Radioisotopic Content In TRU Waste Based on Acceptable Knowledge.	BNFL-5232-RPT-TRUW-07, Rev. 5	12/16/04
P515	Estimated Earthen and Geofabric Covered TRU Waste Inventory in the TSA at Radioactive Waste Management Complex (RWMC)	NEL-95/194 RWMC EDF #837	8/24/95
P516	Advanced Mixed Waste Treatment Project Waste Stream Designations	BNFL-5232-RPT-TRUW-12, Rev. 1	11/20/03
P517	Material Safety Data Sheet, Micro-Cel® E (All Grades)		2/15/04
P518	Material Safety Data Sheets for Various Oils Used at Rocky Flats		Various
P519	Waste Systems Progress Report March 1983 through February 1984	RFP-3682	10/1/84
P520	Building Histories for Building 371, 444, 447, 460, 707, 771, 776/777, 881, 883, and 991 Historical Release Report (HRR)		11/84
P521	Rocky Flats Environmental Technology Site WIPP Waste Stream Profile Form, TRM Solidified Organic Waste.	RF135.01, Rev. 0	3/23/05
P522	Rocky Flats Environmental Technology Site WIPP Waste Stream Profile Form, TRM Solidified Organic Waste.	RF107.04, Rev. 0	1/11/05
P524	Determination of H2 Diffusion Rates through Various Closures on TRU Waste Bag-Out Bags.	LA-13616-MS	6/99

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Source Document Number	Title	Document Number	Date
P532	Summary of Rocky Flats Waste Buried in the Subsurface Disposal Area	ICP/EXT-04-00717	4/2005
P534	Shipment And Disposal Of Solidified Organic Waste (Waste Type IV) TO The Waste Isolation Pilot Plant (WIPP), Presented at WM'06 Conference, February 26-March 2, 2006, Tucson, AZ.		2/26/2006
P535	Drum Treatment Facility Operations	INST-OI-68	9/1/2009
P536	Visual Examination of S3000 Waste in the Facility	INST-FOI-22	TBD
P537	Subsurface Disposal Area (SDA) Waste Identification (1952-1970 Emphasis)	EGG-WM-8727	1/1/1990
P538	Colorimetric Determination of Iron in Plutonium Metal Using a Nitrobenzene Extraction Technique	RFP-948	12/20/1967
P539	Acceptable Knowledge Document for INL Stored Transuranic Waste – Rocky Flats Plant	RPT-TRU-56	8/19/2010
U010	OASIS Solidification and Off Gas Analysis.	PSD 88-038	9/88
U040	Building 774 Low Level Organic and TRU-Waste Organic Waste Log Book.		1976 – 1990
U043	Building 774 Set Up Log Book.		1973 – 1990
U059	Drum Prefix Numbers and Corresponding Material Balance Areas		1/84 – 6/94
U064	Radioactive Materials Associated with Rocky Flats		4/14/77
U069	Drum Prefix Issue Dates Log Book		1987-1997
U092	Inventory values as generated by TRIPS Change Request (TCR) 1821.		5/22/01
U098	Preliminary data for the IDC 003 waste stream.		10/01
U099	Draft Waste Stream Profile Form – Solidified Organics and Supporting Documentation	INW164.001	4/10/02
U505	Rocky Flats Prefix History Timeline		Undated

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Figure 1. Rocky Flats Environmental Technology Site Map

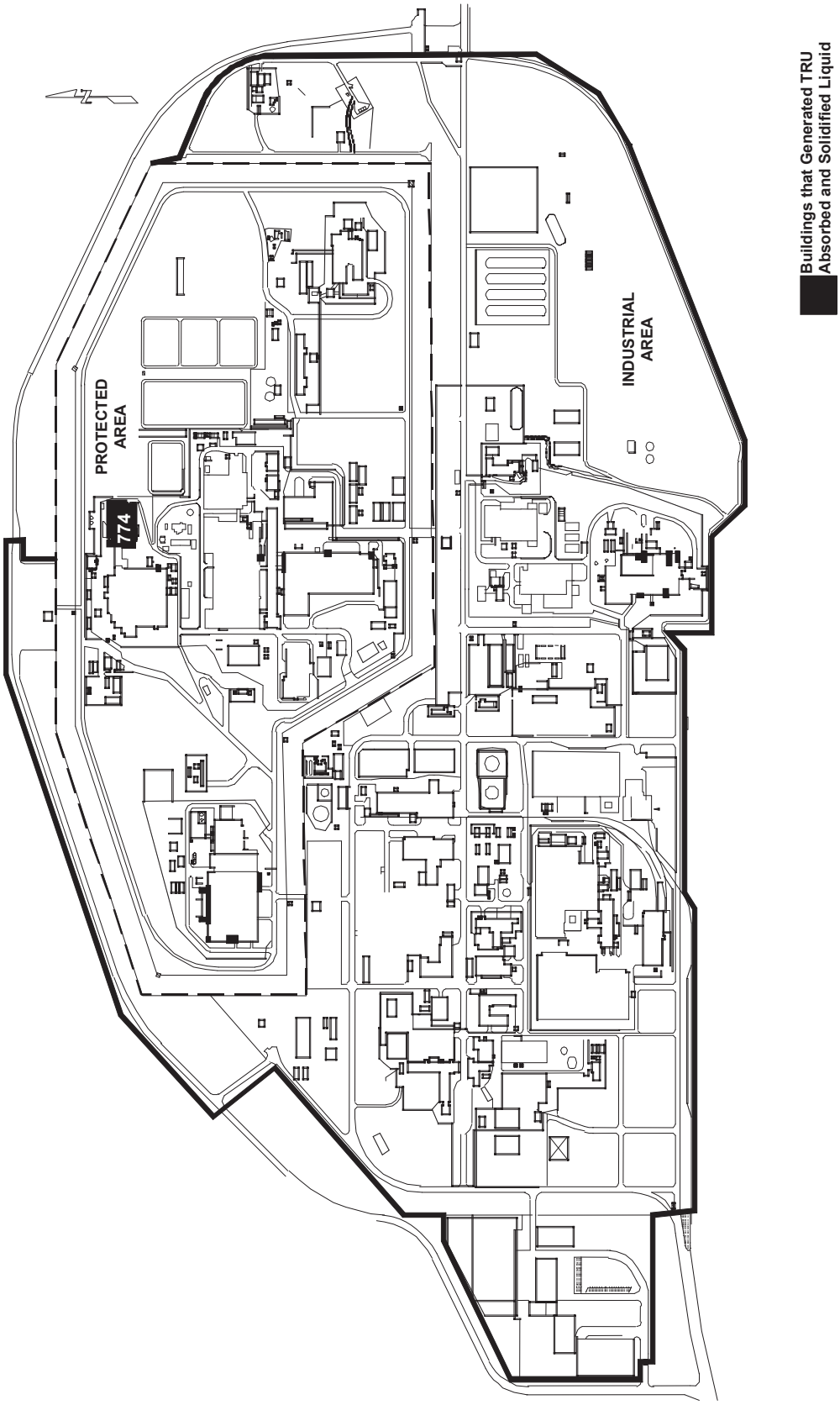

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Figure 2. Location of the INL Radioactive Waste Management Complex

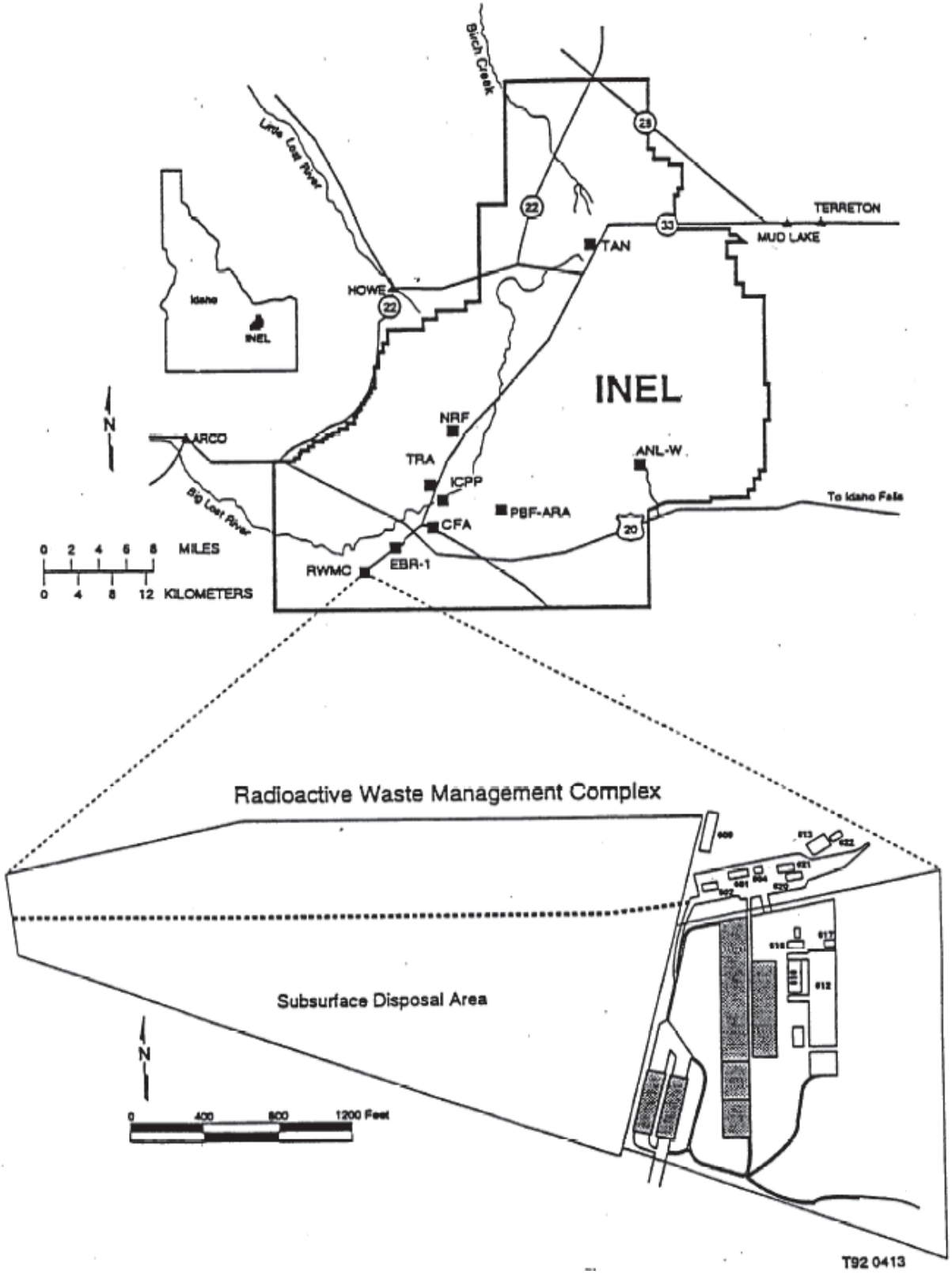

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Figure 3. Radioactive Waste Management Complex Map

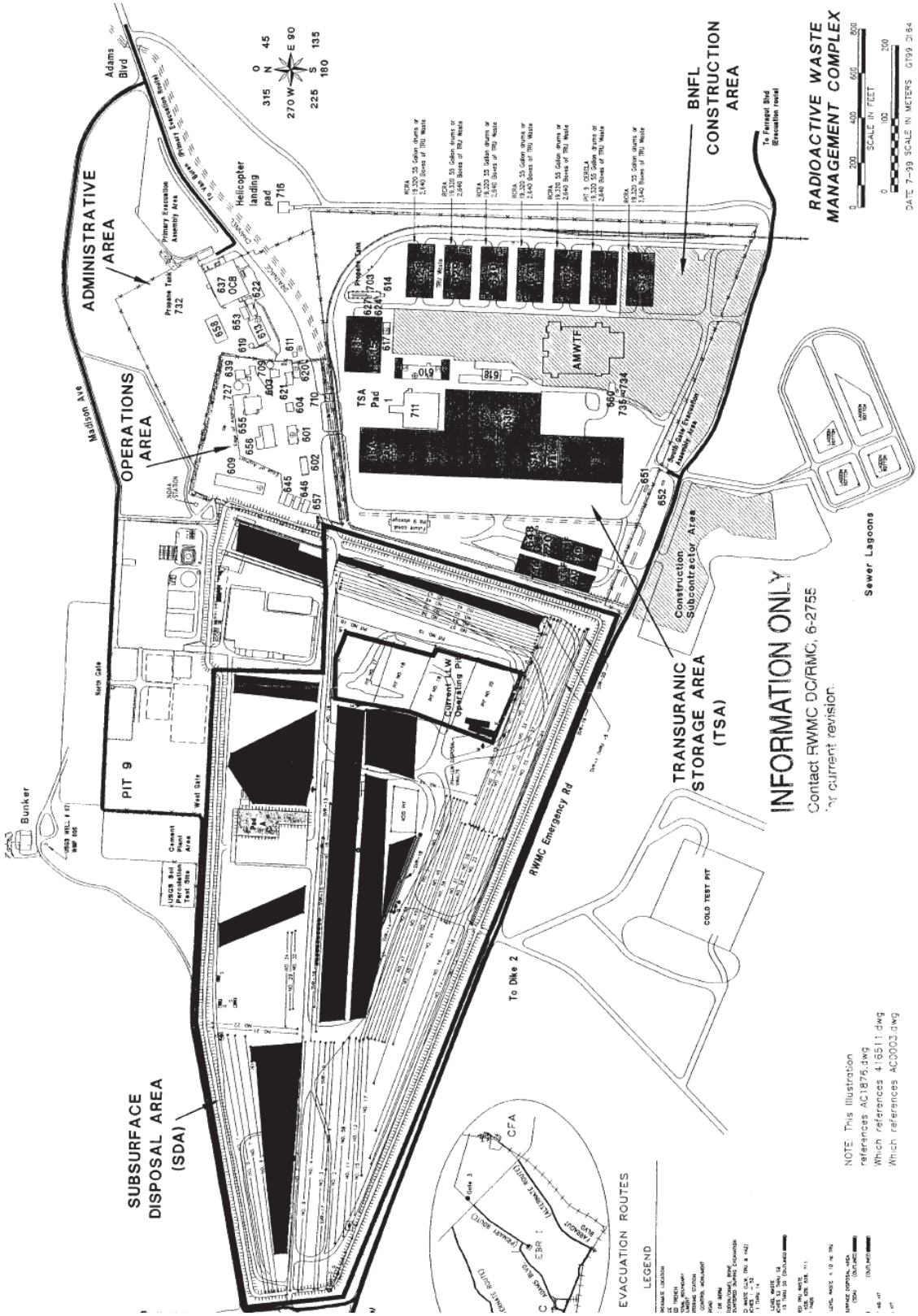

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Figure 4. Grease Plant

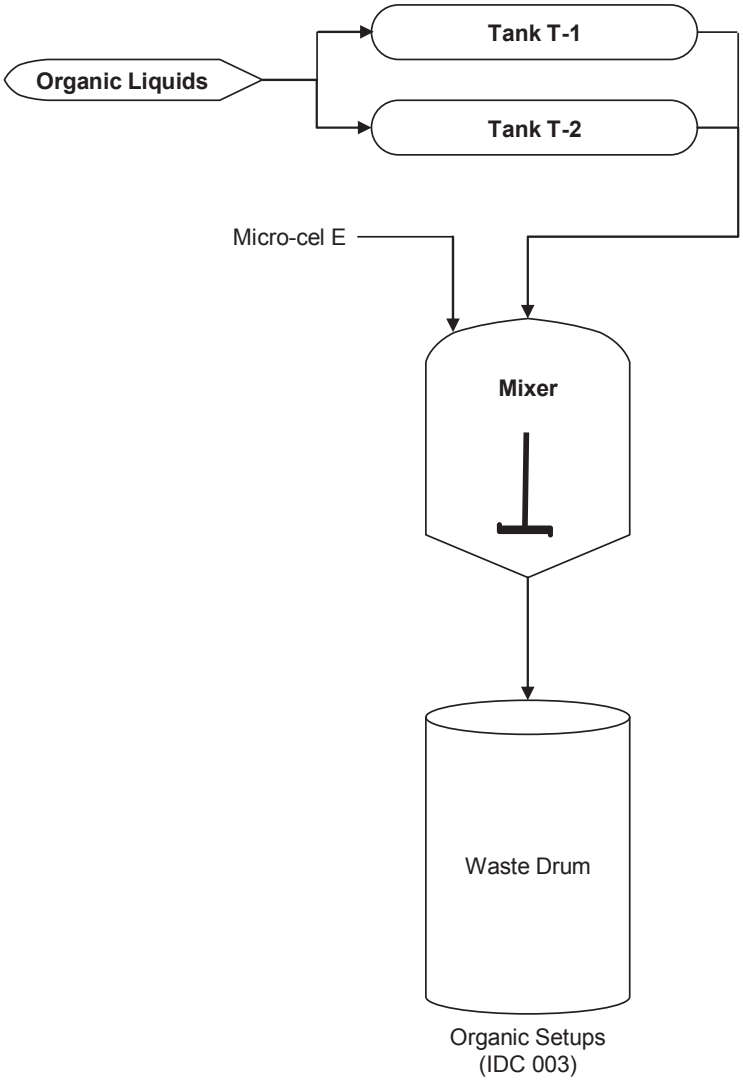

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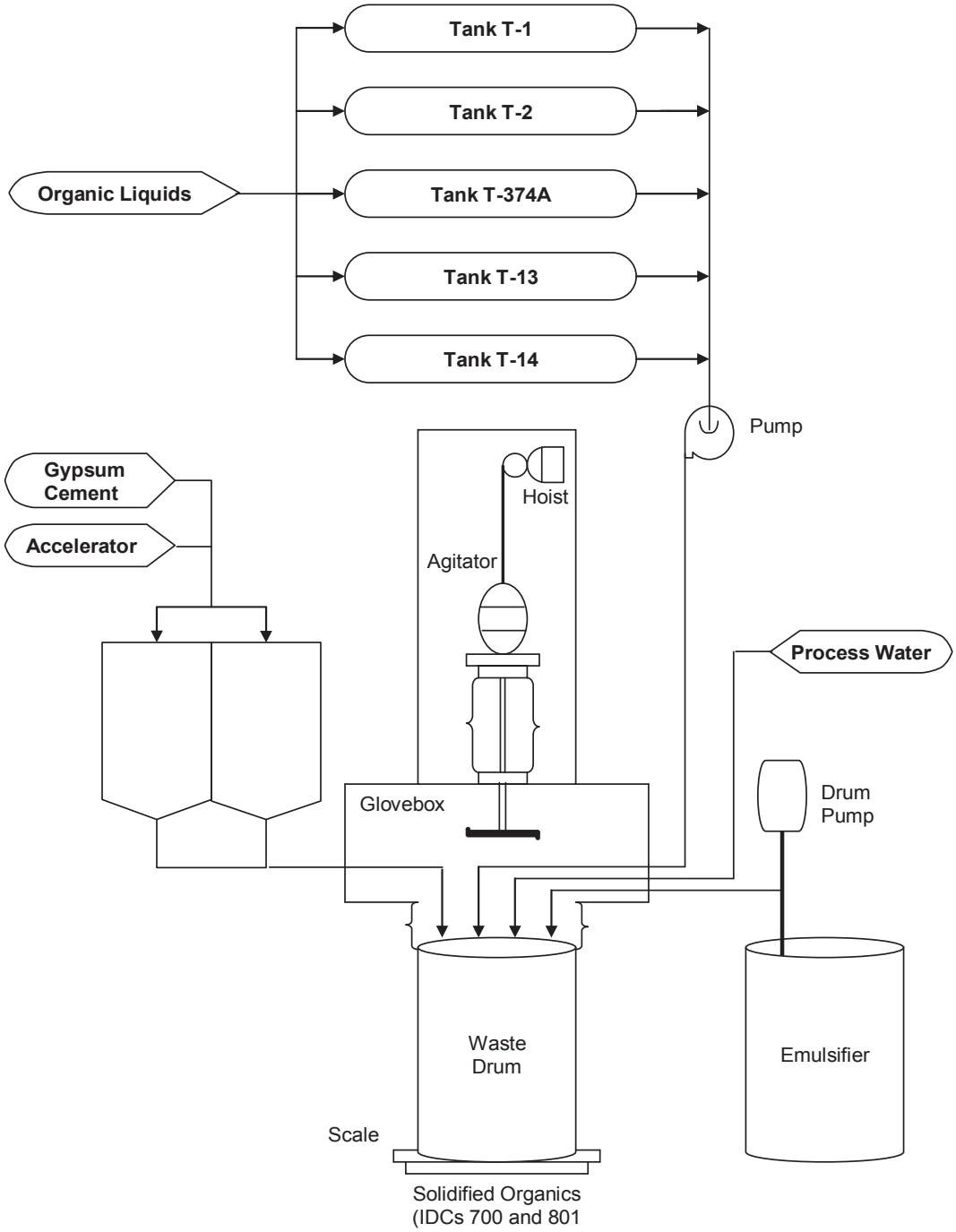
Figure 5. Organic and Sludge Immobilization System



APPENDIX 4

REPORT 228

Project No.: 23927, 25580

MANAGING FREE LIQUID IN NEWLY GENERATED WASTE DRUMS

Document ID: RPT-228
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REPORT

Project No.: 23927, 25580

MANAGING FREE LIQUID IN NEWLY GENERATED WASTE DRUMS

Idaho Cleanup Project

CH2M ◆ WG Idaho, LLC is the Idaho Cleanup Project contractor for the U.S. Department of Energy

RPT-228
Revision 0
Project No. 23927, 25580

Managing Free Liquid in Newly Generated Waste Drums

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June 2007

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Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14516

ABSTRACT

The presence of free liquid in some drums of targeted sludge from the AR Project was initially discovered in December 2006. Since that time, free liquid has been found in about 40% of the sludge drums. Free liquid must be less than 1% by volume for waste sent to the Waste Isolation Pilot Plant (WIPP). Although the moisture content in the sludge is not known, visual examination ensures that no free liquid exists in the waste when it is placed in drums. The most likely mechanism for release of free liquid is capillary flow by gravity through the unsaturated sludge. This process may be enhanced by the effect of freeze-thaw cycles due to temporary storage in unheated buildings. A comparison was made of several potential absorbents, using a nominal one gal of liquid as a basis. It is recommended that two gal of Oil-Dri® be added to each drum of sludge to absorb free liquid that may form.

CONTENTS

ABSTRACT iii

ACRONYMS vii

1. POTENTIAL FREE LIQUID RELEASE FROM SLUDGE WASTE 1

   1.1 Mechanisms for Liquid Release 1

   1.2 Fluid Flow in Waste 2

   1.3 Comparison of Absorbents 2

   1.4 Discussion and Recommendations 4

2. REFERENCES 4

Appendix A—Free Liquid Flow and Absorption 7

Appendix B—Material Safety Data Sheet for Oil-Dri® Floor Absorbent 13

TABLES

1. Comparison of Absorbents 3

ACRONYMS

AMWTP	Advanced Mixed Waste Treatment Plant
ARP	Accelerated Retrieval Project
DPS	Drum Packaging System
MSE	MSE Technology Applications, Inc. of Butte, Montana
RFP	Rocky Flats Plant
RTR	real-time radiography
SDA	Subsurface Disposal Area

Managing Free Liquid in Newly Generated Waste Drums

1. POTENTIAL FREE LIQUID RELEASE FROM SLUDGE WASTE

About a gallon of free liquid was observed during routine examination of a sample drum at the Advanced Mixed Waste Treatment Plant (AMWTP) in December, 2006. The drum consisted of sludge waste exhumed and repackaged at the Accelerated Retrieval (AR) Project. Since that time about 40% of AR Project sludge waste drums have been found to contain free liquid.

Free liquid has been observed in drums of both inorganic sludge and organic sludge generated at the Rocky Flats Plant (RFP). During the 3,100 m^3 Project, approximately 1,150 drums (6% of the total) had absorbent added to them prior to shipment. Liquid was observed above the sludge.

A study of the organic sludge from RFP indicated that free liquid organic compounds can be separated from the sludge matrix.[1] This observation was made during coring of organic sludge drums for sampling. Additional evidence comes from surrogate testing. The release of free liquid from the calcium silicate matrix is possible because the pore size of the matrix decreases when shear force is applied.

Based on observation of drums of sludge waste from RFP, there is evidence for the formation of free liquids.

1.1 Mechanisms for Liquid Release

Inorganic sludge from RFP consists primarily of metal precipitates (oxides and hydroxides) that were filtered before being packaged and shipped to Idaho. The rotary drum filter used at RFP produced a moist filter cake, at or near saturation. This may explain why free liquid was found on top of inorganic sludge drums during the 3,100 m^3 Project.[2] That waste had not been opened or repackaged since shipment to Idaho, and its moisture content was probably quite high. The exhumed waste that was recently sampled had a somewhat different history. It was buried for decades, not stored in a building. The original drum may have corroded enough to form small holes that would allow free liquid to drain out. Even if holes did not develop while the waste was interred, the original drum was split open during exhumation, and this would have released any free liquid. Even if the waste was not moist to the touch, but had dried somewhat, it would still be expected to retain at least as much moisture as the surrounding soil. This can be as much as 30% by weight. **So the drum with a net weight of 204 lb could contain about 60 lb of water, even if the waste appeared dry when it was packaged.**

There are several possible mechanisms for the formation and movement of free liquid in the drum. The first is evaporation and condensation. The first sludge drum with free liquid was initially packaged in May 2006 and stored in buildings without heat or air conditioning. During the summer months, cycles of evaporation and condensation could have occurred. However, any accumulation of liquid water from this process would be slow. Because of the limited void volume in the drum (probably no more than half of the drum volume), only about 3 grams of condensate could form in a single daily evaporation-condensation cycle. Even if all of the condensate drained to the bottom of the drum and was not subject to further evaporation, this process would require several years to generate a gallon of free liquid. Although evaporation and condensation probably occurred in the drum, that process could be only a minor contributor to the free liquid.

Water can also collect in the pores of the waste and settle by gravity. The inorganic sludge has the general appearance of soil, so a vadose zone flow model can probably be applied to the waste. In this model water flows through small pores. The process can be described by a variation of Darcy's equation[3]:

$$q = K(\theta)\ \mathrm{grad}(H)$$

where

$K(\theta)$ = unsaturated hydraulic conductivity, cm/sec

grad H = gradient of head loss (cm/cm)

q = fluid flux, $cm^3/(sec\text{-}cm^2)$ or cm/sec.

For flow in unsaturated media, the hydraulic conductivity is a function of water content. Hubbell and his co-workers have estimated that vadose zone fluxes at the INL can range from 0.2 to 10,000 cm/yr (roughly 10^{-9} to 10^{-4} cm/sec).[4] For comparison, a flux of 10^{-7} cm/sec over one-fourth of the cross-sectional area of a drum would result in the collection of almost a third of a gallon of liquid in 7 months. Because hydraulic conductivities can vary by many orders of magnitude, it is very difficult to precisely estimate the flow rate of fluid in unsaturated media, particularly without performing experimental work. However, this downward flow of water through the pores of unsaturated sludge has at least the potential to generate the volume of water observed in the drums currently under investigation.

Before being transported to the AMWTP for characterization, drums are stored in the unheated WMF-698 building. While there the drums are subject to freeze-thaw cycles as well as periods of evaporation and condensation. Studies have been conducted on the impact of freezing and thawing on fluid movement in soils. These studies have relevance because the RFP sludge waste materials have properties similar to those of silty soil (inorganic sludge) or clay-like soil (organic sludge). It has been shown that one or two freeze-thaw cycles increase the hydraulic conductivity by one or even two orders of magnitude.[5] It is easy to see from the equation above that such a change in hydraulic conductivity can have a major effect on the rate at which liquid flows through the waste.

1.2 Fluid Flow in Waste

From recent observations using real-time radiography (RTR), more than one third of the sludge drums checked have been found to contain free liquid in the bottoms of the drums, always inside the rigid liners. As long as the liquid can flow by gravity towards a layer of absorbent, the absorbent will be effective in removing free liquid from the drum. Appendix A provides a discussion of the rationale for putting absorbent inside the rigid liners of drums.

1.3 Comparison of Absorbents

It is suggested that inorganic absorbents be used to eliminate the potential for additional gas generation in the waste drums and to alleviate any concerns regarding criticality safety. The commercial product, Oil-Dri® is composed of montmorillonite or attapulgite clay and crushed quartz. These clays are also known as Fuller's Earth. The basic ingredients are very similar to those of the Aquaset and Petroset products frequently used for solidification of radioactive waste. Those two products are also based on montmorillonite clay.

The Oil-Dri® vendor literature indicates that this product is effective for water or organic liquids.[6] The Material Safety Data Sheet (see Appendix B) indicates that heat can be generated if Oil-Dri® is used to absorb unsaturated hydrocarbon liquids. Both tetrachloroethylene and trichloroethylene contain double bonds as do other unsaturated hydrocarbons. Other possible organics in the Subsurface Disposal Area (SDA) are saturated and do not have the potential for heating. Testing of Aquaset and Petroset at MSE Technology Applications in Butte, MT during 2006 showed that these materials did not react at all with these chlorinated solvents.[7] Since Oil-Dri® is composed of the same or a similar type of clay as the Aquaset and Petroset materials tested at MSE, it is highly unlikely that Oil-Dri® will react with the saturated organics. Even if an exothermic reaction were to occur, the contacting of fluid in a waste drum with the absorbent would take place over several days or weeks. This long duration would allow any heat to dissipate.

Oil-Dri® is a relatively inexpensive, multi-purpose product. Its absorptive capacity is not as high as specially engineered absorbents, such as Aquaset and Petroset. The table below shows the expected performance of Oil-Dri® for absorbing free liquid in drums.

As noted above, testing was performed with a mixture of Aquaset and Petroset products on a variety of chemical compounds, including organic chemicals expected to be in the SDA. These products effectively absorbed with the simulated rinse waters or organic liquids tested, but did not otherwise react with them. Unlike the Oil-Dri® product, one material is not suited for both aqueous and organic liquids. As the name implies, Aquaset absorbs aqueous liquids such as rinse water and K-W decontamination solution. Petroset II-G would be used in drums containing oils and chlorinated solvents. The table below shows characteristics and performance of the Aquaset and Petroset products, based on vendor literature.[8] It should be noted that a blend of Aquaset and Petroset II-G could be used as a single-product additive to drums. Table 1 shows the quantities needed for a blended absorbent to deal with either aqueous or organic liquid.

Table 1. Comparison of absorbents.

Comparison of Absorbents Basis: absorption of 1 gal of free liquid				
Parameter	Aquaset (aqueous only)	Petroset II-G (organic only)	Aquaset + Petroset II-G	Oil Dri® (all liquids)
Composition	Montmorillonite clay	Montmorillonite clay	Montmorillonite clay	Montmorillonite/attapulgite clay + quartz
Bulk Density of Absorbent, lb per gal (see Note 2)	9.6	6.4	7.8	4.8
Application Rate, gal of absorbent per gal of free liquid	0.33	0.43	0.76	2.1
Volume of Absorbent Required, gal	0.33	0.43	0.76	2.1
Typical Unit Cost, $/lb	$4.00	$4.00	$4.00	$0.10-$0.20
Cost per Drum	$12.67	$11.01	$23.68	$1.01-$2.02

Notes:
1. Densities and application rates based on vendor literature.
2. Density differences in similar clays due largely to differences in particle size.
3. Unit costs do not include shipping or tax.

Based on RTR observation the volume of liquid is typically about one gallon. Using as a basis one gal of liquid, Table 1 shows the amounts of absorbents needed per drum of waste and the associated cost. Information in the table is based on published vendor literature. Physical testing will be conducted in the future to determine the specific amount of absorbent to be applied when dealing with variable amounts of free liquid.

1.4 Discussion and Recommendations

Clay-based absorbents are expected to be effective in eliminating free liquid formed after waste exhumed from the SDA is repackaged. The engineered absorbents, Aquaset and Petroset, are very efficient. Less than half a gal of either absorbent can absorb one gal of liquid. Even if Aquaset and Petroset were blended together in drums to address both aqueous and organic liquids, the required volume would be less than half that of Oil-Dri®. However, the high unit cost of the materials makes them expensive to use when compared with Oil-Dri®. A disadvantage of Oil-Dri® is that it would increase waste volume by about 4% (2.1 gal in a 55-gal drum), compared to a less than 1.4% increase for the Aquaset and Petroset products (0.4 gal or 0.76 gal in a 55-gal drum).

Because the free liquid is expected to collect between the tray liner and the rigid liner, absorbent can be added to drums at some point before they are attached to the DPS. This can be done in the area where drums are staged before use. Using Aquaset and Petroset would require that care be taken to ensure that drums containing Aquaset were used for inorganic sludge and drums with Petroset were used with organic sludge. If this is not practical, the Aquaset or Petroset may be added from the DPS before the waste is placed in a drum. These operational issues are a disadvantage for Aquaset and Petroset. This disadvantage could be overcome by pre-blending Aquaset and Petroset II-G, then adding the mixture to drums as a single product in the same manner as Oil-Dri®.

It is recommended that Oil-Dri® floor absorbent be used to absorb any free liquids that form in drums of sludge packaged in the SDA. The application rate should be 2 gal per drum, based on an assumed maximum of one gal of free liquid formed. Because Oil-Dri® absorbs both aqueous and organic liquid, it can be added inside the rigid liners of every drum used for targeted waste. The addition can be done at any convenient location before the drums are used.

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Appendix A

Free Liquid Flow and Absorption

Appendix A

Free Liquid Flow and Absorption

Free liquid has been discovered in the rigid liners of a number of drums of ARP sludge waste. The liquid occupies the space between the tray liner and the rigid liner inside some drums; in other drums the liquid is in this space plus inside the tray liner, in void spaces in the waste. To date, virtually all free liquid has been found in the bottoms of drums, and all pockets of liquid inside the waste matrix have been hydraulically interconnected, with the liquid in the bottom of the drum. The exceptions to this have been very small amounts of liquid, typically less than half a cup, on the tops of drums, in the folds of the transfer bags. In other words, all liquid found inside tray liners has been adjacent to liquid between the tray liners and the rigid liners. No isolated pockets of free liquid have been found inside the waste matrix. This is an important observation. It indicates that all pockets of liquid can be absorbed by putting absorbent inside the rigid liners before placing waste in drums. The following discussion demonstrates why this conclusion is valid.

Figure A-1 represents a hypothetical situation in a sludge drum containing free liquid. Liquid is present on both sides of the tray liner. Actual observation consistently shows that the two fluid levels are the same. However, the figure represents the condition in which some liquid released by the waste has not yet flowed through the tray liner.

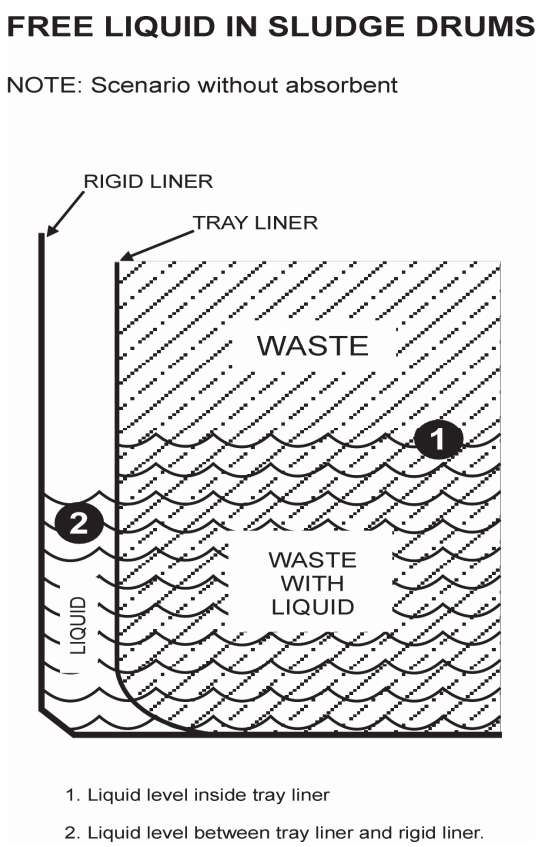

Figure A-1. Free Liquid in Sludge Drums.

Tray liners have been shown to be liquid-permeable. This was confirmed recently by putting about two gallons of water in a tray liner. Initially the fabric was water tight, but water started leaking from the seams in about one minute. Within twenty-four hours the fabric became saturated with water and was leaking.

Flow from the inside to the outside of the tray liner can be described using the Bernoulli equation[1]:

$$\Delta V^2/2g_c + (g/g_c)*(z_2-z_1) + \Delta P/\rho + fl = 0$$

Where:

ΔV = difference in velocity between points 1 and 2 = $V_2 - V_1$

g_c = gravitational constant, 32.2 ft/sec^2

g = acceleration of gravity, 32.2 ft/sec^2

z_1, z_2 = heights above an arbitrary datum, ft

ΔP = pressure difference between points 1 and 2, lbs/ft^2

ρ = density of fluid, lbs/ft^3

fl = friction loss, ft of fluid flowing

The points 1 and 2 in Figure A-1 were chosen to facilitate analysis. At the tops of the two fluid columns the pressure should be the same, essentially atmospheric pressure. So $\Delta P = 0$. Flow will occur if ΔV^2 is greater than zero. Rearranging Bernoulli's equation and solving for ΔV^2 gives:

$$\Delta V^2 = -2*g*(z_2 - z_1) - 2*g_c*fl$$

Now $z_2 < z_1$, so the first term is positive. The difference in height, called head, between points 1 and 2 provides the motive force for fluid flow. The second term on the right hand side of the equation is subtracted from the first term because the resistance to flow imposed by the tray liner reduces the net motive force. This has the effect of slowing the velocity of liquid flowing out of the tray liner. Liquid will flow out of the tray liner as long as $z_2 < z_1$. Loss of head due to friction is proportional to the flow rate. If there is no flow, friction is zero. As flow increases, friction losses become significant and effectively impose an upper limit on flow rate.

Putting absorbent between the tray liner and the rigid liner will promote the flow of liquid out of the tray liner. As liquid collects in the space between the two liner it will be absorbed. Unless the absorbent becomes totally saturated, there will not be a column of free liquid between the tray liner and the rigid liner. So z_2 will be low relative to z_1. This will have the impact of maximizing the motive force defined by $(z_2 - z_1)$ as free liquid collects in pockets inside the tray liner.

It should be emphasized that this technical argument is only valid if liquid collects adjacent to the tray liner. If free liquid becomes trapped in pockets inside the bulk matrix, there is no connection between the fluid and the absorbent. In such situations absorbent located between the tray liner and the rigid liner would be useless. Real time radiography of drums to date has shown that, when free liquid is present, it is always adjacent to the tray liner in the bottom of the drum and/or at the bottom of the drum in the space between the tray liner and the rigid line. No isolated pockets of free liquid have been found inside the sludge matrix.

REFERENCES

(to Appendix A)

1. Bennett, C.O. and J.E. Myers, Momentum, Heat, and Mass Transfer, McGraw-Hill, New York, NY, 1962, page 164.

Appendix B

Material Safety Data Sheet for Oil-Dri® Floor Absorbent

Appendix B

Material Safety Data Sheet for Oil-Dri® Floor Absorbent

Product Name:	**Floor Absorbent**
Manufacturer MSDS:	1003000
Manufacturer Name:	Oil-Dri Corporation of America
Address:	410 North Michigan Avenue Chicago, IL 60611
	Emergency: (800) 424-9300
Business Phone:	(312) 321-1515
Revision Date:	January 3, 2005
	Chemical Name: Fullers Earth
Product Codes:	

NFPA

0

HMIS

HEALTH	1
FIRE	0
REACTIVITY	0
PPE	

SECTION 2: COMPOSITION, INFORMATION ON INGREDIENTS 1003000

Ingredient Name	CAS#	Ingredient Percent
Quartz (crystalline silica)	14808-60-7	10-20% Bulk
OSHA PEL TWA:	10 mg/m3/% SiO2 + 2	
ACGIH TLV TWA:	0.05 mg/m3 0.000085% in the respirable range	
Fullers Earth	8031-18-3	80-90%
OSHA PEL TWA:	5 mg/m3 (respirable fraction)	
Other Exposure Guidelines:	TLV: 3 mg/m3 TWA (respirable fraction); 10 mg/m3 TWA (inhalable dust)	

NOTE:

PEL: OSHA Permissible Exposure Limit.
TLV: American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value.
TWA: 8 hour Weighted Average.
STEL: Short Term Exposure Limit.

SECTION 3: HAZARDS IDENTIFICATION 1003000

Emergency Overview:	This product is a non-combustible, chemically inert mineral. This mineral sample contains a small amount of naturally occurring crystalline silica as quartz. Prolonged overexposure to respirable crystalline silica may cause lung disease (silicosis). IARC, in Monograph 68, has concluded that crystalline silica inhaled in the form of quartzfrom occupational sources is carcinogenic to humans (Group 1); however, carcinogenicity was not detected in all industrial circumstances studied. Because applications and exposure data indicate that exposure to respirable quartz in this product with normal use is well below the OSHA Permissible Exposure Limit (PEL) and ACGIH ThresholdLimit Value (TLV); and because the company is not aware of any scientific or medical data available indicating that exposure to dust from this product under conditions of normal use will cause silicosis or cancer; adverse affects would not be expected from normal use of this product.

Applies to All Ingredients:

Potential Health Effects:	
Eye Contact:	Contact may cause mechanical irritation and possible injury.
Skin Contact:	No adverse effects expected.
Inhalation:	Inhalation of excessive concentrations of dust may cause irritation of mucous membranes and upper respiratory tract.
Ingestion:	No adverse effects expected with unused material.
Chronic Health Effects:	Inhalation of excessive concentrations of any dust, including this material, may lead to lung injury. This product contains crystalline silica. Excessive inhalation of respirable crystalline silica may cause silicosis, a progressive, disabling and fatal disease of the lung. Symptoms may include cough, shortness of breath, wheezing and reduced pulmonary function.
Carcinogenicity:	The international Agency for Research on Cancer (IARC), in Monograph 68 has concluded that crystalline silica inhaled in the form of quartz or cristobalite, from occupational sources is carcinogenic to humans (Group 1). However, in making the overall evaluation, the Working Group noted that carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs. The National Toxicology Program (NTP) classifies crystalline silica as reasonably anticipated to be a carcinogen. Because applications and exposure data indicate that exposure to respirable quartz in this product, with normal use, is well below the OSHA Permissible Exposure Limit (PEL) and ACGIH Threshold Limit Value (TLV); and because the company is not aware of any scientific or medical data available indicating that exposure to dust from this product under conditions of normal use will cause silicosis or cancer; adverse effects would not be expected from normal use of this product.
Sensitizer Information:	No adverse effects expected.
Aggravation of Pre-Existing Conditions:	None currently known.

SECTION 4: FIRST AID MEASURES 1003000

Eye Contact:	Immediately flush eyes with cool running water, lifting upper and lower lids. If irritation persists or foreign body in the eye, get immediate medical attention.
Skin Contact:	None needed for normal use.
Inhalation:	Remove to fresh air.
Ingestion:	If used material is ingested, get medical attention due to possibility of chemical contamination. If large amount of unused material is swallowed, get immediate medical attention.

SECTION 5: FIRE FIGHTING MEASURES 1003000

Fire:	FLAMMABLE LIMITS: Not applicable
Flash Point:	This product is not combustible.
Extinguishing Media:	Use media that is appropriate for surrounding fire.
Hazardous Combustion Byproducts:	None
Fire Fighting Instructions:	None required.
Unusual Fire Hazards:	This product does not normally present a fire or explosion hazard, however, at concentration exceeding 0.1 oz/ft3 dusts can be ignited by sparks or other ignition sources. Minimize hazard by avoiding the generation of airborne dusts, electrically grounding equipment to prevent static sparks and by eliminating ignition sources in the work area. Combustion products may be hazardous.

SECTION 6: ACCIDENTAL RELEASE MEASURES 1003000

Spill Cleanup Measures:	Sweep up and collect for re-use or disposal

SECTION 7: HANDLING and STORAGE 1003000

Handling:	Avoid breathing dust. If clothing becomes dusty, launder before re-use.
Storage:	Store in a dry area.

SECTION 8: EXPOSURE CONTROLS, PERSONAL PROTECTION 1003000

Engineering Controls:	For operations where the exposure limit may be exceeded, local exhaust ventilation is recommended.
Skin Protection Description:	None required for normal use.
Eye/Face Protection:	Safety glasses or goggles recommended.
Respiratory Protection:	For operations where the exposure limit may be exceeded, a NIOSH/MSHA approvedhigh efficiency particulate respirator is recommended.
Other Protective:	None required for normal use.
Exposure Limits:	Refer to Section 2.

SECTION 9: PHYSICAL and CHEMICAL PROPERTIES 1003000

Physical State/Appearance:	Granules
Color:	Gray to tan
Odor:	No odor
Physical State:	Solid
pH:	Not applicable
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Boiling Point:	Not applicable

Melting Point:	Not applicable
Solubility:	IN WATER: Insoluble
Specific Gravity:	2.2
Coefficient of Water/Oil Distribution:	Not available.

SECTION 10: STABILITY and REACTIVITY 1003000

Chemical Stability:	Stable
Incompatibilities with Other Materials:	Contact of dry clay with turpentine, vegetable oil or other unsaturated organic compounds, or with hydrofluoric acid may generate heat and/or fire. Do not use with these compounds.
Hazardous Polymerization:	Will not occur.
Hazardous Decomposition Products:	None

SECTION 11: TOXICOLOGICAL INFORMATION 1003000

Toxicological Paragraph:	No data available.

SECTION 12: ECOLOGICAL INFORMATION 1003000

Ecological Paragraph:	No data available.

SECTION 13: DISPOSAL CONSIDERATIONS 1003000

Waste Disposal:	Dispose in accordance with local, state and federal environmental regulations. Unused material is suitable fordisposal in sanitary landfill. Used material may be subject to regulation, depending on the nature of the materialabsorbed. Check with appropriate regulatory authority for used material containing hazardous waste.

SECTION 14: TRANSPORT INFORMATION 1003000

DOT Shipping Name:	Not regulated
DOT UN Number:	Not applicable
DOT Hazard Class:	Not applicable
DOT Packing Group:	Not applicable
DOT Subpart E Labeling Requirement:	None

SECTION 15: REGULATORY INFORMATION 1003000

Applies to all ingredients:

TSCA 8(b): Inventory Status:	All of the components of this product are listed on the EPA TSCA Inventory or exempt from notification requirements.
Section 304:	None
Section 312 Hazard Category:	
Chronic:	Yes
Section 313 Toxic Release Form:	None
State:	CA PROPOSITION 65: This product contains respirable crystalline silica which is known to the State of California to cause cancer.
Canada WHMIS:	DSL: All of the components of this product are listed on the Canadian Domestic Substance List or exempt from notification requirements.
European Community Chemical Inventory Status:	All of the components of this product are listed on the EINECS Inventory or exempt from notification requirements
Japan MITI:	All of the components of this product are existing chemical substances as defined in the Chemical Substances Control Law.
Australia Chemical Inventory Status:	All of the components of this product are listed on the AICS Inventory or exempt from notification requirements.
Risk Phrases:	EEC: Not Classified as Dangerous under EEC Labeling Regulations
Safety Phrase:	EEC: Not Classified as Dangerous under EEC Labeling Regulations

SECTION 16: ADDITIONAL INFORMATION 1003000

HMIS:	
Health Hazard:	1*
Fire Hazard:	0
Reactivity:	0
NFPA:	
Health:	1
Fire Hazard:	0
Reactivity:	0
MSDS Revision Date:	January 3, 2005

Disclaimer:

The information in this data sheet is believed to be accurate. However, each purchaser should make its own test to determine the suitability of the product for its purposes. OIL-DRI CORPORATION OF AMERICA MAKES NO WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCT and assumes no responsibility for any risk or liability arising from the use of the information or the product. Statements about the product should not be construed as recommendations to use the product in infringement of any patent.

APPENDIX 4

REPORT 228

Project No.: 23927, 25580

MANAGING FREE LIQUID IN NEWLY GENERATED WASTE DRUMS

Document ID: RPT-228
Revision ID: 0
Effective Date: 06/14/07

REPORT

Project No.: 23927, 25580

MANAGING FREE LIQUID IN NEWLY GENERATED WASTE DRUMS

Idaho Cleanup Project

CH2M ◆ WG Idaho, LLC is the Idaho Cleanup Project contractor for the U.S. Department of Energy

RPT-228
Revision 0
Project No. 23927, 25580

Managing Free Liquid in Newly Generated Waste Drums

Rodney Kimmitt

June 2007

Idaho Cleanup Project
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14516

ABSTRACT

The presence of free liquid in some drums of targeted sludge from the AR Project was initially discovered in December 2006. Since that time, free liquid has been found in about 40% of the sludge drums. Free liquid must be less than 1% by volume for waste sent to the Waste Isolation Pilot Plant (WIPP). Although the moisture content in the sludge is not known, visual examination ensures that no free liquid exists in the waste when it is placed in drums. The most likely mechanism for release of free liquid is capillary flow by gravity through the unsaturated sludge. This process may be enhanced by the effect of freeze-thaw cycles due to temporary storage in unheated buildings. A comparison was made of several potential absorbents, using a nominal one gal of liquid as a basis. It is recommended that two gal of Oil-Dri® be added to each drum of sludge to absorb free liquid that may form.

CONTENTS

ABSTRACT iii

ACRONYMS vii

1. POTENTIAL FREE LIQUID RELEASE FROM SLUDGE WASTE 1

   1.1 Mechanisms for Liquid Release 1

   1.2 Fluid Flow in Waste 2

   1.3 Comparison of Absorbents 2

   1.4 Discussion and Recommendations 4

2. REFERENCES 4

Appendix A—Free Liquid Flow and Absorption 7

Appendix B—Material Safety Data Sheet for Oil-Dri® Floor Absorbent 13

TABLES

1. Comparison of Absorbents 3

ACRONYMS

AMWTP	Advanced Mixed Waste Treatment Plant
ARP	Accelerated Retrieval Project
DPS	Drum Packaging System
MSE	MSE Technology Applications, Inc. of Butte, Montana
RFP	Rocky Flats Plant
RTR	real-time radiography
SDA	Subsurface Disposal Area

Managing Free Liquid in Newly Generated Waste Drums

1. POTENTIAL FREE LIQUID RELEASE FROM SLUDGE WASTE

About a gallon of free liquid was observed during routine examination of a sample drum at the Advanced Mixed Waste Treatment Plant (AMWTP) in December, 2006. The drum consisted of sludge waste exhumed and repackaged at the Accelerated Retrieval (AR) Project. Since that time about 40% of AR Project sludge waste drums have been found to contain free liquid.

Free liquid has been observed in drums of both inorganic sludge and organic sludge generated at the Rocky Flats Plant (RFP). During the 3,100 m^3 Project, approximately 1,150 drums (6% of the total) had absorbent added to them prior to shipment. Liquid was observed above the sludge.

A study of the organic sludge from RFP indicated that free liquid organic compounds can be separated from the sludge matrix.[1] This observation was made during coring of organic sludge drums for sampling. Additional evidence comes from surrogate testing. The release of free liquid from the calcium silicate matrix is possible because the pore size of the matrix decreases when shear force is applied.

Based on observation of drums of sludge waste from RFP, there is evidence for the formation of free liquids.

1.1 Mechanisms for Liquid Release

Inorganic sludge from RFP consists primarily of metal precipitates (oxides and hydroxides) that were filtered before being packaged and shipped to Idaho. The rotary drum filter used at RFP produced a moist filter cake, at or near saturation. This may explain why free liquid was found on top of inorganic sludge drums during the 3,100 m^3 Project.[2] That waste had not been opened or repackaged since shipment to Idaho, and its moisture content was probably quite high. The exhumed waste that was recently sampled had a somewhat different history. It was buried for decades, not stored in a building. The original drum may have corroded enough to form small holes that would allow free liquid to drain out. Even if holes did not develop while the waste was interred, the original drum was split open during exhumation, and this would have released any free liquid. Even if the waste was not moist to the touch, but had dried somewhat, it would still be expected to retain at least as much moisture as the surrounding soil. This can be as much as 30% by weight. **So the drum with a net weight of 204 lb could contain about 60 lb of water, even if the waste appeared dry when it was packaged.**

There are several possible mechanisms for the formation and movement of free liquid in the drum. The first is evaporation and condensation. The first sludge drum with free liquid was initially packaged in May 2006 and stored in buildings without heat or air conditioning. During the summer months, cycles of evaporation and condensation could have occurred. However, any accumulation of liquid water from this process would be slow. Because of the limited void volume in the drum (probably no more than half of the drum volume), only about 3 grams of condensate could form in a single daily evaporation-condensation cycle. Even if all of the condensate drained to the bottom of the drum and was not subject to further evaporation, this process would require several years to generate a gallon of free liquid. Although evaporation and condensation probably occurred in the drum, that process could be only a minor contributor to the free liquid.

Water can also collect in the pores of the waste and settle by gravity. The inorganic sludge has the general appearance of soil, so a vadose zone flow model can probably be applied to the waste. In this model water flows through small pores. The process can be described by a variation of Darcy's equation[3]:

$$q = K(\theta)\ \mathrm{grad}(H)$$

where

$K(\theta)$ = unsaturated hydraulic conductivity, cm/sec

grad H = gradient of head loss (cm/cm)

q = fluid flux, $cm^3/(sec\text{-}cm^2)$ or cm/sec.

For flow in unsaturated media, the hydraulic conductivity is a function of water content. Hubbell and his co-workers have estimated that vadose zone fluxes at the INL can range from 0.2 to 10,000 cm/yr (roughly 10^{-9} to 10^{-4} cm/sec).[4] For comparison, a flux of 10^{-7} cm/sec over one-fourth of the cross-sectional area of a drum would result in the collection of almost a third of a gallon of liquid in 7 months. Because hydraulic conductivities can vary by many orders of magnitude, it is very difficult to precisely estimate the flow rate of fluid in unsaturated media, particularly without performing experimental work. However, this downward flow of water through the pores of unsaturated sludge has at least the potential to generate the volume of water observed in the drums currently under investigation.

Before being transported to the AMWTP for characterization, drums are stored in the unheated WMF-698 building. While there the drums are subject to freeze-thaw cycles as well as periods of evaporation and condensation. Studies have been conducted on the impact of freezing and thawing on fluid movement in soils. These studies have relevance because the RFP sludge waste materials have properties similar to those of silty soil (inorganic sludge) or clay-like soil (organic sludge). It has been shown that one or two freeze-thaw cycles increase the hydraulic conductivity by one or even two orders of magnitude.[5] It is easy to see from the equation above that such a change in hydraulic conductivity can have a major effect on the rate at which liquid flows through the waste.

1.2 Fluid Flow in Waste

From recent observations using real-time radiography (RTR), more than one third of the sludge drums checked have been found to contain free liquid in the bottoms of the drums, always inside the rigid liners. As long as the liquid can flow by gravity towards a layer of absorbent, the absorbent will be effective in removing free liquid from the drum. Appendix A provides a discussion of the rationale for putting absorbent inside the rigid liners of drums.

1.3 Comparison of Absorbents

It is suggested that inorganic absorbents be used to eliminate the potential for additional gas generation in the waste drums and to alleviate any concerns regarding criticality safety. The commercial product, Oil-Dri® is composed of montmorillonite or attapulgite clay and crushed quartz. These clays are also known as Fuller's Earth. The basic ingredients are very similar to those of the Aquaset and Petroset products frequently used for solidification of radioactive waste. Those two products are also based on montmorillonite clay.

The Oil-Dri® vendor literature indicates that this product is effective for water or organic liquids.[6] The Material Safety Data Sheet (see Appendix B) indicates that heat can be generated if Oil-Dri® is used to absorb unsaturated hydrocarbon liquids. Both tetrachloroethylene and trichloroethylene contain double bonds as do other unsaturated hydrocarbons. Other possible organics in the Subsurface Disposal Area (SDA) are saturated and do not have the potential for heating. Testing of Aquaset and Petroset at MSE Technology Applications in Butte, MT during 2006 showed that these materials did not react at all with these chlorinated solvents.[7] Since Oil-Dri® is composed of the same or a similar type of clay as the Aquaset and Petroset materials tested at MSE, it is highly unlikely that Oil-Dri® will react with the saturated organics. Even if an exothermic reaction were to occur, the contacting of fluid in a waste drum with the absorbent would take place over several days or weeks. This long duration would allow any heat to dissipate.

Oil-Dri® is a relatively inexpensive, multi-purpose product. Its absorptive capacity is not as high as specially engineered absorbents, such as Aquaset and Petroset. The table below shows the expected performance of Oil-Dri® for absorbing free liquid in drums.

As noted above, testing was performed with a mixture of Aquaset and Petroset products on a variety of chemical compounds, including organic chemicals expected to be in the SDA. These products effectively absorbed with the simulated rinse waters or organic liquids tested, but did not otherwise react with them. Unlike the Oil-Dri® product, one material is not suited for both aqueous and organic liquids. As the name implies, Aquaset absorbs aqueous liquids such as rinse water and K-W decontamination solution. Petroset II-G would be used in drums containing oils and chlorinated solvents. The table below shows characteristics and performance of the Aquaset and Petroset products, based on vendor literature.[8] It should be noted that a blend of Aquaset and Petroset II-G could be used as a single-product additive to drums. Table 1 shows the quantities needed for a blended absorbent to deal with either aqueous or organic liquid.

Table 1. Comparison of absorbents.

Comparison of Absorbents Basis: absorption of 1 gal of free liquid				
Parameter	Aquaset (aqueous only)	Petroset II-G (organic only)	Aquaset + Petroset II-G	Oil Dri® (all liquids)
Composition	Montmorillonite clay	Montmorillonite clay	Montmorillonite clay	Montmorillonite/attapulgite clay + quartz
Bulk Density of Absorbent, lb per gal (see Note 2)	9.6	6.4	7.8	4.8
Application Rate, gal of absorbent per gal of free liquid	0.33	0.43	0.76	2.1
Volume of Absorbent Required, gal	0.33	0.43	0.76	2.1
Typical Unit Cost, $/lb	$4.00	$4.00	$4.00	$0.10-$0.20
Cost per Drum	$12.67	$11.01	$23.68	$1.01-$2.02

Notes:
1. Densities and application rates based on vendor literature.
2. Density differences in similar clays due largely to differences in particle size.
3. Unit costs do not include shipping or tax.

Based on RTR observation the volume of liquid is typically about one gallon. Using as a basis one gal of liquid, Table 1 shows the amounts of absorbents needed per drum of waste and the associated cost. Information in the table is based on published vendor literature. Physical testing will be conducted in the future to determine the specific amount of absorbent to be applied when dealing with variable amounts of free liquid.

1.4 Discussion and Recommendations

Clay-based absorbents are expected to be effective in eliminating free liquid formed after waste exhumed from the SDA is repackaged. The engineered absorbents, Aquaset and Petroset, are very efficient. Less than half a gal of either absorbent can absorb one gal of liquid. Even if Aquaset and Petroset were blended together in drums to address both aqueous and organic liquids, the required volume would be less than half that of Oil-Dri®. However, the high unit cost of the materials makes them expensive to use when compared with Oil-Dri®. A disadvantage of Oil-Dri® is that it would increase waste volume by about 4% (2.1 gal in a 55-gal drum), compared to a less than 1.4% increase for the Aquaset and Petroset products (0.4 gal or 0.76 gal in a 55-gal drum).

Because the free liquid is expected to collect between the tray liner and the rigid liner, absorbent can be added to drums at some point before they are attached to the DPS. This can be done in the area where drums are staged before use. Using Aquaset and Petroset would require that care be taken to ensure that drums containing Aquaset were used for inorganic sludge and drums with Petroset were used with organic sludge. If this is not practical, the Aquaset or Petroset may be added from the DPS before the waste is placed in a drum. These operational issues are a disadvantage for Aquaset and Petroset. This disadvantage could be overcome by pre-blending Aquaset and Petroset II-G, then adding the mixture to drums as a single product in the same manner as Oil-Dri®.

It is recommended that Oil-Dri® floor absorbent be used to absorb any free liquids that form in drums of sludge packaged in the SDA. The application rate should be 2 gal per drum, based on an assumed maximum of one gal of free liquid formed. Because Oil-Dri® absorbs both aqueous and organic liquid, it can be added inside the rigid liners of every drum used for targeted waste. The addition can be done at any convenient location before the drums are used.

2. REFERENCES

1. Sondrup, J. Nalla, G. and E. Miller, "Study of the Migration Potential of Hydrocarbons from Series 743 Sludge for the Targeted Waste Removal and Disposition Project", EDF-5598, Revision 0, draft.

2. INEEL/EXT-03-0034, "3,100 m^3 Project Summary Report," Revision 0, August, 2003, Section 3.2.1.

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4. Hubbell. J.M., Nicholl, M.J., Sisson, J.B. and D.L. McElroy, "Application of a Darcian Approach to Estimate Liquid Flux in a Deep Vadose Zone", Vadose Zone Journal, Volume 3, 2004, pages 560 – 569.

5. Kraus. J.F. and C.H. Benson. "Effect of Freeze-Thaw on the Hydraulic Conductivity of Barrier Materials: Laboratory and Field Evaluation", EPA/600/SR-95/118, Environmental Protection Agency, August, 1995.

6. Web Site, http://www.fastenalmanufacturing.com/web/products/detail.ex?sku=635000-131463, visited January 24 2007.

7. MSE Technology Applications, Inc, "Accelerated Site Cleanup Programs Testing and Demonstration Project Final Report–Sorbent Testing For The Solidification of Unidentified Rocky Flats Laboratory Liquids at the Idaho National Laboratory", MSE-106, September, 2006.

8. Web Site, http://www.fluid-tech-inc.com/Rad%20Waste.htm, visited January 10, 2007.

Appendix A

Free Liquid Flow and Absorption

Appendix A

Free Liquid Flow and Absorption

Free liquid has been discovered in the rigid liners of a number of drums of ARP sludge waste. The liquid occupies the space between the tray liner and the rigid liner inside some drums; in other drums the liquid is in this space plus inside the tray liner, in void spaces in the waste. To date, virtually all free liquid has been found in the bottoms of drums, and all pockets of liquid inside the waste matrix have been hydraulically interconnected, with the liquid in the bottom of the drum. The exceptions to this have been very small amounts of liquid, typically less than half a cup, on the tops of drums, in the folds of the transfer bags. In other words, all liquid found inside tray liners has been adjacent to liquid between the tray liners and the rigid liners. No isolated pockets of free liquid have been found inside the waste matrix. This is an important observation. It indicates that all pockets of liquid can be absorbed by putting absorbent inside the rigid liners before placing waste in drums. The following discussion demonstrates why this conclusion is valid.

Figure A-1 represents a hypothetical situation in a sludge drum containing free liquid. Liquid is present on both sides of the tray liner. Actual observation consistently shows that the two fluid levels are the same. However, the figure represents the condition in which some liquid released by the waste has not yet flowed through the tray liner.

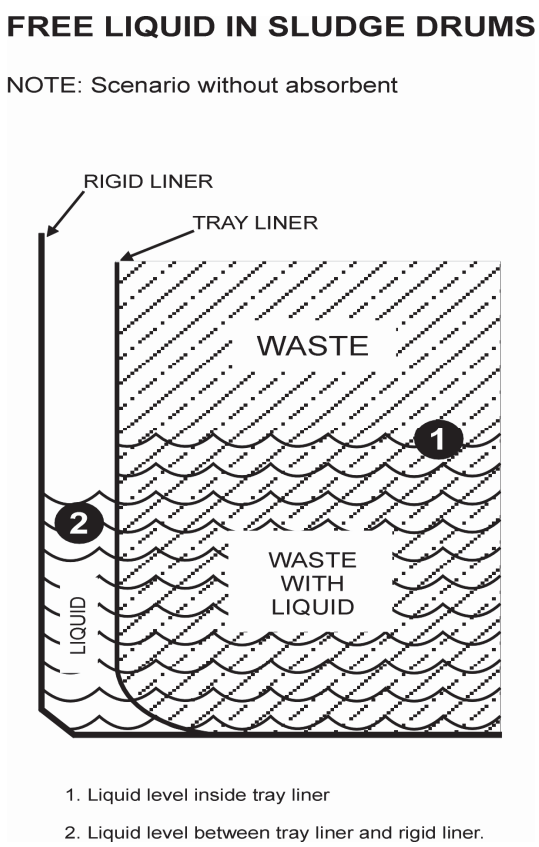

Figure A-1. Free Liquid in Sludge Drums.

Tray liners have been shown to be liquid-permeable. This was confirmed recently by putting about two gallons of water in a tray liner. Initially the fabric was water tight, but water started leaking from the seams in about one minute. Within twenty-four hours the fabric became saturated with water and was leaking.

Flow from the inside to the outside of the tray liner can be described using the Bernoulli equation[1]:

$$\Delta V^2/2g_c + (g/g_c)*(z_2-z_1) + \Delta P/\rho + fl = 0$$

Where:

ΔV = difference in velocity between points 1 and 2 = $V_2 - V_1$

g_c = gravitational constant, 32.2 ft/sec^2

g = acceleration of gravity, 32.2 ft/sec^2

z_1, z_2 = heights above an arbitrary datum, ft

ΔP = pressure difference between points 1 and 2, lbs/ft^2

ρ = density of fluid, lbs/ft^3

fl = friction loss, ft of fluid flowing

The points 1 and 2 in Figure A-1 were chosen to facilitate analysis. At the tops of the two fluid columns the pressure should be the same, essentially atmospheric pressure. So $\Delta P = 0$. Flow will occur if ΔV^2 is greater than zero. Rearranging Bernoulli's equation and solving for ΔV^2 gives:

$$\Delta V^2 = -2*g*(z_2 - z_1) - 2*g_c*fl$$

Now $z_2 < z_1$, so the first term is positive. The difference in height, called head, between points 1 and 2 provides the motive force for fluid flow. The second term on the right hand side of the equation is subtracted from the first term because the resistance to flow imposed by the tray liner reduces the net motive force. This has the effect of slowing the velocity of liquid flowing out of the tray liner. Liquid will flow out of the tray liner as long as $z_2 < z_1$. Loss of head due to friction is proportional to the flow rate. If there is no flow, friction is zero. As flow increases, friction losses become significant and effectively impose an upper limit on flow rate.

Putting absorbent between the tray liner and the rigid liner will promote the flow of liquid out of the tray liner. As liquid collects in the space between the two liner it will be absorbed. Unless the absorbent becomes totally saturated, there will not be a column of free liquid between the tray liner and the rigid liner. So z_2 will be low relative to z_1. This will have the impact of maximizing the motive force defined by $(z_2 - z_1)$ as free liquid collects in pockets inside the tray liner.

It should be emphasized that this technical argument is only valid if liquid collects adjacent to the tray liner. If free liquid becomes trapped in pockets inside the bulk matrix, there is no connection between the fluid and the absorbent. In such situations absorbent located between the tray liner and the rigid liner would be useless. Real time radiography of drums to date has shown that, when free liquid is present, it is always adjacent to the tray liner in the bottom of the drum and/or at the bottom of the drum in the space between the tray liner and the rigid line. No isolated pockets of free liquid have been found inside the sludge matrix.

REFERENCES

(to Appendix A)

1. Bennett, C.O. and J.E. Myers, Momentum, Heat, and Mass Transfer, McGraw-Hill, New York, NY, 1962, page 164.

Appendix B

Material Safety Data Sheet for Oil-Dri® Floor Absorbent

Appendix B

Material Safety Data Sheet for Oil-Dri® Floor Absorbent

Product Name:	**Floor Absorbent**
Manufacturer MSDS:	1003000
Manufacturer Name:	Oil-Dri Corporation of America
Address:	410 North Michigan Avenue Chicago, IL 60611
	Emergency: (800) 424-9300
Business Phone:	(312) 321-1515
Revision Date:	January 3, 2005
	Chemical Name: Fullers Earth
Product Codes:	

NFPA

0

HMIS

HEALTH	1
FIRE	0
REACTIVITY	0
PPE	

SECTION 2: COMPOSITION, INFORMATION ON INGREDIENTS 1003000

Ingredient Name	CAS#	Ingredient Percent
Quartz (crystalline silica)	14808-60-7	10-20% Bulk
OSHA PEL TWA:	10 mg/m3/% SiO2 + 2	
ACGIH TLV TWA:	0.05 mg/m3 0.000085% in the respirable range	
Fullers Earth	8031-18-3	80-90%
OSHA PEL TWA:	5 mg/m3 (respirable fraction)	
Other Exposure Guidelines:	TLV: 3 mg/m3 TWA (respirable fraction); 10 mg/m3 TWA (inhalable dust)	

NOTE:

PEL: OSHA Permissible Exposure Limit.
TLV: American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value.
TWA: 8 hour Weighted Average.
STEL: Short Term Exposure Limit.

SECTION 3: HAZARDS IDENTIFICATION 1003000

Emergency Overview:	This product is a non-combustible, chemically inert mineral. This mineral sample contains a small amount of naturally occurring crystalline silica as quartz. Prolonged overexposure to respirable crystalline silica may cause lung disease (silicosis). IARC, in Monograph 68, has concluded that crystalline silica inhaled in the form of quartzfrom occupational sources is carcinogenic to humans (Group 1); however, carcinogenicity was not detected in all industrial circumstances studied. Because applications and exposure data indicate that exposure to respirable quartz in this product with normal use is well below the OSHA Permissible Exposure Limit (PEL) and ACGIH ThresholdLimit Value (TLV); and because the company is not aware of any scientific or medical data available indicating that exposure to dust from this product under conditions of normal use will cause silicosis or cancer; adverse affects would not be expected from normal use of this product.

Applies to All Ingredients:

Potential Health Effects:	
Eye Contact:	Contact may cause mechanical irritation and possible injury.
Skin Contact:	No adverse effects expected.
Inhalation:	Inhalation of excessive concentrations of dust may cause irritation of mucous membranes and upper respiratory tract.
Ingestion:	No adverse effects expected with unused material.
Chronic Health Effects:	Inhalation of excessive concentrations of any dust, including this material, may lead to lung injury. This product contains crystalline silica. Excessive inhalation of respirable crystalline silica may cause silicosis, a progressive, disabling and fatal disease of the lung. Symptoms may include cough, shortness of breath, wheezing and reduced pulmonary function.
Carcinogenicity:	The international Agency for Research on Cancer (IARC), in Monograph 68 has concluded that crystalline silica inhaled in the form of quartz or cristobalite, from occupational sources is carcinogenic to humans (Group 1). However, in making the overall evaluation, the Working Group noted that carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs. The National Toxicology Program (NTP) classifies crystalline silica as reasonably anticipated to be a carcinogen. Because applications and exposure data indicate that exposure to respirable quartz in this product, with normal use, is well below the OSHA Permissible Exposure Limit (PEL) and ACGIH Threshold Limit Value (TLV); and because the company is not aware of any scientific or medical data available indicating that exposure to dust from this product under conditions of normal use will cause silicosis or cancer; adverse effects would not be expected from normal use of this product.
Sensitizer Information:	No adverse effects expected.
Aggravation of Pre-Existing Conditions:	None currently known.

SECTION 4: FIRST AID MEASURES 1003000

Eye Contact:	Immediately flush eyes with cool running water, lifting upper and lower lids. If irritation persists or foreign body in the eye, get immediate medical attention.
Skin Contact:	None needed for normal use.
Inhalation:	Remove to fresh air.
Ingestion:	If used material is ingested, get medical attention due to possibility of chemical contamination. If large amount of unused material is swallowed, get immediate medical attention.

SECTION 5: FIRE FIGHTING MEASURES 1003000

Fire:	FLAMMABLE LIMITS: Not applicable
Flash Point:	This product is not combustible.
Extinguishing Media:	Use media that is appropriate for surrounding fire.
Hazardous Combustion Byproducts:	None
Fire Fighting Instructions:	None required.
Unusual Fire Hazards:	This product does not normally present a fire or explosion hazard, however, at concentration exceeding 0.1 oz/ft3 dusts can be ignited by sparks or other ignition sources. Minimize hazard by avoiding the generation of airborne dusts, electrically grounding equipment to prevent static sparks and by eliminating ignition sources in the work area. Combustion products may be hazardous.

SECTION 6: ACCIDENTAL RELEASE MEASURES 1003000

Spill Cleanup Measures:	Sweep up and collect for re-use or disposal

SECTION 7: HANDLING and STORAGE 1003000

Handling:	Avoid breathing dust. If clothing becomes dusty, launder before re-use.
Storage:	Store in a dry area.

SECTION 8: EXPOSURE CONTROLS, PERSONAL PROTECTION 1003000

Engineering Controls:	For operations where the exposure limit may be exceeded, local exhaust ventilation is recommended.
Skin Protection Description:	None required for normal use.
Eye/Face Protection:	Safety glasses or goggles recommended.
Respiratory Protection:	For operations where the exposure limit may be exceeded, a NIOSH/MSHA approvedhigh efficiency particulate respirator is recommended.
Other Protective:	None required for normal use.
Exposure Limits:	Refer to Section 2.

SECTION 9: PHYSICAL and CHEMICAL PROPERTIES 1003000

Physical State/Appearance:	Granules
Color:	Gray to tan
Odor:	No odor
Physical State:	Solid
pH:	Not applicable
Vapor Pressure:	Not applicable
Vapor Density:	Not applicable
Boiling Point:	Not applicable

Melting Point:	Not applicable
Solubility:	IN WATER: Insoluble
Specific Gravity:	2.2
Coefficient of Water/Oil Distribution:	Not available.

SECTION 10: STABILITY and REACTIVITY 1003000

Chemical Stability:	Stable
Incompatibilities with Other Materials:	Contact of dry clay with turpentine, vegetable oil or other unsaturated organic compounds, or with hydrofluoric acid may generate heat and/or fire. Do not use with these compounds.
Hazardous Polymerization:	Will not occur.
Hazardous Decomposition Products:	None

SECTION 11: TOXICOLOGICAL INFORMATION 1003000

Toxicological Paragraph:	No data available.

SECTION 12: ECOLOGICAL INFORMATION 1003000

Ecological Paragraph:	No data available.

SECTION 13: DISPOSAL CONSIDERATIONS 1003000

Waste Disposal:	Dispose in accordance with local, state and federal environmental regulations. Unused material is suitable fordisposal in sanitary landfill. Used material may be subject to regulation, depending on the nature of the materialabsorbed. Check with appropriate regulatory authority for used material containing hazardous waste.

SECTION 14: TRANSPORT INFORMATION 1003000

DOT Shipping Name:	Not regulated
DOT UN Number:	Not applicable
DOT Hazard Class:	Not applicable
DOT Packing Group:	Not applicable
DOT Subpart E Labeling Requirement:	None

SECTION 15: REGULATORY INFORMATION 1003000

Applies to all ingredients:

TSCA 8(b): Inventory Status:	All of the components of this product are listed on the EPA TSCA Inventory or exempt from notification requirements.
Section 304:	None
Section 312 Hazard Category:	
Chronic:	Yes
Section 313 Toxic Release Form:	None
State:	CA PROPOSITION 65: This product contains respirable crystalline silica which is known to the State of California to cause cancer.
Canada WHMIS:	DSL: All of the components of this product are listed on the Canadian Domestic Substance List or exempt from notification requirements.
European Community Chemical Inventory Status:	All of the components of this product are listed on the EINECS Inventory or exempt from notification requirements
Japan MITI:	All of the components of this product are existing chemical substances as defined in the Chemical Substances Control Law.
Australia Chemical Inventory Status:	All of the components of this product are listed on the AICS Inventory or exempt from notification requirements.
Risk Phrases:	EEC: Not Classified as Dangerous under EEC Labeling Regulations
Safety Phrase:	EEC: Not Classified as Dangerous under EEC Labeling Regulations

SECTION 16: ADDITIONAL INFORMATION 1003000

HMIS:	
Health Hazard:	1*
Fire Hazard:	0
Reactivity:	0
NFPA:	
Health:	1
Fire Hazard:	0
Reactivity:	0
MSDS Revision Date:	January 3, 2005

Disclaimer:

The information in this data sheet is believed to be accurate. However, each purchaser should make its own test to determine the suitability of the product for its purposes. OIL-DRI CORPORATION OF AMERICA MAKES NO WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCT and assumes no responsibility for any risk or liability arising from the use of the information or the product. Statements about the product should not be construed as recommendations to use the product in infringement of any patent.

APPENDIX 5

RPT-TRUW-09, Rev.7

ACCEPTABLE KNOWLEDGE SUMMARY FOR FIRST/SECOND STAGE SLUDGE (BNINW216)

ADVANCED MIXED WASTE TREATMENT PROJECT

Acceptable Knowledge Summary for First/Second Stage Sludge (BNINW216)

Advanced Mixed Waste Treatment Project

(Signature on file. See DCR-9297.)
Enrique Torres
TRU Programs Manager

09/14/2010
Date

CONTENTS

1.0 WASTE STREAM DESCRIPTION 1

1.1 Waste Stream Number 1

1.2 Basic Waste Stream Information 1

1.3 Waste Stream Description 3

1.4 Process Description 4

1.5 Prohibited Items 10

1.6 Resource Conservation and Recovery Act (RCRA) Determination 11

1.7 Radionuclides 17

2.0 SHIPPING CONSIDERATIONS 18

2.1 Waste Packaging 18

2.2 Flammability Considerations 19

2.3 Tradename Index 20

3.0 PROCESS FLOW DIAGRAMS 20

FIGURES

Figure 3-1. Building 774 aqueous waste treatment process. 21

TABLES

Table 1-1. Physical waste form descriptions for first/second stage sludge. 3

Table 1-2. Wastes feeding second stage sludge treatment. 7

Table 1-3. Estimated waste material parameter weights per unit waste for First/Second Stage Sludge (BNINW216). 10

Table 1-4. Nominal compositions of radionuclide mixtures at RFETS (wt %). 18

ACRONYMS

AK	acceptable knowledge
AMWTP	Advanced Mixed Waste Treatment Project
ATWIR	Annual Transuranic Waste Inventory Report
CCP	Central Characterization Project
CFR	Code of Federal Regulations
CH	contact-handled
CH-TRAMPAC	Contact-Handled Transuranic Waste Authorized Methods for Payload Control
CH-TRUCON	Contact-Handled TRU Waste Content Codes
DOE	Department of Energy
DOT	Department of Transportation
EDMS	Electronic Document Management System
EPA	Environmental Protection Agency
FGE	fissile gram equivalents
FR	Federal Register
HWN	hazardous waste number
IDC	item description code
INEEL	Idaho National Engineering and Environmental Laboratory
INL	Idaho National Laboratory
NACE	National Association of Corrosion Engineer
nCi/g	nanocuries per gram
NDA	non-destructive assay
PCB	polychlorinated biphenyl
ppm	part per million
ppmv	part per million volume
PRQL	program required quantitation limit
PVC	poly vinyl chloride
PWTS	Process Waste Transfer System
RCRA	Resource Conservation and Recovery Act
RFETS	Rocky Flats Environmental Technology Site
RFP	Rocky Flats Plant
RMRS	Rocky Mountain Remediation Services
RTR	real-time radiography
SDA	Subsurface Disposal Area
SWB	standard waste box

TIC	tentatively identified compound
TRU	transuranic
TSA-RE	Transuranic Storage Area-Retrieval Enclosure
TSCA	Toxic Substances Control Act
TWBIR	Transuranic Waste Baseline Inventory Report
UCL_{90}	90% upper confidence limit
VE	visual examination
VOCs	volatile organic compounds
WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan (Attachment B of the WIPP Hazardous Waste Permit)
WIPP	Waste Isolation Pilot Plant
WMC	Waste Matrix Code
WMP	Waste Material Parameter
WSPF	Waste Stream Profile Form
WTS	Waste Tracking System

REFERENCES

NOTE: *Advanced Mixed Waste Treatment Project (AMWTP) documents such as procedures, Acceptable Knowledge (AK) Reports, and operating instructions are cited without revision numbers or dates. The most recent revisions of these documents are available through the AMWTP Electronic Document Management System (EDMS). Previous revisions are available on EDMS.*

1. INEL-96/0280, Acceptable Knowledge Document for INEEL Stored Transuranic Waste – Rocky Flats Plant Waste [P368A]

2. RPT-TRUW-56, Acceptable Knowledge Document for INL Stored Transuranic Waste – Rocky Flats Plant Waste [P649A]

3. RPT-TRUW-12, AMWTP Waste Stream Designations [P393A]

4. CKA-002-10, Memo to file, Volume Estimate for BNINW216 First/Second Stage Sludge Waste Stream, July 5, 2010 [C877A]

5. Waste Stream Profile Form INW216.001-First/Second Stage Sludge, WSPF Update for WIPP Operating Record [P217A]

6. DOE/WIPP-01-3194, CH-TRU Waste Content Codes (CH-TRUCON), Rev. 37, June 2010

7. DOE/LLW-217, DOE Waste Treatability Group Guidance

8. DOE/TRU-2006-3344, Transuranic Waste Baseline Inventory Report -2004, U.S. Department of Energy, Carlsbad, New Mexico.

9. RMRS 2003, Backlog Waste Reassessment Baseline Book, Chapter WF55, March 12, 2003 [P052A]

10. RFETS 1990, Building 774 Set Up Log Book, 1973–1990 [U043A]

11. CO 97-05-30-01, Rocky Flats Environmental Technology Site RCRA Permit

12. RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge [P398A]

13. INEEL/EXT-01-00015, Hazardous Waste Code Determination for First/Second Stage Sludge Waste Stream (IDCs 001, 002, 800) [P219A]

14. Radionuclide (Np-237) inconsistent with AK documentation [AKR-03-8]

15. Radionuclides (Cesium-137 and Strontium 90) inconsistent with AK documentation [AKR-03-9]

16. Radionuclide (K40) inconsistent with AK documentation [AKR-03-10]

17. Filtered Bag identified as Method of Bag Closure [AKR-03-18]

18. Filtered Bag identified as Method of Bag Closure [AKR-03-22]

19. Unexpected Packaging Configuration-Unexpected Liner Configuration [AKR-03-25]

20. Radionuclide (Am-243) inconsistent with AK documentation [AKR-03-30]

21. Radionuclide (Cm-245) inconsistent with AK documentation [AKR-03-33]

22. Unexpected packaging configuration – Absence of Drum Bagging [AKR-03-38]

23. Unexpected packaging configuration – drum stub bag [AKR-04-41]

24. Absorbent (Oil-Dri® or Vermiculite) identified outside of Expected Timeframe [AKR-04-46]

25. INEEL 2001, Response to New Mexico Environment Department Concern with IDC 002, Letter to Idaho Department of Environmental Quality, September 27 [C208A]

26. EDF-RWMC-761, Rocky Flats Characterization (1954-1980), July 18, 1994 [U119A]

27. Unexpected packaging configuration – Round bottom liner used instead rigid liner [AKR-04-50]

28. Absorbent (Oil-Dri® or Vermiculite) identified outside of Expected Timeframe [AKR-04-64]

29. Waste/packaging configuration inconsistent with RF-IDC 001 [AKR-04-76]

30. Waste/packaging configuration inconsistent with RF-IDC 001 [AKR-04-77]

31. Rocky Flats – Waste Stream and Residual Identification and Characterization Building 778, Version 3.0, January 1991 [U084A]

32. Material Safety Data Sheets, Aquaset® (sodium montmorillonite) and Aquaset II-G® (sepiolite), Fluid Tech, January 1, 2005 and November 11, 2008 [P881S]

33. Material Safety Data Sheet for Oil Dri® Floor Absorbent, Oil-Dri Corporation of America, July 21, 1988 [P426A]

34. Material Safety Data Sheet for Portland Cement, Lone Star Industries Inc., August 10, 1994 [P429A]

35. Material Safety Data Sheet for Ox Out 536, ChemClean Corporation, May 5, 1986 and March 5, 1999 [P129A]

36. Material Safety Data Sheet for PuriFloc (R) A23 Flocculant, Dow Chemical, March 1, 1985 [P065A]

37. RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 7.31, Profile No. RF139.01, TRM Wastewater Treatment Sludge, September 16, 2004 [P432A]

38. Letter to Joseph A. Legare from John A. Ciucci, Revision 2 For Resolution of Cesium-137 (Cs-137) Acceptable Knowledge (AK) Discrepancy Between Rocky Flats Environmental Technology Site (Site) and Idaho National Engineering and Environmental Laboratory (INEEL) [C281A]

39. RMRS-WIPP-98-100, Acceptable Knowledge TRU/TRM Waste Stream Summaries, Section 7.24, RF 107.01, TRM Solidified Inorganic Waste [P431A]

40. Memorandum to file from Tim Venneman, Waste Material Parameter Weight Calculations and Supporting Data to Determine Waste Material Parameter Weight per Unit of Waste, January 19, 2007 [C534A]

41. MP-TRUW-8.13, Collection, Review, and Management of Acceptable Knowledge Documentation

42. WM-F1-82-021, Content Code Assessments for INEL Contact-Handled Stored Transuranic Wastes, October 1982 [P024A]

43. INEL-95/0281, Idaho National Engineering Laboratory Code Assessment of the Rocky Flats Transuranic Waste [P016A]

44. CCP-PO-003, CCP Authorized Methods of Payload Control (CCP-CH-TRUPAC) [P672A]

45. RPT-TRUW-05, Waste Matrix Code Reference Manual [P399A]

46. MP-TRUW-8.2, Quality Assurance Project Plan

47. MP-TRUW-8.1, Certification Plan for INL Transuranic Waste

48. Material Safety Data Sheet, Micro-cel®E, Celite Corporation, January 17, 2007 [P808S]

49. RCM-001-10, Memo to file, Earliest Pack Date for Rocky Flats Waste Retrieved from Pits 11 and 12, July 05, 2010 [C875S]

50. DOE/TRU-09-3425, Annual Transuranic Waste Inventory Report - 2009, U. S. Department of Energy, Carlsbad, New Mexico, Rev. 0 [P838A]

Acceptable Knowledge Summary for First/Second Stage Sludge

1.0 WASTE STREAM DESCRIPTION

1.1 Waste Stream Number

BNINW216

1.2 Basic Waste Stream Information

1.2.1 Waste Stream Name

First/Second Stage Sludge

1.2.2 Point of Generation

Rocky Flats Plant (RFP) - Liquid Waste Treatment Area of Building 774

1.2.3 Waste Stream Volume

22,304 containers (4,639 m^3) – current volume[4]

The estimated percentage of the waste greater than 100 nanocuries per gram (nCi/g) is 92%. The estimated percentage of waste equal to or less than 100 nCi/g is 8%.[12]

1.2.4 Generation Dates

AMWTP stored containers of RFP first/second stage sludge waste were generated from 1968 to 1988. Waste stored at AMWTP with generation dates (i.e., pack date) later than 1988 are the result of repackaging (e.g., waste characterization/treatment activities).[2, 49]

1.2.5 Contact-Handled TRU Waste Content Codes (CH-TRUCON)[5, 6]

ID111/ID211, ID132/ID232

1.2.6 Transuranic Waste Baseline Inventory Report (TWBIR) and Annual Transuranic Waste Inventory Report (ATWIR) Information[8, 50]

ATWIR Waste Stream ID: IN-BNINW216 (formerly identified as TWBIR Waste Stream IDs: IN-W216.875, IN-W216.98, IN-W216.99, IN-W228.101, IN-W228.102, IN- W228.103, and IN-W228.883).

TWBIR waste stream descriptions:

IN-W216.875, IN-W216.98, IN-W216.99: Item description code (IDC) 001 waste consists of immobilized materials generated from first-stage treatment operations in RFP Building 774. Aqueous liquids coming into the process originated from Building 771 recovery operations. The liquids were made basic with sodium hydroxide to precipitate iron, magnesium, etc. that also carried down the relatively small precipitate of plutonium and americium hydrated oxides. The precipitate was filtered to produce a sludge (IDC 001), which was placed in a drum with Portland cement. Beginning in 1979, sludge waste from second-stage treatment was combined with first-stage sludge. The combined sludges were also assigned IDC 001. IDC 001 was discontinued in 1986 when the immobilization process changed, and has since been assigned IDC 800.

IN-W228.101, IN-W228.102, IN-W228.103, and IN-W228.883: IDC 002 waste consists of immobilized materials generated from second-stage treatment operations in RFP Building 774. Aqueous liquids to be treated originated from first-stage treatment and from numerous buildings on plant site. The liquids were treated in the same manner as the liquids from the first stage, and the resulting sludge (IDC 002) were placed into a drum with Portland cement. Prior to 1973, second-stage sludge may contain miscellaneous debris.

IN-W216.875, IN-W216.98, IN-W216.99, IN-W228.101, IN-W228.102, IN-W228.103, and IN-W228.883: The process that produced sludge from RFP Building 774 (IDC 800) was the same process as that which generated IDC 001. The difference between the two IDCs was the immobilization process. For IDC 800, the sludge was co-fed into a drum with a diatomite and Portland cement mixture, which formed a solid monolith after curing. IDC 800 is most accurately described by the combination of TWBIR numbers for IDC 001 and IDC 002, therefore all TWBIR numbers associated with IDC 001 or IDC 002 were applied to IDC 800.

ATWIR waste stream description:

IN-BNINW216 (aqueous sludge wastes from Building 774) was generated from a carrier precipitation and immobilization process (sludge mixed with diatomite and Portland cement). The First/Second Stage Sludge waste stream is comprised of IDCs ID-RF-001, ID-RF-002, and ID-RF-800. The First/Second Stage Sludge waste stream consists of >50% by volume secondary sludge or filter cake from wastewater treatment processes or heavy metal sludges from recovery processes. Two waste matrix codes (WMCs) have been assigned to this waste stream because the immobilization process for this waste stream was changed in 1986. Prior to 1986 the first/second stage sludge was placed into a drum with Portland cement. The excess liquid was immobilized, but a solid monolith was not formed. Subsequent to 1986 the sludge was co-fed into a drum with a diatomite and Portland cement mixture, which formed a solid monolith after curing.[a] (8)

1.2.7 Summary Category Group(3, 7)

S3000 Homogeneous Solids

1.2.8 Waste Matrix Codes(3, 7)

S3121 – Waste Water Treatment Sludge (IDC 001, IDC 002, IDC 741, IDC 742)

a. The description in the ATWIR will be revised in the next annual update to include IDCs ID-RF-741 and ID-RF-742.

WMC S3121 consists of >50% by volume secondary sludge, or filtercake from wastewater treatment processes or heavy metal sludges resulting from recovery processes.

S3150 – Solidified Homogeneous Solids (IDC 800)

WMC S3150 consists of >50% by volume solidified forms. An example is sludge waste that is immobilized with cement and cured into a solidified form.

Two WMCs have been assigned to this waste stream because the immobilization process for this waste stream was changed in 1986. Prior to 1986 the first/second stage sludge was placed into a drum with Portland cement. The excess liquid was immobilized, but a solid monolith was not formed. Subsequent to 1986 the sludge was co-fed into a drum with a diatomite and Portland cement mixture, which formed a solid monolith after curing.

1.2.9 Waste Matrix Code Group[7]

S3100 – Inorganic Homogeneous Solids

1.3 Waste Stream Description

1.3.1 Description

The First/Second Stage Sludge waste stream consists of drums containing First Stage Sludge (IDCs 001 and 741), Second Stage Sludge (IDCs 002 and 742), or Solidified Sludge – Bldg 774 (IDC 800).

Table 1-1. Physical waste form descriptions for first/second stage sludge.

IDC	WMC	Description
001 741	S3121	This waste consists of immobilized materials generated from first stage treatment operations in RFP Building 774. Aqueous liquids coming into the process originated from Building 771 recovery operations. The liquids were made basic with sodium hydroxide to precipitate iron, magnesium, etc., that also carried down the relatively small precipitate of plutonium and americium hydrated oxides. The precipitate was filtered to produce sludge, which was placed in a drum with Portland cement (IDCs 001 and 741) and assigned container prefix 741. IDC 001 was assigned to the first stage sludge by RFP. IDC 741 is used to identify first stage sludge drums retrieved from the Subsurface Disposal Area (SDA) Pits 11 and 12. The waste was generated prior to 1972, shipped to Idaho National Laboratory (INL), and buried in the SDA Pits 11 and 12. The waste was subsequently retrieved from the pits and placed into the Transuranic Storage Area-Retrieval Enclosure (TSA-RE) prior to 1979. Because RFP did not assign IDCs to waste until mid-1971, AMWTP assigned IDC 741 to these waste containers.[1, 2, 4] Beginning in 1979, sludge waste from second stage treatment was combined with first stage sludge and assigned container prefix 7412. The combined sludges were also assigned IDC 001. IDC 001 was discontinued in 1986 when the immobilization process changed and has since been assigned IDC 800.[43]

IDC	WMC	Description
002 742	S3121	This waste consists of immobilized materials generated from second stage treatment operations in RFP Building 774. Aqueous liquids to be treated originated from first stage processing and from numerous buildings on plant site. The liquids were treated in the same manner as the liquids from the first stage, and the resulting sludge were placed in a drum with Portland cement (IDCs 002 and 742) and assigned container prefix 742. IDC 002 was assigned to the second stage sludge by RFP. IDC 742 is used to identify second stage sludge drums retrieved from the SDA Pits 11 and 12. The waste was generated prior to 1972, shipped to INL, and buried in the SDA Pits 11 and 12. The waste was subsequently retrieved from the pits and placed into the TSA-RE prior to 1979. Because RFP did not assign IDCs to waste until mid-1971, AMWTP assigned IDC 742 to these waste containers.[1, 2, 4] Prior to 1973, second stage sludge may contain miscellaneous debris, as identified by visual examination (VE) and Real-Time Radiography (RTR) inspections of second stage waste containers. The following types of debris have been identified: cellulosic debris, plastic debris, leaded rubber gloves, rubber debris,[18] rubber gloves, and metal debris. AK indicates that up until 1973, other items (e.g., electric motors, bottles containing residual liquid chemical wastes and mercury, and mercury batteries and lithium batteries) may be present in second stage sludge (IDCs 002 and 742) containers. These items have not been confirmed through characterization activities.
800	S3150	The process that produced sludge from RFP Building 774 (IDC 800) was the same process as that which generated combined first and second stage sludge (container prefix 7412). The difference between the two IDCs was the immobilization process. For IDC 800, the sludge was co-fed into a drum with a diatomite and Portland cement mixture, which formed a solid monolith after curing.[43]

In accordance with Attachment B of the Waste Analysis Plan (WAP), a waste stream is defined as waste material generated from a single process or from an activity that is similar in material, physical form, and hazardous constituents. The aqueous sludge wastes from Building 774 were generated from a carrier precipitation and immobilization process and are similar in material and physical form (sludge mixed with diatomite and Portland cement). The feed streams to the process did not change appreciably over time, and therefore the cemented sludge wastes are similar in hazardous constituents.

1.4 Process Description

1.4.1 Areas of Operation

When Building 774 was built in 1952, its primary purpose was to treat radioactive aqueous waste from Building 771. Later, aqueous wastes from numerous buildings on plant site were treated in Building 774. Production and production support processes in Buildings 371, 444, 447, 559, 707, 771, 776, 777, 779, 865, and 883 generated liquid wastes which were treated in Building 774. Building 774 was a combination batch continuous processing operation with a two-stage carrier precipitation process. Aqueous liquid wastes were treated using neutralization, precipitation, flocculation, and clarification processes. The settled solids were then filtered and immobilized.

1.4.2 Waste Generating Process

Most of the aqueous wastes from Building 771 entered the Building 774 liquid waste processing facility by vacuum transfer through the process waste system. Acid wastes containing large quantities of metal ions that were insoluble in basic solutions, or chloride ions that were corrosive to the process equipment, were neutralized with sodium hydroxide (between 2.5 and 12). The purpose of this process was to remove the metal hydroxide solids prior to the succeeding flocculation and clarification processes. The precipitated solids were sent through vacuum filtration.

Acid waste containing only small quantities of metal ions that were insoluble in basic solutions and caustic wastes containing large quantities of un-dissolved solids were mixed with ferric sulfate and calcium chloride reagents and the pH adjusted as necessary with sodium hydroxide. The solids (mainly ferric hydroxide) settled to the bottom of the tank, and the liquid was decanted into the feed tank for the succeeding precipitation and clarification process. The solids were sent through vacuum filtration.

Liquid waste solutions that were relatively free of solids were mixed with the decanted solution from the previously described batch precipitation processes and the filtrate from the rotary drum vacuum filter. These combined wastes were drained into a flash mixer tank where the decontaminating chemical reagents were introduced. The mixture from the flash mixing vessel flowed into the flocculator where anionic polyelectrolyte flocculent (PuriFloc A2336,37) was added. The mixture then flowed into the clarifier where the floc was allowed to settle out (see Section 2.3 for list of constituents associated with PuriFloc). The clarifier supernatant liquid was pumped to the second stage treatment process. The precipitate at the bottom of the tank flowed into the slurry tank awaiting vacuum filtration.

Slurry from the first stage treatment was drawn through diatomite filter media by a vacuum inside a rotating filter drum. The filter media and trapped solids were continually scraped off the drum filter and fed into a 55-gallon drum. Portland cement was added to the bottom of the drum prior to placing sludge into the drum. Portland cement may also have been added on top of the sludge (see Section 2.3 for list of constituents associated with Portland cement).

The slurry from second stage was kept separate from the first stage slurry up until 1979 (IDC 002). Even during this time frame, there was commingling of liquids between the two stages. The effluent from the first stage process required further treatment by second stage process, and the filtrate from the rotary drum vacuum filter was fed back to first stage treatment. Beginning in 1979, slurry from the first and second stage treatment was combined prior to filtration. The combined sludge was assigned IDC 001.

Treated effluent from the first stage processes, filtrate from the second stage vacuum filter, liquid from the waste treatment process drains, and other wastes from numerous other buildings were received into second stage treatment. In the batch radioactive decontamination process, ferric sulfate and calcium chloride reagents were added, and a flocculating agent was also added near the end of the mixing cycle. The supernatant liquid was decanted into treated waste holding tanks. The floc that settled to the tank bottom was then sent through vacuum filtration.

The continuous radioactive decontamination process accepted low chemical content process wastes, primarily water and detergent from the laundry facility. This process was identical in process chemistry to first stage treatment. The treated liquid was pumped into holding tanks. The settled solids were sent through vacuum filtration.

In a process identical to first stage sludge, slurry from the second stage treatment was drawn through diatomite filter media by a vacuum inside a rotating filter drum. The filter media and trapped solids were continually scraped off the drum filter and fed into a 55 gallon drum. Portland cement was added to the bottom of the drum prior to placing sludge into the drum. During processing of second stage sludge, several layers of cement may have been added between layers of sludge. Portland cement may have also been added to the top of the sludge.

Beginning in 1979, slurry from first and second stage treatment was combined prior to filtration, and the sludge was assigned IDC 001.

In 1986, the process for immobilizing first and second stage sludges was changed. Sludge waste generated under the new immobilization process was assigned IDC 800. Processing of first and second stage sludges through treatment, precipitation, and filtration did not change. However, as the sludge was scraped off the drum filter, it was co-fed into a drum with a diatomite and Portland cement mixture, which formed a solid monolith after curing. Assignment of IDC 001 was discontinued at this time.

1.4.3 Process Flow Diagram

See Figure 3-1.

1.4.4 Material Inputs

1.4.4.1 Material Inputs – RF IDCs 001 and 741

The most common wastes that entered first stage treatment were:

- Plutonium ion column effluent
- Americium ion column effluent
- Thiocyanate waste solution
- Caustic scrubber solution
- Part V waste solutions (nitric, sulfuric, and hydrofluoric acids)
- Nitric acid distillate from feed evaporator
- Water distillate from peroxide precipitation filtrate evaporator
- Steam condensate.

The following compounds were used during recovery operations in Building 771 and may be present in IDC 001.

- Nitric acid
- Aluminum nitrate
- Magnesium
- Sodium peroxide

- Calcium fluoride
- Potassium hydroxide
- Ferrous sulfamate
- Sulfuric acid
- Hydrogen peroxide
- Calcium
- Magnesium oxide
- Potassium iodate
- Hydrogen fluoride
- Sodium nitrate
- Hydrochloric acid
- Hydrofluoric acid
- Sodium hypochlorite
- Potassium fluoride

Aqueous wastes containing complexing agents were handled separately and were not mixed with these aqueous waste streams.

1.4.4.2 Material Inputs – RF IDCs 002 and 742

Second stage treatment handled liquids that were treated by first stage treatment, decanted liquids from Tank 40 (slurry holding tank), and low-level or nonradioactive aqueous process wastes from numerous buildings on plant site. Most of the wastes transferred to second stage treatment by the process waste system were only accepted until August 1984 when the precipitation process in Building 374 went on line. After that time, the wastes from Buildings 771 and 774 given below continued to be transferred to Building 774 second stage treatment through the process waste system. Wastes from the remaining buildings also continued to be sent to Building 774 by tanker after August 1984.

Table 1-2. Wastes feeding second stage sludge treatment.

Source Building	Materials
111	Process liquid waste
122	Medical decontamination wash down
123	Acidic solutions, process waste water, and standards and sample waste
331	Filter sludge and antifreeze solution
334	Ammonium persulfate, copper sulfate, etchants, and cleaners
371	Ammonia hydroxide, potassium hydroxide, and process waste water
443	Lithium chloride solution and water treatment additives
444	Process waste water (acidic), waste plating acid
447	Process waste water
460	Process waste water
551	35% hydrogen peroxide, high in tin content
553	Sulfuric acid, baking soda, calcium chloride
559	Standards, caustic scrubber solution, acid wastes, and process waste water
690	Acid solutions

Table 1-2. (continued).

Source Building	Materials
705	Ox Out 536 (water, ammonium bifluoride, and nitric acid)[a, (35)]
707	Calcium fluoride solution and acid solutions
750	Hydrochloric acid and trisodium phosphate
771	Process waste water (residual chemicals, blow down water, decon
774	Floor wash down and silver recovery effluent
776	Ammonia hydroxide, ethanol, hexane, acid solutions, and process waste water
778	Laundry waste water, suma cleaner (acid bath/nitric acid),[(31)] and rinse water/battery acid
779	Acidic and basic solutions and process waste water
865	Acid solutions, scrubber effluent, polishing solution, and process waste water
881	Acid solutions, standards, samples, ammonium chloride, and process waste water
883	Acid solutions, Ox Out 536 (water, ammonium bifluoride, and nitric acid)[(35)], and process waste water[a]
886	Ferric chloride, detergents, and process waste water
889	Equipment decontamination water
991	Acidic and basic solutions and water samples

a. See Section 2.3 for constituents and Ox Out.

1.4.4.3 Material Inputs – RF IDC 800

Inputs for solidified sludge are the same as those for first stage sludge and second stage sludge described above.

1.4.4.4 Miscellaneous Items

Miscellaneous items are those items that have been identified during characterization activities that are not consistent with expectations based on process descriptions. They appear in a small percentage of the waste stream containers and constitute a small percentage of the waste within the container and summary category group and other determinations are not impacted.

Visual examination and RTR inspections of IDC RF 001 containers have identified the following items:

- Cellulosic debris
- Plastic debris
- Leaded rubber gloves and aprons

- Rubber debris,[18] rubber gloves
- Metal Debris
- Filters (metal alloy and cellulosic)
- Inorganic liquid (see Section 1.5).

Visual examination and RTR inspections of IDC RF 002 containers have identified the following items:

- Cellulosic debris
- Plastic debris
- Leaded rubber gloves
- Rubber debris,[18] rubber gloves
- Metal debris
- Inorganic liquid (see Section 1.5).

AK indicates that up until 1973 items such as the following may have been present in second stage sludge (IDC RF 002). These items have not been confirmed through characterization activities.

- Electric motors
- Bottles containing residual liquid chemical wastes and mercury
- Mercury batteries
- Lithium batteries
- Radioactive sources (until 1979).

Visual examination and RTR inspections of IDC RF 800 containers have identified the following items:

- Cellulosic debris
- Plastic debris
- Leaded rubber gloves
- Lead tape
- Rubber debris,[18] rubber gloves
- Metal bolt
- Inorganic liquid (see Section 1.5).

1.4.4.5 Absorbent Addition

Non-hazardous immobilization/solidification agents (e.g., Aquaset®, Aquaset II-G®, or Micro Cel® E) may be added to waste containers by AMWTP to treat prohibited liquids. Aquaset is a sodium montmorillonite clay material, Aquaset II-G® is a sepiolite clay (granular), and Micro-Cel®E is a synthetic calcium silicate.[32, 48]

1.4.5 Waste Material Parameters

To estimate the waste material parameter (WMP) weight percentages for BNINW216, WMP data from 100% of the completed RTR and VE of first/second stage sludge drums were obtained from the AMWTP Waste Tracking System (WTS) database on October 11, 2006. This represents 41% of the estimated number of drums for this waste stream. Drums evaluated were generated from 1972 through 1988 and are representative of the waste stream. WTS is AMWTPs comprehensive, Department of Energy (DOE)-audited waste tracking database in which all waste containers are tracked cradle-to-grave and all related characterization data are stored. A statistical analysis of the RTR and VE data was performed to estimate WMP weights (by percent) for first/second stage sludge, excluding packaging, in accordance with the requirements of MP-TRUW-8.13, Collection, Review and Management of Acceptable Knowledge Documentation and are summarized in Table 1-3.[40, 41]

Table 1-3. Estimated waste material parameter weights per unit waste for First/Second Stage Sludge (BNINW216).

Waste Material Parameters	Weight per Unit Waste by Percent
Iron-based Metals/Alloys	<1
Aluminum-based Metals/Alloys	<1
Inorganic matrix	98
Other Inorganic Materials	1
Cellulosics	<1
Plastics (waste materials)	<1
Rubber	<1

Although individual drums in this waste stream may contain greater than 10% by volume other homogenous solid waste and debris materials, the waste stream as a whole will be greater than 50%, by volume, inorganic solidified homogeneous solids.[40]

1.5 Prohibited Items

The following items are prohibited in waste containers shipped to Waste Isolation Pilot Plant (WIPP) as documented in MP-TRUW-8.1, Certification Plan for INL Transuranic Waste and MP-TRUW-8.2, Quality Assurance Project Plan.[46, 47]

- Liquid waste or prohibited observable liquids.
- Non-radionuclide pyrophoric materials, such as elemental potassium

- Hazardous wastes not occurring as co-contaminants with transuranic (TRU) mixed wastes (non-mixed hazardous wastes)
- Wastes incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes
- Wastes containing explosives or compressed gases
- Wastes with polychlorinated biphenyls (PCBs) not authorized under an Environmental Protection Agency (EPA) PCB waste disposal authorization
- Wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA hazardous waste numbers [HWNs] of D001, D002, or D003)
- Waste that has ever been managed as high-level waste and waste from tanks specified in Table B-8 of MP-TRUW-8.2 unless specifically approved through a Class 3 permit modification[46]
- Any waste container from a waste stream (or waste stream lot) which has not undergone either radiographic or VE of a statistically representative subpopulation of the waste stream in each shipment, as described in Attachment B7 of MP-TRUW-8.2.[46]
- Sealed containers greater than four (4) liters.

Excess liquid is a common prohibited item identified during RTR and VE in this waste stream. Other prohibited items are expected to be very rare.[1, 2] Drums with excess liquid may be treated by adding non-hazardous absorbent (e.g., Aquaset®, Aquaset II-G®, or Micro Cel® E) prior to shipment.[32, 48] Drums with other prohibited items will be treated or rejected as appropriate. Drums with prohibited items will not be part of the waste stream shipped to the WIPP.

1.6 Resource Conservation and Recovery Act (RCRA) Determination

1.6.1 EPA Hazardous Waste Numbers

Toxicity codes: D004, D005, D006, D007, D008, D009, D010, D011, D022

Listed codes: F001, F002, F003, F005, F006, F007, and F009

1.6.2 Hazardous Determination

1.6.2.1 Characteristic Waste

1.6.2.1.1 Ignitability

The waste is a solid and does not meet the definition of *ignitability* (D001) as defined in 40 Code of Federal Regulations (CFR) 261.21. Originally the generator (RF) assigned the F003 code for the non halogenated, non-toxic F003 constituents (acetone, methanol, and xylene). These compounds are listed for their ignitability. The source wastes containing the F003 constituents were not mixed with any other listed (F001, F002, F004, or F005) constituents or wastes at the point of generation in the laboratory.

None of the F003 compounds had a 90% confidence level in either the headspace gas samples or the solid samples greater than the program required quantitation limit (PRQL), but all of the compounds except for methanol were detected in one or more of the headspace gas samples for these drums. Methanol and xylene were both detected in one or more solid samples.[5] The F003 waste streams also were discarded into the Process Waste Transfer System (PWTS) as non-hazardous wastewaters, i.e., diluted with water and flushed at the point of generation. Therefore, it was determined during the 3,100 m^3 Project that the F003 waste was rendered non ignitable prior to subsequent discharge and aggregation within the liquid waste stream destined for sludge generation.[13] Containers identified with liquid in excess of WIPP waste acceptance criteria (WAC) limits may be treated using non-hazardous solidification agents (e.g., Aquaset, Aquaset II-G®, or Micro Cel® E) to render the waste acceptable prior to shipment[32, 48]

The waste materials in this waste stream are not compressed gas and do not contain compressed gas and the waste does not meet the United States Department of Transportation (DOT) definition of an oxidizer as defined in 49 CFR 173 and is not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change. This waste stream does not exhibit the characteristic of ignitability (D001).

1.6.2.1.2 Corrosivity

Under 40 CFR 261,[22] a solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

- It is aqueous with a pH less than or equal to 2, or greater than or equal to 12.5, as determined by a pH meter using Method 9040 in "Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, EPA Publications SW-846.

- It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.240 inch) per year at a test temperature of 55ºC (130ºF) as determined by its test method specified in National Association of Corrosion Engineer (NACE) Standard TM-01-69 as standardized in SW-846.

The waste stream does not meet the characteristic of corrosivity (D002) as defined.[13] The waste is not an aqueous liquid. As has been determined by radiography and VE, none of the drums to be shipped contain 20% by volume aqueous waste. Since 20% by volume is required in order to measure pH, the corrosive characteristic does not apply. The first/second stage sludge waste stream does not meet the definition of liquid in making a determination of corrosivity toward steel because the waste is not a liquid. A knowledge-based determination is allowable when determining whether or not the waste stream is a liquid relative to corrosivity under the Federal Register (FR), 50 FR 18372, dated April 30, 1985. It is stated in the FR, "EPA believes that, for the purposes of the characteristic of ignitability and corrosivity, it will generally be obvious whether or not the waste is a liquid." Residual liquid may be present in some drums, but only drums with liquids below the WIPP WAC ceiling will be shipped to WIPP. Containers identified with liquid in excess of WIPP WAC limits may be treated using non-hazardous solidification agents to render the waste acceptable prior to shipment (e.g., Aquaset®, Aquaset II-G®, or Micro Cel® E).[32, 48] This waste stream does not exhibit the characteristic of corrosivity (D002).

1.6.2.1.3 Reactivity

The waste stream does not meet the characteristic of reactivity (D003) as defined under RCRA 40 CFR 261.23. The waste materials are stable and will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors or fumes when mixed with water. The materials do not contain sulfides and are not capable of detonation or explosive reaction. The waste is not capable of detonation or explosive reaction if subjected to a strong initiating source or if heated under confinement. The waste is not readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure. The materials do not contain explosive material and are not forbidden explosives or Division 1.1, 1.2, or 1.3 (Class A or B) explosives as defined in 49 CFR Part 173.[13]

The waste may contain trace quantities of cyanide derived from electroplating wastes, and containers with residual amounts of liquid chemical wastes added to the process waste stream (as opposed to piped waste water).[10] Only trace amounts of cyanide are expected in the waste stream feed and would not cause the resulting waste to be reactive. Based on the levels of concentration of cyanide in the feed waste, the alkalinity of the sludges (9 to 11 pH) and the presence of metals (e.g., Fe^{+3}, Cu^{+2}, Al^{+3}), cyanide is not available for release because all free cyanide exists as stable metal complexes.

Second stage sludge generated before 1973 may contain lithium batteries. However, the batteries are spent/used and therefore not reactive. The following rationale supports the decision to not assign EPA hazardous waste codes D003 (reactivity) or D001 (ignitability) to this waste stream due to the potential presence of lithium batteries.[25]

- Lithium metal, which is highly reactive with water, was used as an anode in lithium alkaline batteries. As the battery discharges, the lithium metal is converted to lithium oxide, which is not reactive. The materials in this waste group are therefore neither ignitable (D001) nor reactive wastes (D003) due to the potential presence of batteries.

- Considering the cost of lithium batteries in this time frame (pre-1973), there is no reason a user would replace and discard a lithium battery until the voltage dropped. One of the important features of lithium batteries is the constant voltage (i.e., flat discharge curve), which lasts until all of the lithium has been converted into a non-reactive lithium compound. At that time, virtually none of the lithium is present in the reactive metallic state and there is a sharp voltage drop.

- The lithium contained in batteries present in the 1969–1973 generated second stage sludge waste is no longer reactive or ignitable. According to battery manufacturer information, current lithium batteries have shelf lives of approximately 10 to 20 years (early lithium batteries did not have shelf lives of this length). This is the period of time that it takes for a battery to lose its charge (discharge) due to the electrochemical reaction over time. As the result of discharge, the lithium metal is converted to lithium oxide. By design, lithium batteries are constructed with an excess of positive electrode material to assure that there is enough positive material to react with all of the metallic lithium present. Spent (discharged) lithium batteries do not contain lithium metal and are not toxic, not ignitable, nor reactive. Any battery in the pre-1973 drums is currently 32 years old or older. Based on shelf life, any batteries present have completely discharged.

Containers identified with compressed gases or aerosol cans will have the prohibited items treated/removed prior to shipment. Containers with liquid in excess of WIPP WAC limits may be treated with non-hazardous solidification agents to render the waste acceptable prior to shipment (e.g., Aquaset®, Aquaset II-G®, or Micro Cel® E).[32, 48] The materials in the waste stream do not meet the definition of reactivity and will not be assigned the D003 waste code.

1.6.2.1.4 Toxicity

Acceptable knowledge indicates the potential presence of metals, arsenic, barium, cadmium, chromium, lead, mercury (including mercury batteries), selenium, and silver in this waste stream. Results from sampling and analysis of the sludge (See Table 2 of the Characterization Information Summary) confirm that cadmium, chromium, lead, and silver are present in the waste stream in quantities that exceed the toxicity limit and that arsenic, barium, mercury and selenium also are present, but at levels less than the toxicity limit. Based on AK, the waste stream will be assigned all of the EPA codes for the metals including those metals with concentrations that did not exceed regulatory limits. EPA HWNs for these metals are D004 through D011.[13]

Toxicity characteristic organic constituents, tetrachloroethylene, trichloroethylene, carbon tetrachloride, chlorobenzene, chloroform, and benzene were identified in the acceptable knowledge baseline document as potential hazardous constituents present in first/second stage sludge waste. Tetrachloroethylene, trichloroethylene, and carbon tetrachloride were used primarily for cleaning and degreasing. Although chlorobenzene and chloroform were not identified as being used at the RF site in AK source documents, both were detected in characterization samples from the waste as reported in the baseline AK document: chlorobenzene was detected in volatile organic compound (VOC) analysis of a single sample of sludge with a totals concentration significantly less than the regulatory level; and chloroform was detected in headspace gas samples collected at the Idaho National Engineering and Environmental Laboratory (INEEL) with a 90% upper confidence limit (UCL_{90}) greater than the PRQL. Benzene was used as a solvent in laboratory operations.

First and Second Stage Sludge waste was generated from an aqueous waste treatment process and only trace amounts of the solvents listed above are present as shown by the waste stream data. Because these constituents were used as solvents and degreasers and all except chloroform are identified as F-listed, the waste is regulated as listed hazardous waste and not characteristic waste. Therefore, the toxicity characteristic waste codes associated with the F-listed constituents were not assigned to the waste.

Chloroform was the only toxicity characteristic organic compound with a UCL_{90} that exceeded the PRQL in headspace gas sampling done in support of the previous characterization activities for Waste Stream Profile Form (WSPF) INW216.001. Other AK and solid sampling data did not indicate that chloroform was an expected constituent of the waste. The toxicity characteristic HWN D022 for chloroform is assigned to the waste as a conservative measure, although solids data does not exceed the PRQL for chloroform.

Based on AK and sampling data, D004–D011 and D022 have been assigned to this waste stream.

A portion of two Rocky Flats Environmental Technology Site (RFETS) waste streams, RF107.01 and RF139.01, was sent to the INEEL for storage and subsequent characterization and treatment by the AMWTP.[37, 39] The AMWTP waste stream BNINW216 includes the IDCs from both of the waste streams (i.e., RF107.01 and RF139.01) and consequently incorporates the HWNs from the two RFETS waste

streams. The AMWTP has applied EPA HWN D022 (chloroform), as a conservative measure because chloroform was the only toxicity characteristic compound with a UCL_{90} that exceeded the PRQL in headspace gas sampling during characterization of WSPF INW216.001. In addition, even though this waste is not ignitable, F003 has been conservatively applied because F003 listed constituents were detected in headspace gases.

1.6.2.2 Listed Waste

1.6.2.2.1 F Listed Codes

Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, chlorobenzene, and 1,1,2-trichloro-1,2,2-trifluoroethane were commonly used for cleaning, degreasing or paint removal, and the sludges may contain residual amounts of these spent solvents. Headspace gas sampling (Table 1A of the Characterization Information Summary) supports the evaluation with the UCL_{90} for 1,1,1-trichloroethane above the PRQL. Sampling and analysis results for solids did not indicate the presence of any organic compounds above regulatory or program-required limits at the UCL_{90}. Carbon tetrachloride, 1,1,1-trichloroethane, methylene chloride and tetrachloroethylene were all detected (above the minimum detection level) in solid samples taken from one or more of the drums (Table 3A of the Characterization Information Summary). The applicable EPA listed waste codes, F001 and F002, have been assigned to the waste stream based on AK as confirmed by sampling and analysis.[13]

Acetone, benzene, butanol, ethyl benzene, ethyl ether, methanol, toluene, and xylene were used as solvents in laboratory operations. The aqueous waste transferred to Building 774 second stage treatment may have contained small quantities of these spent solvents. Headspace gas samples did not have detections of these compounds with UCL_{90}s in either the headspace gas samples or the solid samples greater than the PRQL. Both methanol and xylene were detected in one or more of the solid samples.[13]

Originally, the generator (RF) assigned the F003 code for the non-halogenated, non-toxic F003 constituents (acetone, methanol, and xylene). These compounds are listed for their ignitability. The source wastes containing the F003 constituents were not mixed with any other listed (F001, F002, F004, or F005) constituents or wastes at the point of generation in the laboratory. The F003 waste streams also were discarded into the PWTS as non-hazardous wastewaters, i.e., diluted with water and flushed at the point of generation. Therefore, it was determined that the F003 waste was rendered non-ignitable prior to subsequent discharge and aggregation within the liquid waste stream destined for sludge generation, and the F003 code was not assigned to the waste. However, the 2,639 drums with analytical results from 3,100 m^3 Project do indicate that some drums have headspace gas results with detections of F003 constituents. Acetone was the most common of the F003 constituents with 2,271 drums with levels above the detection level. However the mean concentration was 4.24 part per million volume (ppmv) and the UCL_{90} was 5.00, which is well below the PRQL of 100. After evaluation of the data and the AK for the waste stream and the containers, it was determined that detections of the F003 constituents in containers do not indicate a different waste population. The data confirms the presence of the F003 listed constituents predicted by AK. The concentrations detected do not render the waste ignitable; however, the F003 HWN will be applied to the waste as a conservative measure and to comply with the WAP requirement that if an F-listed waste constituent is detected, the appropriate HWN shall be applied.[13]

The presence of the F005 solvent benzene was confirmed by detects in headspace gas sampling. Toluene was also routinely detected in historical data for the 3,100 m^3 Project. Assignment of the F005

code is appropriate for this waste stream. EPA code assignments applicable to each analyte are included in Table 1A of the Characterization Information Summary.[13]

Spent stripping, cleaning, and plating solutions from electroplating operations in which cyanides were used were treated in Building 774 up until 1982. The solidified aqueous wastes from this building were derived from the treatment of the hazardous electroplating wastes and are assigned EPA hazardous waste codes F006, F007, and F009.[13] Wastes generated after 1982 continue to carry the F006, F007, and F009 codes because the Building 774 treatment process was a RCRA permitted system that never went through closure.[11]

Based on the above discussion first/second stage sludge will be assigned F001, F002, F003, F005, F006, F007, and F009.

1.6.2.2.2 K Listed Codes

The materials in this waste stream do not meet the definition for K-listed EPA codes. K listed EPA codes only apply to hazardous waste from specific sources. The waste is not and does not contain any hazardous waste from specific sources paragraphs (a) of 40 CFR 261.32.

1.6.2.2.3 P- and U-Listed Codes

The materials in this waste stream do not meet the definition for any P- or U-listed codes. P- and U-listed EPA codes only apply to discarded commercial chemical products, and residues of commercial chemical or off-specification products. The waste is not and does not contain any commercial product, or manufacturing chemical intermediate listed under paragraphs (e) or (f) of 40 CFR 261.33 that when they were discarded were mixed with waste oil or used oil or other material that was applied to the land, or used as a fuel, in lieu of their original intended use as described in detail in 40 CFR 261.33. Sludge waste containers may contain small amounts of mercury in internal containers. However, the related P- and U-listed codes are not applicable based on the rationale presented in the following paragraphs.

Acceptable knowledge and solid sampling and analysis data indicate the potential presence of trace amounts of beryllium (less than 1% by weight) in IDC 001 and IDC 002 containers of first/second stage sludge. This characterization is consistent with RFETS WSPF RF139.01 that also identifies beryllium as less that 1% by weight for IDCs 001 and 002.[37]

Acceptable knowledge and solid sampling data from RFETS WSPF RF107.01 suggest that beryllium may exceed 1% by weight for containers of IDC 800.[39] Therefore, in accordance with the WIPP transportation requirements, shipments of IDC 800 containers from this waste stream will be limited to 100 Fissile Gram Equivalents (FGE) per payload container and 100 FGE per payload package.

Beryllium contamination is an integral part of the sludge and is not in powder form. It is not a commercial chemical product, an off-specification species, a container residue, or a spill residue thereof. Therefore, the P-listed waste code (P015) for beryllium as defined in 40 CFR 261.33 was not assigned to the waste.

Acceptable knowledge indicates the presence of residual amounts of contaminated mercury in pint bottles in Second Stage Sludge containers generated prior to 1973. The mercury is described as “contaminated,” which denotes that it was used and discarded as waste. According to the Backlog Waste

Reassessment Baseline Book, the liquid chemical wastes were compatible wastes, not commercially pure grade chemicals.[9] Therefore, the U-listed code for mercury does not apply.

The U-listed code (U134) for hydrofluoric acid is not applicable to this waste stream. Hydrofluoric acid may have been used during recovery operations in Building 771, but was not disposed of as unused product within the waste stream. As established previously, this waste does not exhibit the characteristic for corrosivity.

The U-listed code (U079) for trans-1,2-dichloroethylene also is not applicable to this waste stream. It is not an expected constituent of this waste and the waste does not meet the definition of a U-listed waste per 40 CFR 261.33. Although trans 1,2 dichloroethylene is currently a WAP target analyte, it was not included as such in the solids sampling analytical results used to characterize this waste. As stated earlier, the solids samples were collected and analyzed under a WAP compliant program, but prior to the time that trans-1,2-dichloroethylene was added to the target analyte list. It was not detected (as a Tentatively Identified Compound [TIC]) in any of the solid samples analyzed under the 3,100 m^3 Project WIPP compliant program and has not been detected as a TIC in any of the RFP wastes headspace gas samples in 25% or more of samples, including first/second stage sludge.

In addition to the pipeline-transferred waste, wastes in containers that were compatible with the first and second stage treatment processes were treated in Building 774. Some of the wastes in containers exhibited hazardous characteristics. However, the EPA codes applicable to these wastes did not include additional codes that were different from those cited for pipeline-transferred wastes. Therefore, no additional listed waste codes apply.

No discarded chemical products, off-specification compounds chemical residues, spill residues, or hazardous waste from specific sources (40 CFR 261.32) were included in this waste stream. Therefore no K, U, or P listings have been applied to the First/Second Stage Sludge waste stream.

1.6.2.3 TSCA Regulated Contaminants

Acceptable knowledge indicates that the first/second stage sludge waste does not contain PCBs as regulated by the Toxic Substances Control Act (TSCA), 15 U.S.C. 2601 et seq.

1.7 Radionuclides

The two most prevalent radioisotopes in waste stream BNINW216 can be any two of the following: ^{239}Pu, ^{240}Pu, ^{235}U, and ^{238}U, depending on the relative mixture of weapons grade plutonium, enriched uranium, and depleted uranium in the waste. [12, 47]

As a minimum, to confirm existing AK data, the ratios of the two most prevalent radionuclides in the isotopic mix are compared.[22] The two most prevalent radionuclides expected in the Building 774 sludge waste drums are ^{239}Pu and ^{240}Pu.

The recommended default mass fraction values of the plutonium isotopes to be used as the AK based values and confirmed during non-destructive assay (NDA) are listed in RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge.[12]

Table 1-4 provides a breakdown of the radionuclides present so that the general isotopic content of the waste is established.

Table 1-4. Nominal compositions of radionuclide mixtures at RFETS (wt %).

Weapons-Grade Plutonium		Enriched Uranium		Depleted Uranium	
^{238}Pu	0.01 – 0.05%	^{231}Th	negligible	^{231}Th	negligible
^{239}Pu	92.8 – 94.4%	^{234}Th	negligible	^{234}Th	negligible
^{240}Pu	4.85 – 6.5%	^{234}U	~0.1%	^{234}U	~0.0006%
^{241}Pu[a]	0.3 – 1.0%	^{235}U	~90 – 93%	^{235}U	~0.2%
^{242}Pu	0.005 – 0.60%	^{236}U	~0.4%	^{238}U	~99.8%
		^{238}U	~5.3%		

a. Includes ^{241}Am daughter product

Mass fraction values for ^{241}Am, ^{233}U, ^{235}U, and ^{238}U previously determined for RFP at the INEEL were based on individual gamma spectrometric measurements. The ^{234}U activities were calculated based on ratios with depleted uranium isotopes. The criteria used for selection and the formulas for determining the ^{234}U mass are presented in RPT-TRUW-07.(12)

Radionuclides such as ^{244}Cm, ^{232}Th, and ^{236}U may be found in RFP wastes.(12) Americium-241, ^{234}U, and ^{237}Np are expected in most of the RFP TRU waste containers due to radioactive decay and ingrowth.(14) Americium-243 and ^{245}Cm, other isotopes resulting from radioactive decay, have also been detected during AMWTP NDA.(15, 20, 21, 38) Potassium-40 may be detected when other radionuclides in a container are significantly lower in concentration. In some cases, ^{40}K has been detected in higher concentrations than ^{239}Pu and contributes to 95% of the radionuclide hazard.(16)

AMWTP will employ payload management practices in accordance with the WAC for waste stream BNINW216. The estimated total waste volume for BNINW216 is 4,431 m^3. The estimated percentage of the waste greater than 100 nCi/g is 92%. The estimated percentage of waste equal to or less than 100 nCi/g is 8%.

2.0 SHIPPING CONSIDERATIONS

2.1 Waste Packaging

Depending on waste packaging requirements at the time, several combinations of bags and liners were used to prepare 55-gallon drums for shipment. From 1970 to 1972, waste drums were lined with one or two polyethylene drum bags.(26) Use of the 90 mil rigid polyethylene liner began in 1972. The rigid liner was placed in each drum and lined with a polyethylene round bottom drum liner, a polyethylene drum bag and poly vinyl chloride (PVC) O-ring bag, or a single round bottom polyethylene liner placed between the rigid liner and O-ring bag.(27) Some drums packaged after 1972 may not have rigid liners.(19)

When a drum was full, the drum liners were twisted and taped closed, the lid was secured with a bolted ring, and a tamper-indicating device was attached to the drum.(42)

Typically sludge was placed directly and treated (i.e., monolith) directly in drum bags within the drum and have no inner packaging. Approximately 20 to 60 pounds of Portland cement were added to IDC 001 and 002 First/Second Stage Sludge and can be found layered throughout the drum and packaging. During maintenance cleanout operations, First Stage Sludge was removed from tanks and equipment and placed into smaller containers (poly bottles, metal cans, or poly bags, etc.). These smaller containers may have been single or double bagged prior to placement into the drum.[29, 30]

The typical bag closure method was "twisted and taped". Drum stub bags may be identified in containers that were visually examined or cored at WMF-634.[23] A "Filtered bag" method was used for bag closure in drums visually examined at Argonne-West as part of the 3,100 m^3 Project.[17] Lead sheeting may be found within IDC 001 and 002 First/Second Stage Sludge waste containers. Lead tape may have been used to wrap the outside of the rigid liner.

After drums were inspected, one to two quarts of absorbent material (Oil-Dri®) was placed on the top of the outer, sealed polyethylene drum bag (see Section 2.3 for list of constituents associated with Oil-Dri®). This procedure changed in February 1982 when vermiculite was used to fill the void space. The quantity of vermiculite varied from 3 to 12 pounds according to the amount of waste contained in each drum.[42] The type, amount, and expected time-frame of absorbent use may vary.[24, 28] Aquaset® or vermiculite in varying amounts was added to drums of waste during the 3,100 m^3 Project recovery operations (see Section 2.3 for list of constituents associated with Aquaset).[32–36]

Any combination of plastic bags that does not exceed five layers of confinement (of which no more than three are inner bags) is acceptable for shipment to WIPP. Containers with excess layers of confinement or packaging configurations not addressed by an approved TRUCON code for this waste stream will be segregated and vented or rejected as appropriate.[45]

Some of the 55-gallon drums may be overpacked into 83- or 85-gallon drums. Either four 55-gallon drums or two 83- or 85-gallon drums, with either the drum lid filters or the drum lids removed, may be direct loaded into a standard waste box (SWB) equipped with approved filters.

2.2 Flammability Considerations

The payload containers in the waste stream must comply with the Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC) requirements. As specified in the CH-TRAMPAC, a determination of compliance with the flammable gas limits will be performed for VOCs, hydrogen, and methane. Headspace gas sampling and analysis is performed when required by the WAP and/or CH-TRAMPAC. At a minimum, the headspace gas analytical results are evaluated to determine the total concentration of flammable VOCs present in the waste. Payload containers, including those with headspace gas results exceeding 500 part per million (ppm) flammable VOCs, are evaluated for compliance with applicable CH TRAMPAC requirements prior to shipment. Payloads containing flammable VOCs are managed in accordance with CCP-PO-003, Central Characterization Project (CCP) Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC).[44]

2.3 Tradename Index

Tradename	Chemical Constituents
Aquaset	Sodium montmorillonite clay[32]
Aquaset II-G®	Granular sepiolite clay (granular)[48]
Micro-Cel®E	Synthetic calcium silicate[48]
Oil-Dri	Crystalline silica and clay minerals, e.g., montmorillinite, bentonite[33]
Ox Out 536	Water, ammonium bifluoride, and nitric acid[35]
Portland Cement	Tricalcium silicate, dicalcium silicate, tricalcium aluminate, calcium alumino ferrite, gypsum, calcium oxide, magnesium oxide, sodium sulfate, potassium sulfate, crystalline quartz silica, trace chromium[35]
PuriFloc A23 Flocculant	Hydrolyzed polyacrylamide, sodium carbonate, sodium sulfite, sodium sulfate, proprietary ingredients, water[36]

3.0 PROCESS FLOW DIAGRAMS

This section contains process flow diagrams available for the First/Second Stage Sludge waste stream.

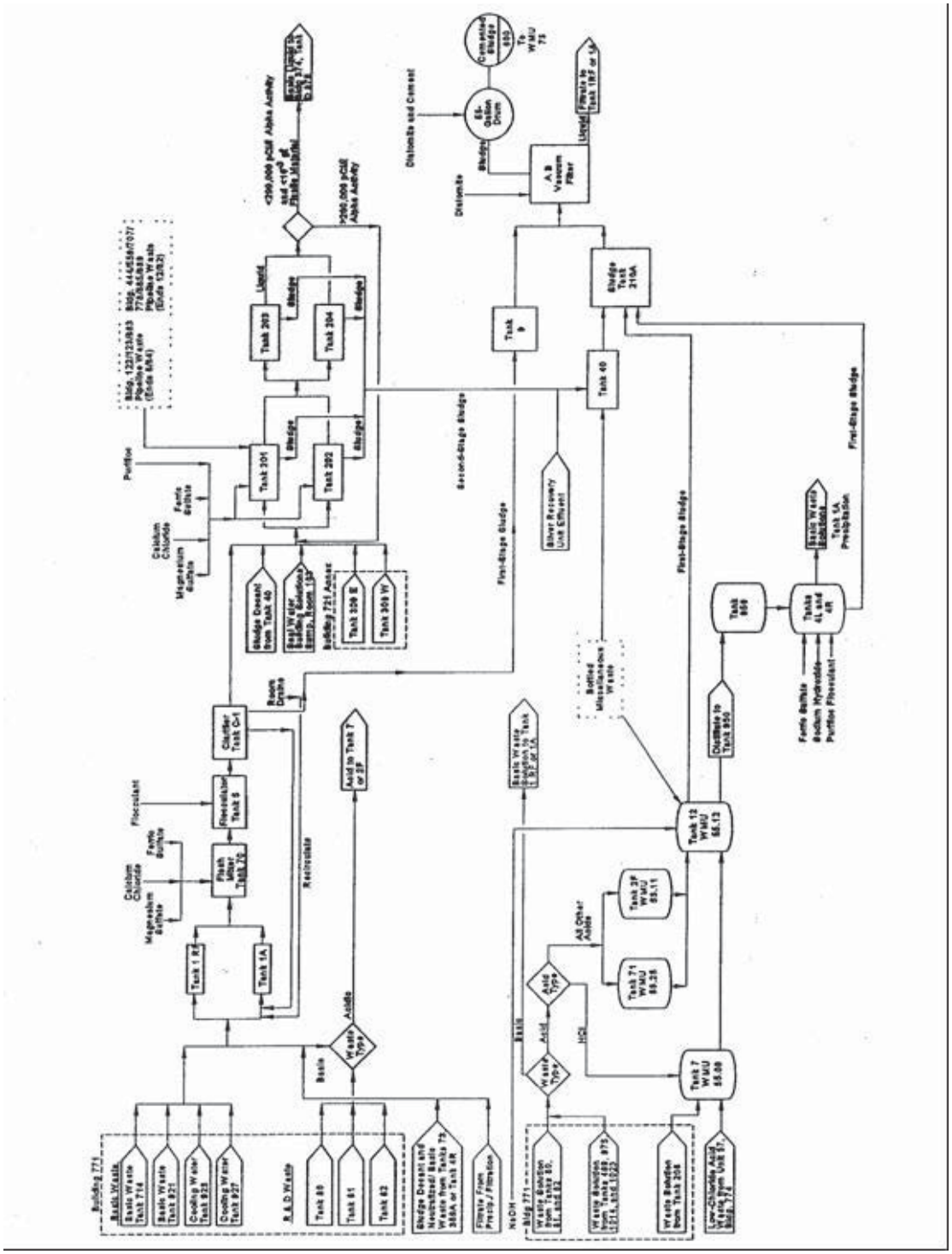

Figure 3-1. Building 774 aqueous waste treatment process.

APPENDIX 6

RPT-TRUW-15, Rev. 10
ACCEPTABLE KNOWLEDGE SUMMARY FOR
BUILDING 374 SLUDGE (BNINW218)
ADVANCED MIXED WASTE TREATMENT PROJECT

RPT-TRUW-15, Rev. 10

Acceptable Knowledge Summary for Building 374 Sludge (BNINW218)

Advanced Mixed Waste Treatment Project

(Signature on file. See DCR-8322.)
Enrique Torres
TRU Programs Manager

07/14/09
Date

Next Periodic Review: 06/30/11

REVISION LOG

Revision Number	Date Approved	Pages Affected	Description of Revision
0	03/22/04	All	DCR-2627. Initial Issue.
1	08/19/04	All	DCR-3048. Updated to add TRUCON code 11D/211D; Oil-Dri® added as potential absorbent.
2	10/07/04	All	DCR-3296. Incorporate changes per CBFO comments.
3	04/15/05	All	DCR-4152. Incorporate changes per CBFO comments.
4	08/03/05	All	DCR-4462. Add references 41-47. Add new Section 1.2.2 to include EPA Hazardous Waste Numbers.
5	04/04/06	All	DCR-4833. Change reference 44; Add (BNINW218) to end of title.
6		Page 16	DCR-5366. Change RF filter debris to Building 374 Sludge.
7	07/28/07	All	DCR-5991. Change document based on Change Notice Approval (Change Notice #2).
8	10/30/07	References	DCR-6312. Update references as a result of the periodic review.
9	06/30/08	All	DCR-6966. Update per change notice #3.
10	07/14/09	References	DCR-8322. Minor Change. Remove references to close MAR 40045 action item 40099.

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS v

REFERENCES vi

1.0 Waste Stream Description 1

1.1 Waste Stream Number 1

1.2 Basic Waste Stream Information 1

1.2.1 Waste Stream Name 1

1.2.2 EPA Hazardous Waste Numbers 1

1.2.3 Point of Generation 1

1.2.4 Waste Stream Volume 1

1.2.5 Generation Dates 1

1.2.6 TRUCON Codes 2

1.2.7 TWBIR Information 2

1.2.8 Summary Category Group 2

1.2.9 Waste Matrix Codes 2

1.2.10 Waste Matrix Code Group 2

1.3 Physical Waste Form 3

1.3.1 Description 3

1.4 Process Description 4

1.4.1 Areas of Operation 4

1.4.2 Waste Generating Processes 4

1.4.3 Material Inputs 7

1.4.4 Waste Material Parameters 9

1.5 Prohibited Items 10

1.6 RCRA Determination....11
1.6.1 EPA Hazardous Waste Numbers....11
1.6.2 Hazardous Determination....11
1.7 Radionuclides....16
2.0 Shipping Considerations....17
2.1 Waste Packaging....17
2.2 Flammability Consideration....18

FIGURES

Figure 3-1. Building 374 radioactive decontamination and evaporation processes. 20
Figure 3-2. Building 374 acid neutralization and sludge immobilization processes. 21

TABLES

Table 1-1. Physical Waste Form Descriptions for Bldg. 374 Sludge. 3
Table 1-2. Wastes Treated in the Sludge Solidification Process. 7
Table 1-3. Estimated Waste Material Parameter Weights per Unit of Waste for Building 374 Sludge (BNINW218). 9
Table 2-1. Tradename Index 19

ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
AMWTP	Advanced Mixed Waste Treatment Project
BBWI	Bechtel BWXT Idaho, LLC
CCP	Central Characterization Project
CPR	combustibles, plastics, rubber
DCP	Direct Cementation Process
DOT	Department of Transportation
EDL	Economic discard limit
EPA	Environmental Protection Agency
HWN	hazardous waste number
IDC	item description code
INEEL	Idaho National Engineering and Environmental Laboratory
N/A	not applicable
NDA	non-destructive assay
pCi/l	Picocuries per liter
PVC	polyvinyl chloride
RFETS	Rocky Flats Environmental Technology Site
RTR	real-time radiography
SWB	standard waste box
TDOP	ten-drum overpack
TRUCON	TRUPACT-II Content Code
TWBIR	Transuranic Waste Baseline Inventory Report
WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan (Attachment B of the WIPP Hazardous Waste Permit)
WIPP	Waste Isolation Pilot Plant
WMC	Waste Matrix Code
WSPF	Waste Stream Profile Form
WTS	Waste Tracking System
WWIS	WIPP Waste Information System

REFERENCES

NOTE: *References are cited per the style guide provided by AMWTP Document Control. AMWTP documents that are often repeatedly revised, such as procedures, AK reports, and operating instructions, they are cited without revision numbers or dates. The most recent revisions of these documents are available through the AMWTP Electronic Data Management System. Previous revisions are available upon request through Document Services.*

1. INEL-96/0280, Acceptable Knowledge Document for INEEL Stored Transuranic Waste – Rocky Flats Plant Waste [P368A]

2. EDF-2657, INEEL Acceptable Knowledge Waste Stream Summary Sheet – Building 374 Sludge [P238A]

3. RPT-TRUW-12, AMWTP Waste Stream Designations

4. RPT-TRUW-06, AMWTP TRU Waste Management Acceptable Knowledge Elements

5. Waste Stream Profile Form (WSPF) INW218.001-Building 374 Sludge, including WSPF Update for WIPP Operating Record, 2003 [P218A]

6. DOE/WIPP-01-3194, CH-TRU Waste Content Codes (CH-TRUCON), February 2008

7. DOE/LLW-217, DOE Waste Treatability Group Guidance, 1995

8. DOE/TRU-2006-3344, Transuranic Waste Baseline Inventory Report -2004, U.S. Department of Energy, Carlsbad, New Mexico

9. RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge

10. Radionuclide (Np-237) inconsistent with AK documentation [AKR-03-8]

11. Radionuclide (K-40) inconsistent with AK documentation [AKR-03-10]

12. INEEL/EXT-01-00517, Characterization of Rocky Flats Plant Building 374 Sludge Waste Stream (IDCs 007, 803, 807) [P220A]

13. Not used

14. Oil-Dri® is an absorbent not identified with IDC 007, Building 374, Dry Sludge [AKR-03-26]

15. Vermiculite not expected in RF-IDC 007 & 803 waste containers [AKR-03-36]

16. Unspecified absorbent material may be present in RF-IDC 007 Containers [AKR-03-37]

17. Unexpected packaging configuration – Absence of Drum Bagging [AKR-03-35]

18. Unexpected packaging configuration – Absence of Drum Bagging [AKR-03-39]

19. Unexpected packaging configuration, Drum Stub Bag [AKR-04-41]

20. NM4890139088-TSDF, Waste Isolation Pilot Plant Hazardous Waste Facility Permit, New Mexico Environment Department, current revision

21. DOE/WIPP 02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, U. S. Department of Energy, Carlsbad Field Office, Rev. 6.1, October 29, 2007

22. Radionuclide (Am-243) inconsistent with AK documentation [AKR-03-30]

23. Radionuclide (Cm-245) inconsistent with AK documentation [AKR-03-33]

24. Filtered bag identified as method of closure [AKR-03-22]

25. Absorbent material (Oil Dri®) not expected in RF-IDC 807 waste Containers [AKR-04-48]

26. Material Safety Data Sheet for TRIM SOL, Master Chemical Corporation, February 27, 1992 [P130A]

27. Material Safety Data Sheet for Oakite Aluminum Cleaner 164; Oakite Products Inc., January 4, 1990 [P425A]

28. Material Safety Data Sheet for Mariko, Huntington Laboratories, Inc., September 11, 1986 [P128A]

29. Material Safety Data Sheet for Oil-Dri®, Oil-Dri® Corporation of America, March 15, 1993 [P426A]

30. Material Safety Data Sheet for Portland Cement, Lone Star Industries Inc., June 5, 1992 [P429A]

31. Not used.

32. Acceptable Knowledge TRU/TRM Waste Stream Summaries, TRM Solidified Inorganic Waste (F001, F002, F005, F006, F007, F009) Section 7.28, Revision 3, August 25, 2004 [P435S]

33. Material Safety Data Sheet for Aquaset, Fluid Tech Inc., August 1, 2001 [P401A]

34. Material Safety Data Sheet for Oakite Super Ruststripper; Oakite Products Inc., October 1, 1999 [P425A]

35. Material Safety Data Sheet for Oakite Dynadet; Oakite Products Inc., March 27, 1992 [P425A]

36. Material Safety Data Sheet for Oakite 360L; Oakite Products Inc., May 18, 1992 [P425A]

37. Material Safety Data Sheet for Ox Out 536; ChemClean Corporation, March 5, 1986 [P129A]

38. Material Safety Data Sheet for Polymer 1192; Betz Laboratories, Inc., August 1985 [P428A]

39. John A. Ciucci to Joseph A. Legare, Revision 2 For Resolution of Cesium-137 (Cs-137) Acceptable Knowledge (AK) Discrepancy Between Rocky Flats Environmental Technology Site (Site) and Idaho National Engineering and Environmental Laboratory (INEEL) [C281A]

40. MP-TRUW-8.2, Quality Assurance Project Plan

41. MP-TRUW-8.1, Certification Plan for INL Transuranic Waste

42. Absorbent Material (Vermiculite) Not Expected in RF-IDC 807 Waste Containers [AKR-04-83]

43. RPT-TRUW-05, AMWTP Waste Matrix Code Reference Manual

44. RPT-TRUW-56, Acceptable Knowledge Document for INL Stored Transuranic Waste – Rocky Flats Plant [P649A]

45. CCP-PO-003, CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC) [P672A]

46. Memorandum from Tim Venneman to file, Waste Material Parameter Weight Calculations and Supporting Data to Determine Waste Material Parameter Weight per Unit of Waste, January 19, 2007 [C534A]

47. MP-TRUW-8.13, Collection, Review, and Management of Acceptable Knowledge Documentation

48. BBWI-Generated Drum Data, including Data from the Transuranic Waste Management Information System (TWMIS) [U127A]

NOTICE TO READER

Source documents (e.g., C037, P052, etc.) referenced in the *Acceptable Knowledge Document for INEEL Stored Transuranic Waste – Rocky Flats Plant Waste*, Revision 3, INEL-96/0280, are included in the AK record for the INEEL 3,100 m^3 Project. The same source documents have been added to the AMWTP AK record under a new reference number.

INEEL reference numbers used in the *Acceptable Knowledge Document for INEEL Stored Transuranic Waste – Rocky Flats Plant Waste*, Revision 3, INEL-96/0280, Section 22.0, Solidified Aqueous Waste – Building 374, are listed in the table below. The AMWTP reference numbers corresponding to the INEEL reference numbers provide a crosswalk for the reader to the applicable AMWTP source document.

INEEL Ref No.	AMWTP Ref No.	INEEL Ref No.	AMWTP Ref No.	INEEL Ref No.	AMWTP Ref No.
C010	C010A	P062	P062A	P240	P240A
C013	C013A	P067	P067A	P280	P280A
C015	C015A	P068	P068A	P303	P303A
C031	C031A	P076	P076A	P321	P321A
C063	C063A	P078	P078A	P322	P322A
C087	C087A	P079	P079A	P323	P358A
C111	C111A	P080	P080A	P324	P359A
C112	C112A	P091	P091A	U029	U029A
C113	C113A	P106	P106A	U030	U030A
C114	C114A	P113	P113A	U043	U043A
C121	C121A	P128	P128A	U045	U045A
C122	C122A	P129	P129A	U049	U049A
C154	C154A	P130	P130A	U050	U050A
C175	C175A	P141	P141A	U051	U051A
C184	C184A	P143	P143A	U053	U053A
C242	C242A	P144	P144A	U059	U059A
C243	C243A	P145	P145A	U060	U060A
P001	P001A	P146	P146A	U092	U092A
P004	P004A	P147	P147A		
P012	P012A	P148	P148A		
P013	P013A	P149	P149A		
P014	P014A	P150	P150A		
P015	P015A	P153	P153A		
P016	P016A	P164	P164A		
P022	P022A	P189	P189A		
P024	P024A	P194	P194A		
P026	P026A	P198	P198A		
P033	P033A	P200	P200A		
P043	P043A	P218	P218A		
P047	P047A	P220	P220A		
P052	P052A	P227	P227A		
P053	P053A	P228	P228A		

Acceptable Knowledge Summary Building 374 Sludge

1.0 Waste Stream Description

1.1 Waste Stream Number

BNINW218

1.2 Basic Waste Stream Information

1.2.1 Waste Stream Name

Building 374 Sludge

1.2.2 EPA Hazardous Waste Numbers

A. Toxicity Characteristic Codes: D006, D007, D008, D009, D010, D011, D032

B. Listed Waste Codes: F001, F002, F005, F006, F007, and F009

1.2.3 Point of Generation

Rocky Flats Plant - Liquid Waste Treatment Area of Building 374

1.2.4 Waste Stream Volume

2,000 Containers (416 m^3) [(4)]

IDC 007: 1,668 containers (347 m^3)

IDC 803: 64 containers (13 m^3)

IDC 807: 268 containers (56 m^3)

1.2.5 Generation Dates

1982 – 1988: Rocky Flats generated the waste up through 1991, but the AMWTP only has inventory through 1988. [(4)]

1988 – Present: Package dates later than 1988 will be associated with some containers. Waste stored at AMWTP with generation dates (i.e., pack date) later than 1988 are the result of repackaging (e.g., waste characterization/treatment activities). There is no additional Building 374 Sludge generation occurring at INEEL. [(4)]

IDC 007: 1982 – 1987 [4]

IDC 803: 1986 – 1987 [4]

IDC 807: 1987 – 1988 [4]

1.2.6 TRUCON Codes

ID111, ID211 [3, 5, 6]

1.2.7 TWBIR Information

IN-W218.909 [3, 8]

IN-W220.114 [3, 8]

1.2.8 Summary Category Group

S3000 Homogenous Solids [3, 7]

1.2.9 Waste Matrix Codes

S3121 – Waste Water Treatment Sludge (IDC 007, IDC 807) [3, 7]

Waste Matrix Code (WMC) S3121 consists of >50% by volume secondary sludge, or filtercake from wastewater treatment processes or heavy metal sludges resulting from recovery processes.

S3150 – Solidified Homogeneous Solids (IDC 803) [3, 7]

WMC S3150 consists of >50% by volume solidified forms. An example is sludge waste that is immobilized with cement and cured into a solidified form.

Two waste matrix codes have been assigned to this waste stream because the cementation immobilization process for this waste stream changed in the 1986 – 1987 timeframe. The immobilization process at other times involved mixing the sludge with Portland cement or a Portland cement and diatomite mixture. The feed streams to the process did not change over time.

1.2.10 Waste Matrix Code Group

S3100 – Solidified Inorganics

1.3 Physical Waste Form

1.3.1 Description

The Building 374 Sludge waste stream consists of drums containing Building 374 Dry Sludge (IDC 007), Solidified Direct Cementation Process (DCP) Sludge (IDC 803), or Building 374 Solidified By-pass Sludge (IDC 807). The aqueous sludge wastes from Building 374 were generated from a carrier precipitation and immobilization process.

Table 1-1. Physical Waste Form Descriptions for Bldg. 374 Sludge.

1995 TWBIR Number(s)	2004 TWBIR Number(s)	IDC	WMC	Description
IN-W218.109 IN-W218.900	IN-W218.909	007	S3121	This waste consists of moist sludge mixed with Portland cement or a diatomite and Portland cement mixture. The moist sludge was produced from 1982 to 1987.
IN-W220.114 IN-W220.925	IN-W220.114	803[a]	S3150	This waste consists of sludge dried in a dryer, and mixed with Portland cement and water, which cured to form a solid monolith. IDC 803 was generated for about one year (1986-1987). ANL-E waste described in IN-W220 is excluded from this waste stream.
IN-W220.114 IN-W220.925	IN-W220.114	807 [a, b]	S3121	This waste consists of sludge that bypassed the dryer and was mixed with diatomite and Portland cement. IDC 807 sludge is the same as the IDC 007 sludge generated using the bypass system. IDC 807 was generated from March 1987 to 1991. ANL-E waste described in IN-W220 is excluded from this waste stream.

a. IDCs 803 and 807 are not specifically identified in the TWBIR; however, the containers of IDCs 803 and 807 wastes were originally shipped from Rocky Flats to INL using 111 for the content code which is included in IN-W220.

b. Prior to March 1987, IDC 807 was assigned to cemented incinerator sludge generated in Building 771, After March 1987, IDC 807 was assigned to the sludge previously identified under IDC 007. Letters a and b are used to distinguish between the IDC 807 sludges in some AK documents, with a denoting Building 374 sludge after 3/87 and b for incinerator sludge generated before 3/87. IDC 807 is assigned only to Building 374 by-pass sludge in the Waste Tracking System (WTS).

1.4 Process Description

1.4.1 Areas of Operation

Building 374 was built in 1980, and was an integral part of the new plutonium (Pu) recovery facility, Building 371. Building 374s primary purpose was to treat radioactive aqueous waste from Building 371, and, on an as needed basis, from Building 774. Only waste that contained plutonium below the economic discard limit (EDL) was processed in Building 374. The treatment process involved three separate stages of precipitation, flocculation, and clarification, followed by evaporation, neutralization (if necessary), and immobilization.

1.4.2 Waste Generating Processes

1.4.2.1 Radioactive Decontamination

Aqueous wastes containing greater than 13,500 picocuries per liter (pCi/l) alpha contamination were treated in the radioactive decontamination process. Wastes were received by pipeline from Buildings 371, 444, 559, 707, 774, 776, 779, 865, 881, 883, and 889. The treatment process involved three separate stages of precipitation, flocculation, and clarification.

The first stage feed tank, D-812, received supernatant from the sludge solidification process and basic waste solutions from Building 371. If needed, the pH of the solutions was adjusted to 10.5 or greater with potassium hydroxide. The basic solutions were pumped to a reactor tank where reagents, including magnesium sulfate, calcium chloride, and ferric sulfate, were added, which attracted and combined with the radioactive isotopes. The reactor contents were mixed with an agitator and flowed continuously by gravity to a flocculator tank. A flocculent (Polymer 1192) was added to aid in agglomeration of the precipitate. [32, 38] The contents were mixed with an agitator and continuously overflowed to a clarifier. A rake at the bottom of the clarifier slowly moved the solids to the center, where they were drawn off the bottom of the tank into the feed tanks, D824 A and B, for the sludge solidification process.

The first-stage clarifier liquids flowed over a weir and were pumped to the second-stage feed tank. The second-stage feed tank also received third-stage clarifier effluent, steam condensate, and decontamination wastewater from Building 371, wastes from Building 444, and from the 500, 700, and 800 areas. The second- and third-stage reactors, flocculators, and clarifiers functioned exactly as the first stage. Figure 3-1 shows the radioactive decontamination process.

1.4.2.2 Evaporation

The evaporation process concentrated soluble materials from low-level desaltable aqueous wastes. Aqueous wastes were received from Buildings 122, 123, 443, 444, 447, 460, 559, 561, and 566. Clarifier effluent from the radioactive decontamination process, solar pond water, and aqueous wastes from buildings in the 700 and 800 areas were also sent to the evaporator. The aqueous wastes were pumped to the evaporator where they were continuously circulated and heated by steam producing concentrated salt brine and steam. The steam was condensed for use by the boiler plant and cooling tower. The salt brine was dried, using a spray drier, and immobilized with cement. Periodically, a nitric and phosphoric acid descaling solution was used to flush the evaporator heat exchangers. This solution was then sent to the sludge immobilization process. The evaporation process is shown in Figure 3-1.

1.4.2.3 Acid Neutralization

Nitric acid wastes from plutonium recovery operations in Building 371 were received in Building 374 by pipeline. Acid wastes were also received as packaged materials in 55-gallon drums from Buildings 123, 444, 460, 559, 774, 865, 881, and 883. The acid wastes were continuously mixed by an agitator in Tank D-808, and by circulation through a heat exchanger. The heat exchanger removed heat generated during the process. As the liquid circulated, a pH analyzer regulated the amount of neutralization solution containing 46% potassium hydroxide that was fed to the tank to maintain a pH of 12.5. Neutralized acid waste was piped to Tanks D-824 A and B for eventual treatment by the sludge solidification process. The acid neutralization process is shown in Figure 3-2.

1.4.2.4 Sludge Solidification

Liquid wastes treated by the acid neutralization, radioactive decontamination, and evaporation processes were transferred to the sludge solidification process.

The slurry from radioactive decontamination, spent descaling solution from the evaporator, and wastes from acid neutralization were fed into the filter feed tanks, D-824 A and B. Supernatant from the filter feed tanks was decanted to the radioactive decontamination process. The slurry from the feed tanks was pumped to the radioactively contaminated solids on the surface of the filter media. The filter drum was coated with a

mixture of diatomite and water or the filtrate. The slurry was fed into the filter pan. The filtrate was drawn through the pre-coat by a vacuum process, leaving the radioactively contaminated solids on the surface of the filter media. An advancing blade continuously removed the sludge and a thin layer of pre-coat. The filtrate from the rotary drum filter was transferred back to the radioactive decontamination process. From here, sludge from the rotary drum filter was immobilized using either the sludge dryer system or the bypass system (Figure 3-2). It is here where final treatment rendered the sludge, either IDC 007, IDC 803, or IDC 807.

(IDC 007): The sludge from the rotary drum filter was immobilized using either the sludge dryer system or the bypass system. In the sludge dryer system, the sludge from the vacuum filters was fed to the dryer feed hopper then conveyed through the dryer in heated flights. The dried sludge was transferred directly into a 55-gallon drum. The resulting waste was assigned IDC 007 and consisted of dispersible fines.

(IDC 803): The process for receiving and treating aqueous feed streams in Building 374 was the same as that for IDC 007. However, the method for solidifying sludge generated from aqueous treatment operations was modified from a bypass system to a dryer system in 1985. The sludge from the vacuum filter was dried in the same manner as the sludge generated prior to October 1982. However, the dried sludge was cemented in the direct cementation process (DCP). The dried sludge overflowed directly into the DCP sludge hopper, and cement and water were mixed in using a paddle mixer. The sludge, cement, and water mixture was deposited into a 55-gallon drum and allowed to solidify. DCP sludge was assigned IDC 803. Due to mechanical problems, the DCP was only in operation for about a year.

(IDC 807): The process for receiving and treating aqueous feed streams in Building 374 was the same as that for IDC 007. At the time IDC 007 was discontinued in 1987 and replaced by IDC 807, the solidification process in use bypassed the sludge dryer system. The bypass system used a series of two conveyor belts to transfer the moist sludge exiting the vacuum filter directly into the 55-gallon drum. Diatomite and Portland cement in a 1:1 ratio were metered into the drum with the sludge. A 7:1 ratio of sludge to cement/diatomite mixture was used. As the drum was filled, the waste was periodically tamped down using a tamping tool. Oil Dri® and vermiculite have also been noted in IDC RF 807 wastes. IDC RF 807 drums containing Oil Dri®

have been identified during real-time radiography (RTR) examination at the AMWTP. The estimated volumes of Oil Dri® and vermiculite did not exceed 50% of the overall volume within the waste containers. [42]

1.4.3 Material Inputs

Material inputs for IDC 007, IDC 803, and IDC 807 are common for this waste stream. Liquid wastes treated by the acid neutralization, radioactive decontamination, and evaporation processes were transferred to the sludge solidification process. The waste streams that were treated in the sludge solidification process are presented in Table 1-2.

Table 1-2. Wastes Treated in the Sludge Solidification Process.

Waste Streams	Source Buildings	Contaminants
Tank D-808: Packaged Acid Wastes and Building 371 Nitric Acid Wastes	Buildings 123, 371, 444, 460, 559, 774, 865, 881, and 883	Acid Wastes.
Tanks D-815, D-819, D-823: Radioactive Decontamination Process Effluent	Buildings 371 and 559, and 700 and 800 Areas	Acids, bases, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, selenium, silver, Trim Sol[a], Oakite Cleaner[a], Ox Out 536[a], acetone, ethyl alcohol, hexane, methanol, methyl ethyl ketone, methylene chloride, eutectic salts, photo developer, and photo stop bath.
Tank D-845: Evaporation Process Descaling Solution (nitric and phosphoric acid)	Buildings 122, 123, 443, 444, 447, 460, 559, 561, 566, 700 and 800 Areas, and Solar Ponds	Radioactive decontamination process effluent contaminants, solar pond water constituents, demineralization salts, water softeners, chemical indicators, 1,1,2-trichloro-1,2,2-trifluoroethane, toluene, penetrant oils, isopropanol, ethylene glycol, Mariko[a] [28], diamond paste, spent emulsifier, spent developer.

[a] See Table 2-1 for chemical description of Trademark Names.

In addition to the contaminants described in Table 1-2, liquid wastes set to Tanks D-824A and B can be contaminated with the following spent solvents:

- Tetrachloroethylene
- Trichloroethylene
- 1,1,1-Trichloroethane

- Carbon tetrachloride
- 1,1,2-Trichloro-1,2,2-trifluoroethane
- Acetone
- Methanol
- Xylene
- Benzene
- Toluene

1.4.3.1 Miscellaneous Items

Miscellaneous items are those items that have been identified during characterization activities that are not consistent with expectations based on process descriptions. They appear in a small percentage of the waste stream containers and constitute a small percentage of the waste within the container and summary category group and other determinations are not impacted.

Visual examination (VE) and RTR inspections of IDC 007 containers have identified the following items:

- Inorganic liquids (see Section 1.5)
- Lead-containing items
- Miscellaneous metal debris
- Miscellaneous plastic debris.

Visual examination and RTR inspections of IDC 803 containers have identified the following item:

- Inorganic liquid (See Section 1.5)

Visual examination and RTR inspections of IDC 807 containers have identified the following item:

- Inorganic liquid (See Section 1.5)
- Lead-containing items
- D-cell battery
- Miscellaneous plastics

1.4.4 Waste Material Parameters

To estimate the waste material parameter (WMP) weight percentages for BNINW218, waste material parameter data from 100% of the completed RTR and VE of Building 374 Sludge waste drums were obtained from the AMWTP Waste Tracking System (WTS) database on October 11, 2006. This represents 95% of the estimated number of drums for this waste stream. The Building 374 Sludge waste was generated at RF from 1982 through 1988. Drums evaluated to estimate the WMP weights per unit of waste were generated from 1982 to 1988; therefore, the WTS data is representative of the waste stream. WTS is AMWTP's comprehensive, DOE-audited waste tracking database in which all waste containers are tracked cradle-to-grave and all related characterization data are stored. A statistical analysis of the RTR and VE data was performed to estimate WMP weights (by percent) for Building 374 Sludge, excluding packaging, in accordance with the requirements of MP-TRUW-8.13, Collection, Review and Management of Acceptable Knowledge Documentation and are summarized in Table 1-3. [44, 46, 47, 48]

Table 1-3. Estimated Waste Material Parameter Weights per Unit of Waste for Building 374 Sludge (BNINW218).

Waste Material Parameters	Weight per Unit Waste by Percent
Iron-based Metals/Alloys	<1
Aluminum-based Metals/Alloys	<1
Other Metals	<1
Other Inorganic Materials	6
Cellulosics	<1
Rubber	<1
Plastics (waste materials)	1
Inorganic matrix	93

Although individual drums in this waste stream may contain other homogenous solid waste and debris materials, the waste stream as a whole will be greater than 50%, by volume, inorganic solidified homogeneous solids. [2, 44, 46]

1.5 Prohibited Items

The absence of prohibited items is determined and documented through acceptable knowledge and historical confirmation activities. The following item is expected in this waste based upon the above review.

- Liquid waste (waste shall contain as little residual liquid as is reasonably achievable by pouring, pumping and/or aspirating, and internal containers shall contain less than 1 inch or 2.5 centimeters of liquid in the bottom of the container. Total residual liquid in any payload container [e.g., 55-gallon drum or standard waste box] may not exceed 1% volume of that container)

The following items have been determined as not present in this waste through review of the AK record.

- Non-radionuclide pyrophoric materials, such as elemental potassium
- Hazardous waste not occurring as co-contaminants with TRU mixed wastes (non-mixed hazardous waste)
- Wastes incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes
- Wastes containing explosives or compressed gases
- Wastes with polychlorinated biphenyls (PCBs) not authorized under an EPA PCB waste disposal authorization
- Wastes exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers (HWN) of D001, D002, or D003)

Excess residual liquid is a common prohibited item identified during RTR and VE in this waste stream. Other prohibited items are expected to be very rare. [1, 44] Drums with excess residual liquid will be treated by adding absorbent prior to shipment. Drums with prohibited items will be treated or rejected as appropriate. Drums with prohibited items will not be part of the waste stream shipped to WIPP.

- Waste that has ever been managed as high-level waste and waste from tanks specified in Table B-8 of MP-TRUW-8.2, Quality Assurance Project Plan, unless specifically approved through a Class 3 permit modification. [20, 40]

- Any waste container from a waste stream (or waste stream lot) that has not undergone either radiographic or visual examination of a statistically representative subpopulation of the waste stream in each shipment, as

described in Attachment B7 of MP-TRUW-8.2, Quality Assurance Project Plan. [40]

1.6 RCRA Determination

1.6.1 EPA Hazardous Waste Numbers

Toxicity Characteristic Codes: D006, D007, D008, D009, D010, D011, D032

Listed Waste Codes: F001, F002, F005, F006, F007, and F009

Rocky Flats Environmental Technology Site (RFETS) has also prepared a waste stream profile form for the Building 374 Sludge waste stream. The following paragraph is from the Rocky Flats submittal.

A portion of this waste stream, generated at RFETS, was sent to INEEL for storage; however, the INEEL waste stream (BNINW218) is also assigned EPA HWN D006, D007, D008, D009, D010, D011 and D032 in addition to F001, F002, F005, F006, F007, and F009. RFETS acceptable knowledge indicates that cadmium, chromium, lead, mercury, selenium and silver are present in this waste stream but that only chromium (D007) is present in concentrations above the RTL. There is no RFETS acceptable knowledge that hexachlorobenzene (D032) is present in this waste stream. Confirmatory solid sampling performed at RFETS detected chromium (D007) and silver (D011) in concentrations above the RTL; whereas, confirmatory solid sampling performed by INEEL detected chromium (D007) and mercury (D009). Because solid and/or headspace sampling performed at RFETS did not detect cadmium, lead, mercury, and hexachlorobenzene at concentrations above their RTLs, EPA HWNs D006, D008, D009, D010 and D032 were not applied to the RFETS waste stream. Per RFETS policy not to assign characteristic EPA HWNs to a listed waste, where the treatment standards for the listed waste addresses the characteristic, D007 (chromium) and D011 (silver) were not applied. [32]

The following sections discuss the application of HWNs by AMWTP.

1.6.2 Hazardous Determination

Ignitability:

The materials in this waste group do not meet the definition of *ignitability* as defined in 40 CFR 261.21. These materials are not liquid, are not capable of causing fire through friction, absorption of moisture, or spontaneous chemical change. These materials are not compressed gases, nor do the containers contain compressed gases. These materials are not

DOT oxidizers as defined in 49 CFR 173. The materials in this waste group are therefore not ignitable wastes (D001).

Corrosivity:

The materials in this waste do not meet the definition of *corrosivity* as defined in 40 CFR 261.22. Under 40 CFR 261.22, a solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

- It is aqueous with a pH less than or equal to 2, or greater than or equal to 12.5, as determined by a pH meter using Method 9040 in "Test Methods for Evaluating Solid Waste, Physical and Chemical Methods," EPA Publications SW-846.
- It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.240 inch) per year at a test temperature of 55 degrees Celsius (130 degrees Fahrenheit) as determined by its test method specified in National Association of Corrosion Engineer (NACE) Standard TM-01-69 as standardized in SW-846.

The waste is not a liquid and does not meet the criteria for a corrosive hazardous waste as noted above. As determined by radioscopy and VE, none of the drums shipped contained 20% by volume, liquid waste (20% by volume is required in order to measure pH per the prescribed method in 40 CFR 261.22). Results of measurement of pH of residual liquids as reported in INEEL/EXT-01-00517 [(12)] ranged from 8.6 to 11.9, which supports this determination. Therefore, the corrosive characteristic (D002) does not apply.

Reactivity:

The materials in this waste group do not meet the definition of *reactivity* as defined in 40 CFR 261.23. The materials are stable and will not undergo violent chemical change. The materials will not react violently with water, form potentially explosive mixtures with water, or generate toxic gases, vapors, or fumes when mixed with water. The materials do not contain sulfides, and are not capable of detonation or explosive reaction. The materials are not forbidden explosives or Division 1.1, 1.2, or 1.3 (Class A or B) explosives as defined in 49 CFR 173, nor do the drums contain explosive materials. Explosives were not handled or used around radioactive material. The waste may contain cyanide from treatment of electroplating wastes. Analysis of bypass sludge indicates a maximum total cyanide concentration of 8.2 mg/kg, and a maximum reactive cyanide concentration of 5.36 mg/kg. These cyanide levels will not cause the waste to be reactive. The materials in this waste group are not reactive wastes (i.e., D003).

The materials in the waste stream do not meet the definition of reactivity and will not be assigned the D003 waste code.

Toxicity:

Acceptable knowledge indicates the presence of metals, cadmium, chromium, lead, mercury, selenium, and silver in this waste stream. Results from solid sampling and analysis of the sludge (see Table 2 of the Characterization Information Summary associated with WSPF BNINW218) confirm that chromium and mercury are present in concentrations above the RTL. The results also indicate that cadmium, lead, selenium, and silver are present in the sludge, but at levels less than the toxicity limit. However, as a conservative measure, the D codes indicated by AK will be retained. The EPA hazardous waste codes (D006 through D011) for these metals have been applied to this waste stream.

Analytical results for semi-volatile organic compounds of solid samples collected in two samples from 1997 and 1998 indicated the potential presence of hexachlorobenzene. [(12)] These are part of the data set that was used by 3,100 m^3 to establish the required size of the final sample set. See Table 4 in INEEL/EXT-01-00517. [(12)] No other semi-volatile organic compounds were detected. The INEEL assigned the toxicity code (D032) for hexachlorobenzene as a conservative measure. The AMWTP will maintain this code assignment based on the AK as a conservative measure.

Spent halogenated organic compounds commonly used for their solvent properties for cleaning and degreasing were included in the feed waste. Results from solid sampling and analysis indicate that none of the toxicity volatile organic compounds were detected above the RTL. The appropriate F-listed codes for the halogenated solvents used have been applied to this waste; therefore, the toxicity characteristic waste codes associated with these compounds will not be assigned.

There is no documentation indicating the presence or use of pesticides or herbicides in the areas or processes that generated the aqueous waste from which Building 374 solidified aqueous waste was derived. Therefore, this waste group does not exhibit the characteristic of toxicity due to pesticides or herbicides (D012-D017).

Based on AK and sampling data, D006, D007, D008, D009, D010, D011, and D032 have been assigned to the Building 374 waste stream.

Listed Waste:

F Codes:

Tetrachloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, and 1,1,2-trichloro-1,2,2-trifluoroethane were commonly

used for cleaning and degreasing. Methylene chloride was used primarily for paint removal. The aqueous waste transferred to Building 374 for treatment may have contained small amounts of these spent solvents. Solid sampling organic data (Table 3A and 4A of the Characterization Information Summary associated with BNINW218) and headspace gas sampling results (Table 1A Characterization Information Summary associated with BNINW218) of the Waste Stream Profile Form BNINW218 indicate the presence of F001 and F002 organic compounds, although only the UCL_{90} for 1,1,1-trichloroethane approaches the PRQL. None of the UCL_{90}s exceeded the PRQL. However, because Building 374 solidified aqueous waste was derived from the treatment of a listed hazardous waste the EPA HWNs F001 and F002 are applied.

Acetone, methanol, and xylene were used primarily as solvents in laboratory operations. The aqueous waste transferred to Building 374 for treatment may have contained small amounts of these spent solvents. However, F-listed solvents were not mixed before being discharged into the process waste line. Solvents were also diluted with water and washed into the process waste line at the point of generation. Therefore, the ignitability characteristic was removed at the time of dilution and discharge. Since the F003-listed wastes were rendered non-ignitable prior to subsequent discharge and aggregation within the liquid waste stream destined for sludge generation, the F003 code, which is listed solely for ignitability, does not have to be applied. Neither solid nor headspace gas sampling have indicated UCL_{90} levels of these compounds. Therefore, this waste is not assigned EPA HWN F003.

There is no documentation indicating the presence or use of F004-listed solvents in the areas or processes that generated the aqueous waste from which Building 374 solidified aqueous waste was derived. Therefore, this waste group is not an F004-listed hazardous waste.

F005-listed solvents, benzene and toluene, were used in laboratory operations, and methyl ethyl ketone is identified as a contaminant by AK. The aqueous waste transferred to Building 374 for treatment may have contained small amounts of these spent solvents. Headspace gas sampling results from the 3,100 m^3 Project indicated the presence of benzene, methyl ethyl ketone, and toluene, although the calculated UCL_{90}s were all below the respective PRQLS. The headspace gas data set presented in Table 1A does not indicate the presence of benzene, toluene, or methyl ethyl ketone. However, because Building 374 solidified aqueous waste was derived from the treatment of a listed hazardous waste, the EPA HWN F005 is applied.

In late 1984 and early 1985, the evaporator in Building 374 began treating spent stripping, cleaning, and plating solutions from electroplating operations in Building 444. The Building 444 electroplating operations utilized cyanide and therefore the Buildings 374 wastewater treatment operations received F007 and F009 wastes, and generated F006 wastewater treatment sludge. The Building 374 sludges were derived from the treatment of spent descaling solution from the evaporator, and were assigned EPA HWNs F006, F007, and F009.

Based on the above discussion Building 374 Sludge will be assigned F001, F002, F005, F006, F007, and F009.

K-Listed Codes:

The materials in this waste stream do not meet the definition for K-listed EPA codes. K-listed EPA codes only apply to hazardous waste from specific sources. The waste is not and does not contain any hazardous waste from specific sources paragraphs (a) of 40 261.32.

P- and U-Listed Codes:

The materials in this waste stream do not meet the definition for any P- or U-listed codes. P- and U-listed EPA codes only apply to discarded commercial chemical products, and residues of commercial chemical or off-specification products. The waste is not and does not contain any commercial product, or manufacturing chemical intermediate listed under paragraphs (e) or (f) of 40 CFR 261.33 that when they were discarded were mixed with waste oil or used oil or other material that was applied to the land, or used as a fuel, in lieu of their original intended use as described in detail in 40 CFR 261.33. The following paragraphs contain detailed justification that P- and U-listed codes are not applicable.

Waste generated from non-restricted operations (or buildings) or after 1974, may be contaminated with trace quantities of beryllium (e.g., less than one percent (1%) of the waste by weight). This beryllium contamination is an integral part of the sludge and is not in powder form. It is not a commercial chemical product, an off-specification species, a container residue, or a spill residue thereof. Therefore, the P-listed waste code (P015) for beryllium as defined in 40 CFR 261.33 was not assigned to the waste.

The U-listed code (U134) for hydrofluoric acid is not applicable to this waste stream. Hydrofluoric acid may have been used during recovery operations in Building 771, but was not disposed of as unused product within the waste stream. As established previously, this waste does not exhibit the characteristic for corrosivity.

The U-listed code (U079) for trans-1,2-dichloroethylene also is not applicable to this waste stream. It is not an expected constituent of this waste and the waste does not meet the definition of a U-listed waste per 40 CFR 261.33. Although trans-1,2-dichloroethylene is currently a WAP target analyte, it was not included as such in the solids sampling analytical results used to characterize this waste. The solids samples were collected and analyzed under a WAP compliant program, but prior to the time that trans-1,2-dichloroethylene was added to the target analyte list. It was not detected (as a TIC) in any of the solid samples analyzed under the 3,100 m^3 Project WIPP compliant program and has not been detected as a TIC in any of the RF wastes headspace gas samples in 25% or more of samples, including Building 374 Sludge.

TSCA Regulated Contaminants

Acceptable knowledge indicates that Building 374 Sludge waste does not contain polychlorinated biphenyls (PCBs) as regulated by the Toxic Substances Control Act (TSCA), 15 U.S.C. 2601 et seq.

1.7 Radionuclides

The WIPP-tracked radionuclides of concern for this waste are: ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{233}U, ^{234}U, ^{238}U, and ^{241}Am. [1, 44] The remaining WIPP-tracked radionuclides, ^{137}Cs, and ^{90}Sr, are not expected to be present in measurable quantities in this waste. [39] The Building 374 sludge waste stream does not contain concentrations of plutonium in excess of 20% by weight for the aggregate of any material category. [9, 41]

As a minimum, to confirm existing AK data, the ratios of the two most prevalent radionuclides in the isotopic mix are compared. [21] The two most prevalent radionuclides by weight expected in the Building 374 sludge waste drums are ^{239}Pu and ^{240}Pu. [9]

The recommended default mass fraction values of the plutonium isotopes to be used as the AK based values and confirmed at the AMWTP during non-destructive assay (NDA) are listed in RPT-TRUW-07, *Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge*. [9]

Mass fraction values for ^{241}Am, ^{233}U, ^{235}U, and ^{238}U previously determined for Rocky Flats at the Idaho National Engineering and Environmental Laboratory (INEEL) were based on individual gamma spectrometric measurements. The ^{234}U activities were calculated based on ratios with depleted uranium isotopes. The criteria used for selection and the formulas for determining the ^{234}U mass is presented in RPT-TRUW-07. [9]

Radionuclides such as ^{244}Cm, ^{232}Th, and ^{236}U may be found in Rocky Flats wastes. [9] Americium-241, ^{234}U, and ^{237}Np are expected in most of the Rocky Flats TRU waste containers due to radioactive decay and ingrowth. [10] ^{243}Am and ^{245}Cm, other isotopes resulting from radioactive decay, have also been detected during AMWTP NDA. [22, 23] Potassium-40 may be detected when other radionuclides in a container are significantly lower in concentration. In some cases ^{40}K has been detected in higher concentrations than ^{239}Pu and contributes to 95% of the radionuclide hazard. [11]

AMWTP will employ payload management practices in accordance with the WIPP-WAC Appendix E, for waste stream BNINW218. The estimated total waste volume for BNINW218 is 416 m^3. The estimated percentage of the waste greater than 100 nCi/g is 66%. The estimated percentage of waste less than or equal to 100 nCi/g is 34%. [9]

2.0 Shipping Considerations

2.1 Waste Packaging

Depending on waste packaging requirements at the time, several combinations of bags and liners were used to prepare 55-gallon drums for shipment. Use of the 90-mil rigid polyethylene liner began in 1972. The rigid liner was placed in each drum and lined with a polyethylene round bottom drum liner, a polyethylene drum bag and PVC O-ring bag, or a single round bottom polyethylene liner placed between the rigid liner and O-ring bag. Some drums packaged after 1972 may not have rigid liners.

When a drum was full, the drum liners were twisted and taped closed, the lid was secured with a bolted ring, and a tamper-indicating device was attached to the drum. Approximately one liter of Oil Dri® was placed in the bottom of the O-ring bag. One liter of Oil Dri® was placed on top of the O-ring bag inside the polyethylene drum bag (See Table 2.1 for list for constituents associated with Oil Dri®).

Typically sludge was placed directly and treated (i.e., monolith) directly in drum bags within the drum and have no inner packaging or may be layered. [17, 18] Diatomite and cement were added to the waste in various amounts. [25] Approximately 20 to 50 pounds of Portland cement were typically added to IDC 007 and 807 Sludge and can be found layered throughout the drum and packaging. After April, 1986, a 1:1 ratio of diatomite and Portland cement was used in a 7:1 sludge/absorbent ratio. (See Table 2-1 for list of constituents associated with Portland cement).

The typical bag closure method was “twisted and taped.” Drum stub bags may be identified in containers that were visually examined or cored at WMF-634. [19] A “Filtered bag” method was used for bag closure in drums visually examined at Argonne-West as part of the 3,100 m^3 Project. [24]

After drums were inspected, one to two quarts of absorbent material (Oil-Dri®) was placed on the top of the outer, sealed polyethylene drum bag. [2, 14, 15, 16] This procedure changed in February 1982 when vermiculite was used to fill the void space. The quantity of vermiculite varied from 3-12 pounds according to the amount of waste contained in each drum. The type, amount, and expected time-frame of absorbent use may vary. Aquaset® or vermiculite in varying amounts was added to drums of waste during the 3,100 m^3 Project recovery operations (See Table 2-1 for list of constituents associated with Aquaset®).

Any combination of plastic bags that does not exceed five layers of confinement (of which no more than three are inner bags) is acceptable for shipment to WIPP. Containers with excess layers of confinement or packaging configurations not addressed by an approved TRUCON code for this waste stream will be segregated and vented or rejected as appropriate. [43]

2.2 Flammability Consideration

The payload containers in the waste stream must comply with the Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC) requirements. As specified in the CH-TRAMPAC, a determination of compliance with the flammable gas limits will be performed for volatile organic compounds (VOCs), hydrogen, and methane. Headspace gas sampling and analysis is performed when required by the WAP and/or CH-TRAMPAC. At a minimum, the headspace gas analytical results are evaluated to determine the total concentration of flammable VOCs present in the waste. Payload containers, including those with headspace gas results exceeding 500 ppm flammable VOCs, are evaluated for compliance with applicable CH TRAMPAC requirements prior to shipment. Payloads containing flammable gases are managed in accordance with CCP-CH-TRAMPAC, CCP-PO-003. [45]

Table 2-1. Tradename Index

Tradename	Chemical Constituents
Aquaset	Sodium montmorillonite [33]
Mariko	Nonhazardous mixture [28]
Oakite Cleaners	
Oakite Aluminum Cleaner	Sodium carbonate; sodium phosphate, tribasic; tetrasodium pyrophosphate, sodium metasilicate, sodium silicate [27]
Super Ruststripper	Sodium hydroxide, sodium hydroxyethylene diamine triacetate, Trade secret registry (735517), Non-hazardous ingredients [34]
Oakite Dynadet	Sodium hydroxide, tetrasodium pyrophosphate, nonylphenoxy polyethoxy ethanol, dipentene, non-hazardous ingredients [35]
Oakite 360 L	Sodium hydroxide, non-hazardous ingredients [36]
Oil-Dri	Crystalline silica and clay minerals, e.g., montmorillonite, bentonite [29]
Ox Out 536	Water, ammonium bifluoride, and nitric acid [37]
Polymer 1192	Material Safety Data Sheet Section 1, Hazardous Ingredients, states; "This product contains no hazardous ingredients by OSHA regulations or any state Right-To-Know regulations." [38]
Portland Cement	Tricalcium silicate, dicalcium silicate, tricalcium aluminate, calcium alumino ferrite, gypsum, calcium oxide, magnesium oxide, sodium sulfate, potassium sulfate, crystalline quartz silica, trace chromium [30]
TRIM SOL	Water miscible cutting and grinding fluid concentrate, not hazardous per Environmental Protection Agency (EPA) or Department of Transportation (DOT) guidelines [26]

PROCESS FLOW DIAGRAMS

This section contains process flow diagrams available for the Building 374 waste stream.

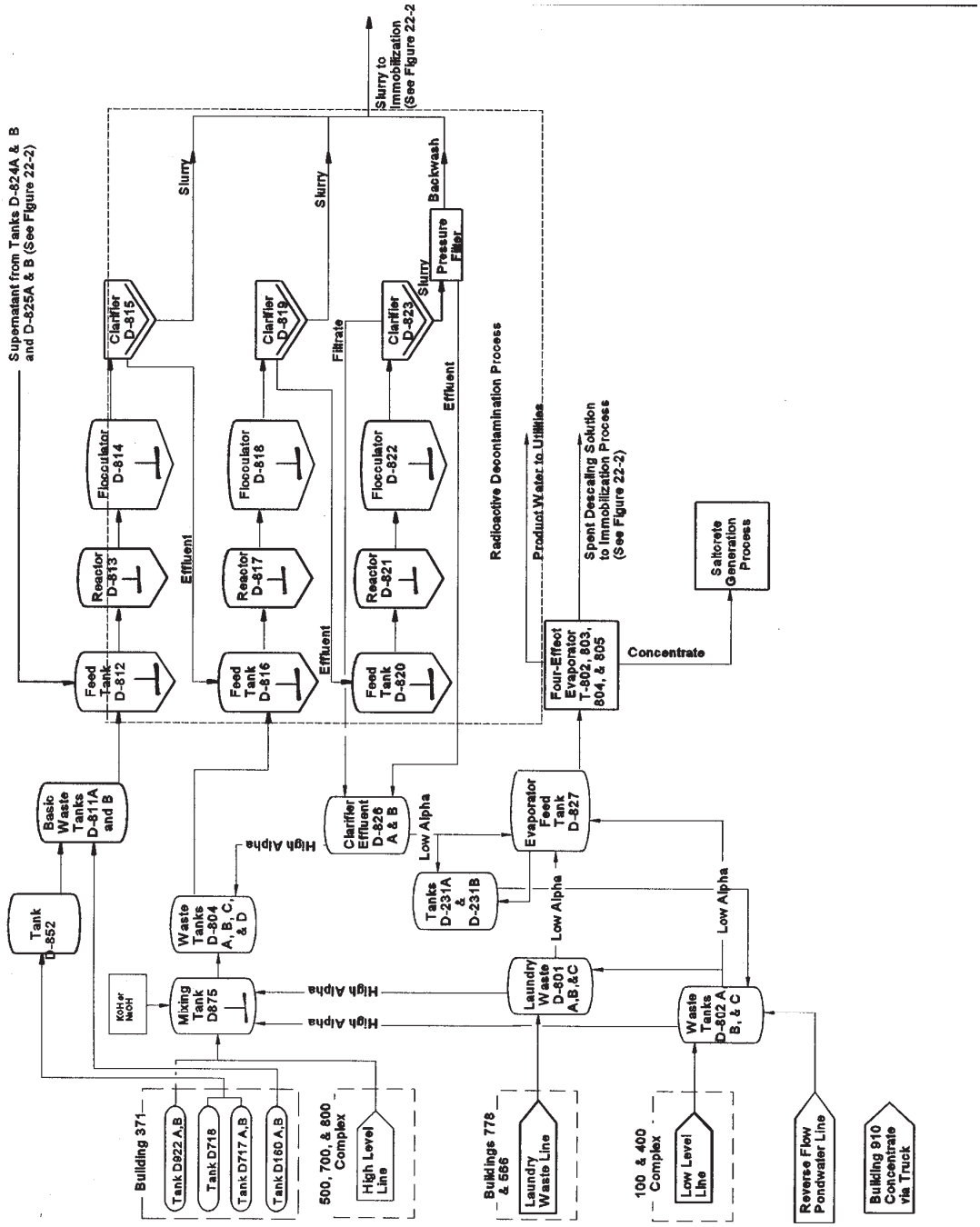

Figure 3-1. Building 374 radioactive decontamination and evaporation processes.

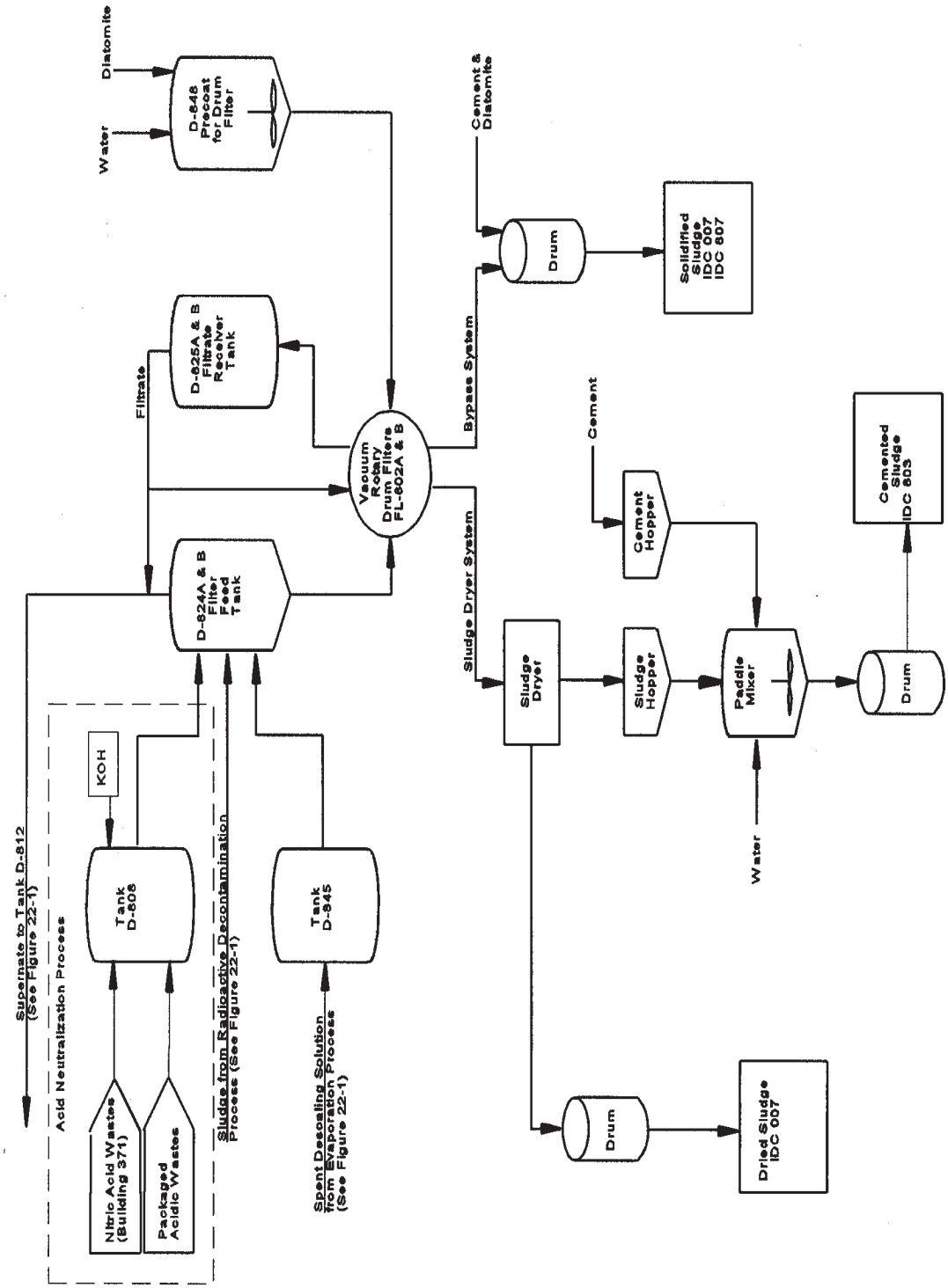

Figure 3-2. Building 374 acid neutralization and sludge immobilization processes.