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Hazards Assessment Document

for the

Test Reactor Area Research and Development Laboratories Hazard Classification

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

Idaho National Engineering and Environmental Laboratory

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ACRONYMS

ANSI	American National Standards Institute
ARF	Airborne Release Fractions
ASA	Audible Safety Analysis
BBWI	Bechtel BWXT Idaho, LLC
CCA	Criticality Control Area
CFR	Code of Federal Regulations
DOE	Department Of Energy
DOE-ID	Department Of Energy Idaho Operations Office
ETR	Engineering Test Reactor
ETRC	Engineering Test Reactor Critical
HC	Hazard Categorization
HEPA	High-Efficiency Particulate Air
ICMS	INEEL Chemical Management System
INEEL	Idaho National Engineering and Environmental Laboratory
IWTS	Integrated Waste Tracking System
MAR	Material At Risk
MCCA	Mass Criticality Control Area
MTR	Material Test Reactor
NFPA	National Fire Protection Association
NG	Neutron Gamma
PFN	Prompt Fission Neutron
PSAN	Plug Storage Area North
R&D	Research and Development

RCM	Radiological Control Manual
RQ	Reportable Quantity
TAA	Temporary Accumulation Area
TEDE	Total Effective Dose Equivalent
TPQ	Threshold Planning Quantity
TQ	Threshold Quantity
TQV	Threshold Quantity Value
TRA	Test Reactor Area

1. INTRODUCTION

Department of Energy (DOE), Idaho Operations Office (DOE-ID) Order ID O 420.D, "Requirements and Guidance for Safety Analysis," requires that a hazard classification be performed for all DOE activities for which DOE has assumed environment, safety, and health responsibility. A hazard classification defines the level of hazard posed by an operation assuming no active mitigating systems are available. The hazard classification determines what level of safety basis is appropriate. This report documents that the hazard classification performed for the Test Reactor Area (TRA) Research and Development (R&D) Laboratories at the Idaho National Engineering and Environmental Laboratory (INEEL) is "Radiological, Low Hazard."

In accordance with the requirements of Title 10 Code of Federal Regulations (CFR) Part 830, Subpart B, the categorization of the TRA R&D laboratories, based on the postulated inventory of radioactive material within the facility, is "below Category 3." For further categorization of below Category 3 facilities, 10 CFR 830 requires that the guidance presented in U.S. Department of Energy DOE-STD-1027-92, "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports," be employed. STD-1027-92 states that those facilities that do not meet or exceed Category 3 threshold criteria but still possess some amount of radioactive material may be considered Radiological Facilities. Thus, the TRA R&D laboratories meet the definition of nonnuclear and are classified "Radiological." Further, in accordance with DOE-ID Order 420.D, Paragraph 4.b, based on the mass of nonradioactive hazardous material present in the facility, the classification is "Low Hazard." The facility classification, based on the mass of radioactive and nonradioactive hazardous material present in the facility, is "Radiological, Low Hazard."

2. FACILITY DESCRIPTION

Operations in the R&D Laboratories involve chemical research, routine chemistry, physics research, instrumentation research, computer applications, and radioactive material counting. These operations use chemicals and produce some chemically and radioactively contaminated materials. The analytical procedures and laboratory setups within the facility are typical of many analytical and research laboratories located elsewhere.

The R&D labs are operated by Bechtel BWXT Idaho (BBWI) for the DOE at the INEEL. Organizational hierarchy includes the Research and Development Branch, R&D Integration and Operations Directorate, and R&D Operations Department.

This section describes the buildings within the TRA that house the R&D laboratories covered in this hazard classification. Figure 1 shows the TRA R&D Laboratories. TRA-603, -604, -635, -654, -657, -661, -665, -666 & -666A, -668, and -690 comprise the

R&D Laboratories.[1] The breakdown of R&D laboratories by building is identified in Table 1. A brief description of each building is discussed in the following sections. The description identifies the laboratories housed in each facility. Although some of the buildings are joined, each was constructed at different times; thus, each structure has different characteristics.

The TRA R&D laboratories are segmented into two zones in accordance with DOE-STD-1027. Zone 1 comprises all the R&D laboratories excluding TRA-665. The ground story of TRA-665 solely comprises zone 2. The combination of facility features and the form of material precludes bringing material together or causing harmful interaction from a common severe phenomenon. Justification of facility segmentation into two zones is based on the fact that the material in each zone does not have the potential to migrate from one zone to another. TRA-665 is a two-story concrete storage vault (Figure 2). The ground story of the vault is used for storage of radioactive sources and materials. No piping or HVAC systems interact with the other R&D laboratories or the top story of TRA-665 (the ceiling that separates the ground story from the second story is approximately 36-inches thick). The radioactive and hazardous material inventories are controlled independently in each zone. The sum of the ratios for radioactive and hazardous material is applicable for each zone, and is not cumulative for TRA R&D laboratories as a whole.

A 90-day storage area is located in TRA-657. It was not possible to segment this section of TRA-657 from the R&D section of the building even though it is not considered part of the R&D inventory. Hazard categorization, however, depends on the inventory within each segment. Based on previous studies (see Reference 9) performed to determine the maximum inventory of the temporary accumulation area (TAA) at TRA, it has been shown that the radionuclide content of any waste container generated at TRA is unlikely to exceed adjusted Category 3 threshold limits. The most conservative "Sum of the Ratios" for the TAA was added to the total zone radiological inventory for TRA-657. The radionuclide quantities are very conservative and overestimate the waste present at any time because the radionuclide quantities represent the sum of all the waste generated at all the TRA facilities during the time interval (the time inventory with the highest sum of the ratios was chosen for the sake of conservatism), not the small amount stored in the TAA. Records obtained from the IWTS indicate the actual contents in the TAA consist largely of bulk items such as pipes, thermostats, contaminated leaching equipment, etc. (further adding conservatism to the inventory listed for the TAA). Flammable material in the TAA is stored in appropriate cabinets that meet the requirements of NFPA 30, "Flammable and Combustible Liquids Code."

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1. TRA-666A, the Tritium Research Laboratory, has a separate safety basis document ("Safety Analysis Report for INEL Tritium Research Laboratory," STSAR-89-01-TRA, Rev. 1, November 1995) and is not addressed in this hazard classification. Development and review of safety documentation that addresses activities in TRA-666 and 666A is currently in progress and is not covered in this hazard classification. TRA-604, Materials Test Reactor (MTR) canal has a separate basis for interim operation (BIO) safety basis documents ("Basis for Interim Operation for Materials Test Reactor Canal and Plug Storage Holes 1 and 2, "MTRBIO3.DOC, Rev. 5, 12/01) and is not addressed in this hazard classification. The MTR defueled reactor in TRA-603 also has a separate safety basis document and is not addressed in this hazard classification.

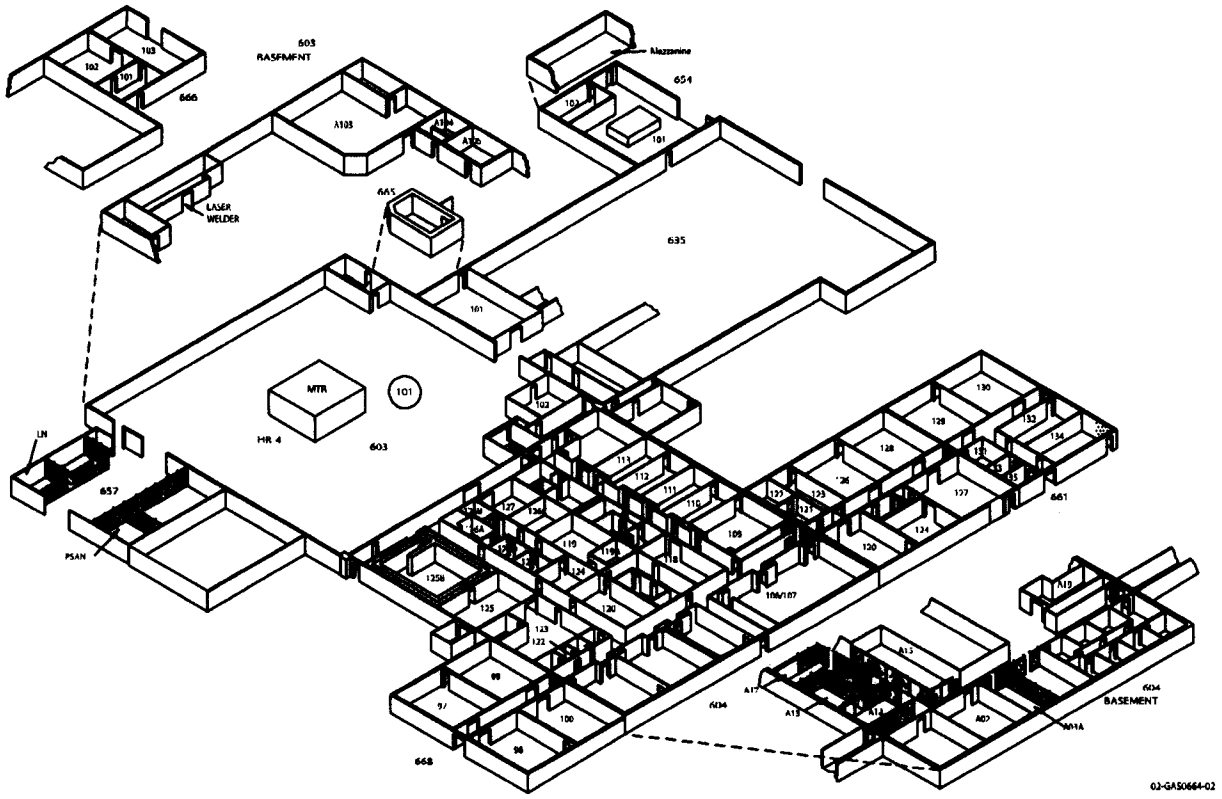

Figure 1. Schematic of R&D TRA laboratories.

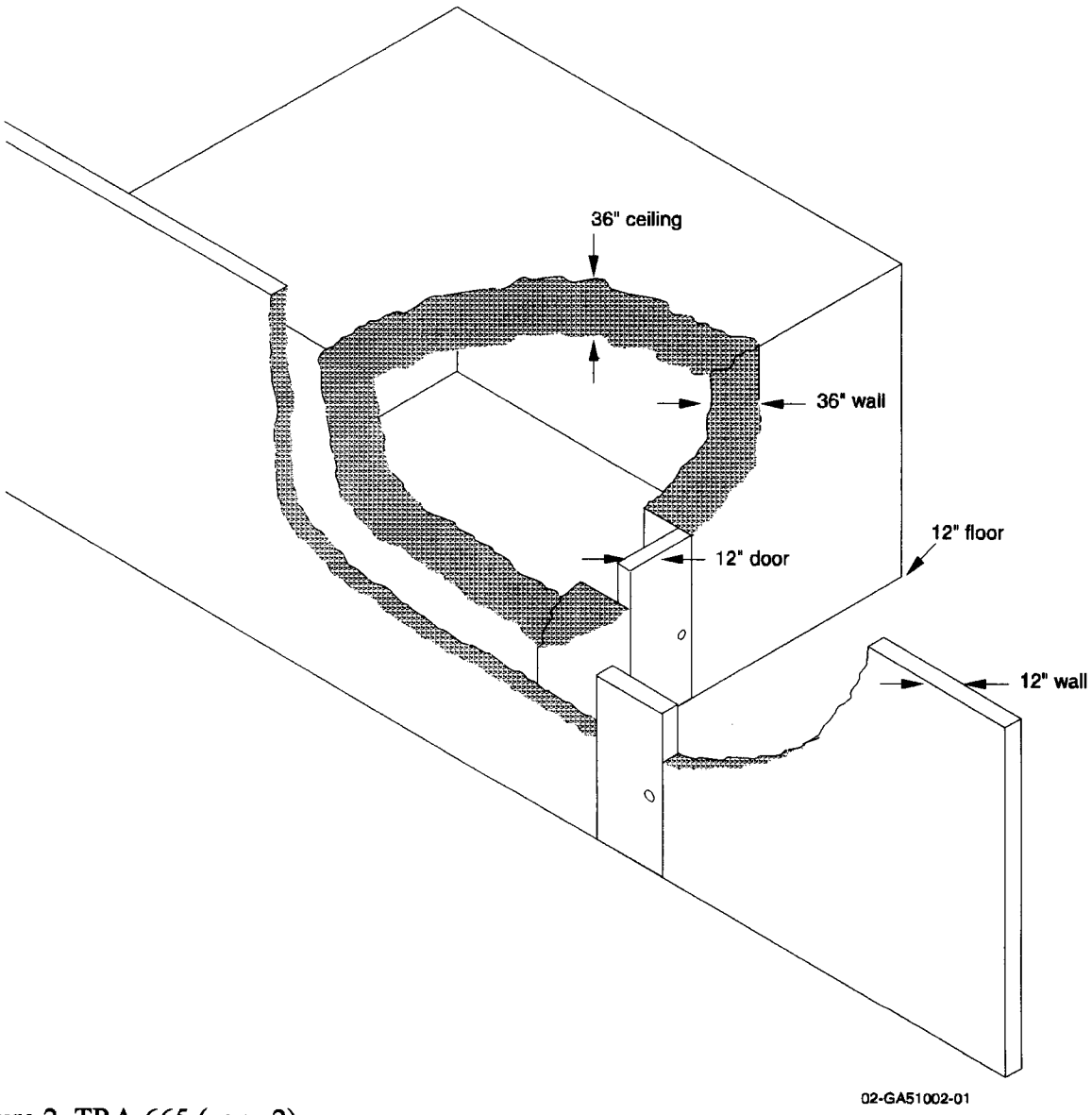

Figure 2. TRA-665 (zone 2).

Table 1. TRA R&D Laboratories.

		Building	Lab Room	Lab Activity
(1)	Physics research	603	102	Physics research
		635	101	Physics research
		654	101	Physics research
			102	Physics research
		668	98	Physics research
			100	Physics research
(2)	Radiochemistry	604	109	Radiochemistry
			110	Radiochemistry
			111	Radiochemistry
			112	RML sample prep
			113	Radiochemistry
		661	126	Radiochemistry
			128	Radiochemistry
			129	Radiochemistry
			130	Radiochemistry
			132	Radiochemistry
			134	Radiochemistry
(3)	Radiochemistry Cell	661	127	Radiochemistry Cell
(4)	Californium Ops	661	120	Mass separator
			124	Californium Cave
(5)	Radcon	661	121	Radcon office
			123	Radcon office
(6)	Electronics	604	127	Instrumentation lab
		668	97	Instrumentation lab
			99	Instrumentation lab
(7)	Analytical	604	118	Radiochemistry counting
			120	Radiation measurement
			123	RML sample counting
			124	Sample receiving
			125	Radiation measurement
			125B	RML sample counting
			A02	Radiation measurement
(8)	High bay	654	101	Physics research (neutron generator)
(9)	Machine shop	604	106	Machine Shop
			107	Machine Shop
(10)	Utilities	661	131	Equipment and electrical room

Table 1. (continued).

		Building	Lab Room	Lab Activity
(11)	Chemical and general storage	603	A105	General storage
		604	122	Chemical storage
			A03A	General storage
			A13	General storage
			A15	General storage
		661	133	Chemical storage
			135	General storage
(12)	Radiological storage areas	603	HR-4	Fissile material (criticality control area [CCA])
			A104	Radiological source storage
		604	A12	Radiological storage
		657	PSAN	Plug storage area north (CCA)
		665		Radiological storage vault
(13)	Robotics Program	603		Remote Mockup and Testing Annex
		690		Hydraulic Power Unit

2.1 TRA-603

TRA-603 is the Materials Test Reactor (MTR) building built in 1952. The MTR has been deactivated and isolated with the area surrounding the reactor used as storage and nonlaboratory functions. The building has a five-story high bay connected to a one-story portion with a basement, housing laboratories and offices. The roof is a built-up asphalt composition on poured concrete on steel trusses; the walls are constructed of poured concrete panels in concrete columns with a steel frame. The floor is reinforced concrete. The basement contains a canal, which was used for radioactive material and spent fuel storage (the MTR defueled reactor in TRA-603 also has a separate safety basis document and is not addressed in this hazard classification). The building is equipped with a 30-ton capacity overhead crane. Several R&D laboratories and storage areas are located in TRA-603. There is one physics research laboratory located in room 102. Rooms A104 and HR-4 are radioactive material storage areas and Fissile Material Control Areas, respectively. Room A105 is used for general storage.

2.2 TRA-604

TRA-604 is a one-story building with a basement and a partial second floor. The roof is asphalt composition on poured concrete on steel beams with paper wrapped insulation. The ceilings are noncombustible tile and the walls are approximately 8-in., hollow core block. The floor is concrete, poured on steel beams supported by steel columns. The second floor is concrete on a steel deck on steel beams. The partial second floor is used as office space and computer laboratory. TRA-604 was built in 1952. Laboratory 106/107 is a machine shop. A radiological control office is located in both Rooms 114 and 114A. Laboratories where chemistry is performed are equipped with cold drains (no radioactive material is allowed down the drain) and warm drains (radioactive material is allowed down the drain). All laboratories, where compressed gas cylinders are used, are equipped with cylinder restraints. Standard 110 V power is available in all laboratories. In addition, some laboratories are equipped with 220 V power and 480 V power. Radiation measurement laboratories and instrument development laboratories are equipped with nuclear counting equipment and computers, which are used to control equipment, and to process data.

2.3 TRA-635

TRA-635 is a high bay building (equal to two stories) built in 1952 with a two-story area on the west side of the building. The roof is asphalt composition on poured concrete on steel joist beams supported by steel columns. The walls are hollow core block set in a steel frame. The floor is reinforced concrete. Laboratory 101 is in TRA-635. Laboratory 101 is operated as a general physics laboratory and is used for experiment setup and calibration. It contains nuclear counting equipment and computer equipment used to process the experimental data. TRA-635 is a sprinklered building of noncombustible construction with controlled storage in an open area on the east side of the building, industrial waste segregation on the west side of the ground floor and an office area on second floor of the west side of the building.

2.4 TRA-654

TRA-654 was originally built to house the Engineering Test Reactor Critical (ETRC) Facility. The ETRC was a nuclear mock-up of the Engineering Test Reactor. The ETRC has been removed and the building partially converted for laboratory purposes. TRA-654 is a high bay area. A balcony is installed at the east end of the facility. The roof is asphalt composition on a metal deck on bar joists. The walls are approximately 8-in.-thick, hollow-core block. The floor is made of reinforced concrete. TRA-654 was constructed in 1959. The building has two laboratories, identified as Laboratories 101 and 102. Laboratory 101 is equipped with a 10-ton capacity traveling bridge crane. The former ETRC pit canal, which measures approximately 15 ft wide × 20 ft long × 17 ft deep, is located in Laboratory 101 at the center of the TRA-654. Laboratory 102, a support

laboratory with laboratory benches, a sink, and cabinets for glassware, is located in the northeast corner of the building. TRA-654 houses 3 neutron generators that produce doses rate of approximately 935 mrem/hr at one foot. The deuterium and tritium used in these devices are metallically bound and not considered releasable. In addition to the neutron generators the Radiation Physics organization received consent to store/operate two neutron generating probes in the former laboratory room inside the ETRC in TRA-654 under the requirements of the INEEL Radiological Control Manual (RCM). The probes consist of a Prompt Fission Neutron (PFN) probe and Neutron Gamma (NG) probe. These probes do not contain conventional producing sealed radioactive neutron sources but produce neutrons through the deuterium tritium interaction. They contain small quantities of tritium which is metallically bound. The generator probes are sealed units and stored in a storage tube whose end caps are maintained under lock and key. The individual/organization responsible for the storage/operation of these items is the Radiation Physics Organization. The probes support geophysics initiatives and environmental restoration programs at the INEEL. Both probes produce a dose rate of approximately 900 mrem/hr at one foot.

2.5 TRA-657

TRA-657 was originally a plug storage building. It adjoins the north wall of TRA-603, which is the decommissioned MTR Reactor Building. The Plug Storage Area North (PSAN) is a cage occupying the northwest portion of the TRA-657. The one-story building is approximately 50 ft × 60 ft (15.2 m × 18.3 m) pumice block building with a roof height of approximately 18 ft (5.5 m) at the south wall, which slopes downwards to approximately 16 ft (4.5 m) at the north wall. The north wall contains a truck door, which is approximately 14 ft × 13.7 ft (4.3 m × 4.2 m), three windows, and personnel double door. The east wall contains three windows and a double door for personnel access. The west wall is used as a retaining wall against a solid berm. The berm acts as shielding over the plug storage tubes. The west wall plug storage facilities consist of 21 cylindrical tubes (approximately 29 ft long × 10 in. diameter) and four box-shaped storage areas of various dimensions. The storage tube orifices that are through the west wall have faceplates made of 1/2-in. (1.3-cm)-thick-steel bolted to the wall. All 21 tubes and four box areas are approximately 29 ft long and are covered with at least 12 ft (3.7 m) of compacted soil acting as shielding. Chain link fencing is used to border the radioactive material storage areas and the ninety day storage area on the west side of the room and also for an area on the east side of the building designated as a liquid nitrogen dispensing area. Heat is supplied to TRA-657 by two large electrical space heaters, which are located on the north wall. The building is not sealed and has no specific ventilation system, fire suppression system, or pollution control equipment. Eight suspended fixtures supply lighting. Electrical power is available in the facility at outlets along the walls. One fire extinguisher is located along the north wall. There are no floor drains in the PSAN or TRA-657. TRA-657 was also used to access the MTR

canal for transporting fuel out of the canal to INTEC. The fuel in the MTR canal and the plug storage area was removed in FY02.

2.6 TRA-661

TRA-661 radiochemistry wing is a one-story building made of approximately 8-in. thick, hollow-core block with a utility tunnel. It is connected to TRA-604 with the main entrance to TRA-661 from the south side of TRA-604. TRA-661 is constructed in two sections: the northern half and the southern half. The northern half of TRA-661 was constructed in 1962. The roof is constructed on a steel deck set on steel beams supported by steel composition. The ceiling is comprised of fiberglass tiles set in metal "T" frames. The floor is made of reinforced concrete. The southern half of TRA-661 was constructed in 1987. It is also made of approximately 8-in., hollow-core block, but has a metal roof with insulation bats mounted to the underside of the metal. The make-up air to both sections of TRA-661 is filtered. The hood exhaust system for the north end of TRA-661, including the High-Efficiency Particulate Air (HEPA) filters, is located in the TRA-604 fan loft. The exhaust draws the air out through the stack located on the west wall of TRA-603. The ventilation air for the south end of TRA-661 is sent out through the exhaust hoods and the HEPA filter bank located at the south end of the building. The exhaust stack is also located at the south end of the building; it is approximately 30 ft high and has a diameter of approximately 24 in.

2.7 TRA-665

TRA 665 is a 776 ft^2 two-story (the ground story, zone 2, of the vault is used for storage of radioactive sources and materials), single-room, reinforced concrete vault (the second story is connected to TRA-635 but is separated from the ground story of TRA 665). TRA 665 is located adjacent to the exterior walls of TRA-603 and TRA-635. There are no communicating openings between TRA 603 and TRA 665 or between TRA 635 and TRA 665. An exhaust vent goes directly from inside the vault to the atmosphere and does not vent into the upper portion of the building or into the other laboratories. There are no penetrations from the vault to any other building. The door to TRA-665 is an approximately 12-inch thick steel door (the door opens to the outside and does not open into TRA 635). The floor is approximately 12-inch thick concrete. The walls and ceiling (separating the ground story from the second story) are approximately 36-inch thick concrete. The vault is used for storage of radioactive sources and materials.

2.8 TRA-668

TRA-668 is a one-story building with a utility tunnel. The roof is made of asphalt composition on a steel deck supported by steel beams. The walls are approximately 8-in. thick, hollow-core block and the floor is reinforced concrete. TRA-668 is an extension to TRA-604. The four laboratories in TRA-668 are used for physics research and for instrument research and development. The rooms contain nuclear event electronic counting equipment, electronic test equipment, and computer equipment. A clean room is located in Laboratory 100. It occupies the southwest corner of the laboratory. It contains special inlet air filtering equipment (HEPA) and is used for experiments and engineering studies requiring a clean environment. The laboratory contains workbenches and other specialized equipment.

2.9 TRA-690

TRA-690 is a single room metal shed on the east side of TRA-603. The robotics group uses it as a protective cover for a hydraulic power unit.

3. MATERIAL INVENTORY

Generic hazards applicable to TRA R&D lab operations will be addressed in the safety analysis.

The hazard categorization and classification for the facility is defined in Management Control Procedure 2451. To determine the classification of the facility, inventories were compiled for radioactive material and hazardous material. These inventories were then compared to criteria in DOE-STD-1027-92 as provided for in Reference 1.

3.1 Radiological Inventory

For radioactive material, typical inventory tables were compiled for each building and separated into two zones. The TRA R&D labs are dynamic and constantly changing their inventories. Because the inventory changes daily, it is not possible to quantify a fixed inventory, but the quantities presented are conservative (the inventory of the TAA was incorporated as part of the R&D inventory and decay of sources was not adjusted when considering the inventory) and the administrative and institutional safety programs shall be implemented in the approved Auditable Safety Analysis (ASA) to ensure that the Category 3 thresholds will not be exceeded. Radioactive material was classified as releasable or not releasable, based on form and conditions of storage. As allowed by Reference 3, material stored in Department of Transportation (DOT) Type B containers is classified as not releasable. Sealed sources are also classified as not releasable if the source is double-encapsulated, standard design, and manufactured to meet the "special form testing" of the DOT requirements or the testing specified by ANSI N43.6 as referenced in DOE-STD-1027-92.

DOE-ID Order 420.D allows the use of alternate Airborne Release Fractions (ARFs) for hazard categorization where such use more closely represents actual conditions in the facility under consideration. ARFs were selected in accordance with the methodology of DOE ID Order 420.D for use in modification of the DOE-STD-1027-92 HC 2 and HC 3 TQVs (Reference 10). The threshold quantities of DOE-STD-1027 are adjusted (adj) in accordance with the following formula taken from DOE-ID Order 420.D:

$$TQV_{(adj)} = TQV_{STD-1027}/ARF_{HC}/ARF_{STD-1027}$$

where

$TQV_{(adj)}$ = modified TQV

$TQV_{STD-1027}$ = TQV from DOE-STD-1027

$ARF_{STD-1027}$ = ARF assumed in the DOE-STD-1027 model

ARF_{HC} = alternate ARF to be used for Hazard Categorization (HC)

Material at risk was then compared to Category 3 threshold limits from Reference 3 and a ratio calculated (materials not in drums or type B containers were evaluated against the Category 3 threshold limits without alternate ARFs and thus have the same adjusted TQV as the threshold limit). A sum of ratios was then calculated for each room. Reference 10 presents the R&D Labs radioactive material inventory. As allowed by Reference 3, the facility was segmented into two separate and distinct zones, since a release in one zone would not be expected to result in a release in the other zone. This is based on the separate buildings that make up the facility, their robust construction, a series of walk-downs with building and fire personnel to assess the systems and construction that separate each zone, and fire barriers. TRA 635 exterior walls are pre-cast concrete panels, clip welded and bolted to concrete columns. The exterior walls of TRA 603 are constructed of eight-inch hollow core block set in a steel frame. The exterior walls of TRA 635 and TRA 603 are butted against the exterior walls of TRA 665. The exterior walls of TRA 665 are approximately 36-inches thick. The combined thickness of the exterior walls between TRA 635 and TRA 665 is approximately 48 inches. The combined thickness of the exterior walls between TRA 603 and TRA 665 is approximately 48 inches. The combination of the thickness of the walls and the lack of penetrations (no piping or HVAC exist between the buildings) from TRA 665 to either TRA 603 or TRA 635 preclude the inventories from the two zones from interacting. Table 2 presents the two segmented zones with nuclear categorization ratios. Neither of the zones exceeded the Category 3 sum of ratios unity (one), thus the R&D labs are a not a nuclear facility.

Table 2. R&D Labs nuclear categorization, classification, and segmentation.

Zone	Building	Room	Categorization Sum of Ratios	Classification Sum of the Ratios
1	TRA-603	HR-4	1.78E-01	8.47E+02
		A104	4.19E-02	5.22E+01
		102	5.12E-06	1.07E-04
	TRA-657	—	2.68E-01	5.12E+02
		TAA	8.53E-03	—
	TRA-604	109	1.79E-03	1.00E-01
		125	1.63E-04	1.01E-01
		A12	7.25E-06	1.45E-04
		118	1.70E-08	1.88E-06
		112	8.80E-06	1.76E-04
	TRA-668	98	1.04E-01	9.40E+00
	TRA-661	124	1.73E-01	1.83E+01
		126	3.98E-04	3.06E-02
		129/130	5.21E-05	4.89E-03
	TRA-635	635/654	8.66E-04	9.01E-02
			Zone 1 DOE-STD-1027 total sum of the ratios 7.77E-01	**Zone 1 40 CFR 302.4 total sum of the ratios 1.44E+03**
2	TRA-665	—	7.28E-01	5.71E+02
			Zone 2 DOE-STD-1027 total sum of the ratios 7.28E-01	**Zone 2 40 CFR 302.4 total sum of the ratios 5.71E+02**

The potential for criticality in the Mass Criticality Control Areas (MCCA) is not considered credible due to the small quantities (< 350 grams U-235 or < 250 grams Pu-239) of fissile material stored and the form and distribution of the materials handled in the labs. PSAN (657) and HR-4 are Fissile Material Control Areas. The two rooms are physically isolated from one another. The MCCAs are controlled in accordance with a company approved criticality program. The potential for a criticality in the TRA R&D laboratories with multiple MCCAs is not considered to be credible because the MCCAs are physically isolated from each other.

To further classify the facility, releasable radioactive material was compared to 40 CFR 302.4, Appendix B limits. The sum of the ratios were calculated and summed for each zone in Table 2. Each zone had a ratio above 1.00E+00. This classifies the TRA R&D Labs as a "Radiological" facility.

3.2 Hazardous Materials Inventory

Nonnuclear facility inventories of hazardous materials are evaluated in a manner similar to that of radioactive materials, except that estimated quantities of hazardous materials are compared to the threshold quantities of 29 CFR 1910.119, or to the levels specified in 40 CFR 355 if not listed in 29 CFR 1910.119. The hazardous materials inventories for each segmented zone is presented in Reference 10 (zone 2, TRA-665, does not contain any hazardous material quantities). The inventories were compiled over the last three years to determine the maximum amount of each material that was present during this time period. The TRA R&D labs are dynamic and constantly changing their inventories. Because the inventory changes daily, it is not possible to quantify a fixed inventory, but the quantities presented are conservative and the administrative and institutional safety programs are in place to ensure that the TQs and TPQs will not be exceeded. The TRA R&D labs will maintain inventory controls through an administrative control that limits the quantities of hazardous materials to the TQs and TPQs listed in 29 CFR 1910.119 and 40 CFR 355. This control will be derived by the safety analysis in the ASA. None of the hazardous materials inventory quantities at the TRA R&D laboratories exceed the 29 CFR 1910.119 TQs or the 40 CFR 355 Threshold Planning Quantities (TPQs) (this includes those quantities stored in the TAA in TRA-657). It should be noted that, in addition to the estimated inventory, the existing inventory taken from the INEEL Chemical Management System Inventory Report for the TRA R&D laboratories was used in this evaluation.

For a nonnuclear facility, the estimated quantities of the MAR are further evaluated by comparing the MAR to the reportable quantities of 40 CFR 302.4, Table 302.4, to aid in determining the level of facility safety documentation that must be developed. It is not necessary to calculate the "Sum of the Ratios" because there is at least one hazardous material whose ratio exceeds 1 in the TRA R&D laboratories inventory. In accordance with DOE-ID Order 420.D, an analysis must be performed in which those hazardous materials are evaluated against the low, moderate, or high criteria defined therein. The hazardous materials: arsenic trioxide, chloroform, hydrazine, phosphorus, potassium bichromate, and silver nitrate were found to exceed Reportable Quantity (RQs). Lead bricks used for shielding were also evaluated. Due to the low fire hazard and fact that the form of the lead precludes inhalation or ingestion, it is not considered part of the hazardous materials inventory. The TRA R&D laboratories hazardous material inventories shall be controlled so that the hazardous materials brought into the facility do not exceed the TQs and TPQs listed in 29 CFR 1910.119 and

40 CFR 355 and those materials that exceed 40 CFR 302.4 RQs will be controlled by company approved procedures.

3.3 Other Hazards

DOE-ID Order 420.D requires that a hazard assessment be performed for all facilities and activities. The estimated inventory of materials is to be evaluated using the guidance presented in DOE-STD-1027-92 to establish facility classification. The TRA R&D laboratories assessment was also compared to the low hazard criteria of DOE-ID Order 420.D to establish the facility overall hazard classification.

- Could not have potential personnel radiation exposure from sealed radioactive sources, radiation-producing devices, or non-releasable radioactive material in excess of a Total Effective Dose Equivalent (TEDE) of 2 rem from a single event.

  Neither the neutron generators nor the neutron generator probes in TRA-654 produce a dose that will exceed 2 rem. Further, none of the sources produce a dose that will exceed 2 rem.

- Could not have potentially releasable quantities of hazardous material that meet or exceed the 29 CFR 1910.119 TQs or the 40 CFR 355 TPQs (if the hazardous material is not listed in 29 CFR 1910.119).

  None of the hazardous materials exceed 29 CFR 1910.119 TQs or the 40 CFR 355 TPQs.

- Could not potentially result in injury to more than five (5) people on site from a single event.

  Laboratory operations do not typically involve more than two or three personnel working in a single laboratory. Additionally, the labs will not contain hazardous materials exceeding the 29 CFR 1910.119 TQs or 40 CFR 355 TPQs. Any hazardous material exceeding the reportable quantity specified in 40 CFR 302.4 will be evaluated and handled on a case-by-case basis.

- Could not potentially result in any increased risk to the off-site public.

  Laboratory operations at TRA are 10.7 km from the nearest site boundary, thus any increased risk to the off-site public is negligible.

- Could not potentially result in any environmental perturbations other than those that would be temporary and totally restorable in nature, thereby resulting in no environmental impact.

  Potential environmental damage is limited by the quantities of hazardous materials allowed in the facility and any environmental perturbation would be temporary and totally restorable.

The R&D labs meet the "Low Hazard" criteria of Reference 1.

4. CONCLUSION

Considering the form of the material and the mass and activity of the releasable constituents in the inventory of the TRA R&D laboratories, the hazard classification of the facility is "Radiological, Low Hazard." This classification is in accordance with 10 CFR 830 and DOE-ID Order 420.D and is based on a comparison of the estimated radioactive and hazardous material constituent quantities with the associated thresholds and RQs listed in DOE-STD-1027-92, 40 CFR 302.4, 29 CFR 1910.119, and 40 CFR 355.

An ASA will be prepared for this facility consistent with the classification of "Low Hazard" and will be approved by Bechtel BWXT Idaho, LLC (BBWI). Inventory control will be delineated in the administrative controls of the ASA to ensure the inventory of radioactive and hazardous materials does not exceed the appropriate regulatory quantity and the integrity of the classification is maintained.

5. REFERENCES

1. DOE-ID O 420.D, "Requirements and Guidance for Safety Analysis," U.S. Department of Energy, Idaho Operations Office, July 2000.

2. 10 CFR 830 part B, "Safety Basis Requirements," January 2001.

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