Chapter 12 - Appendix B:

Meitner-1 Emergency Plan

ATOMIC ALCHEMY INC.

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TERMS

ABBREVIATIONS AND ACRONYMS

AAI	Atomic Alchemy Inc.
ADAMS	NRC Agencywide Documents Access and Management System
CAM	Continuous Area Monitor
DOE-ID	Department of Energy-Idaho Operations Office
EAA	Emergency Action Assistant
EAL	Emergency Action Level
EAM	Emergency Action Manager
EP	Emergency Plan
EC	effluent concentration
ECC	Emergency Control Center
ECS	Emergency Communication System
EP	Emergency Plan
EPA	Environmental Protection Agency
EPIP	Emergency Plan Implementing Procedure
EPZ	Emergency Planning Zone
ERO	Emergency Response Organization
IAG	Interface Agreement (a BEA document type)
INL	Idaho National Laboratory
NOAA	National Oceanic and Atmospheric Administration
NOUE	Notification of Unusual Event
NPUF	Non-power Production and Utilization Facility
RAM	Radiation Area Monitor
RG	NRC Regulatory Guide
RSO	Radiation Safety Officer
USGS	United States Geological Survey
VIPR	Versatile Isotope Production Reactor

12B MEITNER-1 PRELIMINARY EMERGENCY PLAN

12B.1 INTRODUCTION

This Emergency Plan (EP) is for the Meitner-1 Non-power Production and Utilization Facility (NPUF), which is operated by Atomic Alchemy Inc. (AAI), a wholly owned subsidiary of Oklo, Inc. The Meitner-1 facility irradiates targets to produce isotopes used for medical, industry, space, defense, and research applications. It contains up to four Versatile Isotope Production Reactors (VIPRs), each 15 MWth, licensed under Title 10 *Code of Federal Regulations* (CFR) Part 50, plus an Isotope Manufacturing Facility, licensed under 10 CFR Parts 30 and 70.

Meitner-1 is located on the *AAI Site* (see Definitions) at the Idaho National Laboratory (INL) Site on a 172-acre plot of land, leased by AAI from the Department of Energy, Idaho Operations Office (DOE-ID) under license number DOE-ID-LI-25-001 (DOE-ID 2024). Battelle Energy Alliance (BEA) is the prime contractor for DOE-ID that operates INL.

All facilities are located within a fenced area of approximately 23-acre, which constitutes the *operations boundary* (see Definitions) and is synonymous with the AAI *controlled area* (see Definitions). The operations boundary encompasses the *site boundary* (see Definitions). The Meitner-1 facility is approximately 492 ft (150 m) from the site boundary.

The site boundary was established at a short distance from the facility as one of the conservative elements in the assessment of potential doses to the public. In this context, the area between the site boundary and the operations boundary represents the *unrestricted area* (see Definitions) per 10 CFR 50.34(a)(1)(i), “Contents of applications; technical information.” As a result, a portion of what AAI defines as unrestricted is restricted to members of the public, and the only areas that are truly uncontrolled by AAI fall beyond the AAI Site. The size and scale of AAI’s Emergency Program is appropriate for the risk presented by the inherently safe VIPR design.

The objective of this EP is to provide protection for individuals onsite as well as defense-in-depth for the Meitner-1 facility. It is designed to be compliant with the applicable requirements of 10 CFR Part 50, Appendix E, “Emergency Planning and Preparedness for Production and Utilization Facilities,” Section II, “The Preliminary Safety Analysis Report,” and Section IV, “Content of Emergency Plans,” based on NRC guidelines for implementing these requirements. This version is preliminary; it will be finalized and submitted with the FSAR.

12B.2 DEFINITIONS

Each term is italicized upon first use and marked with (see Definitions) for identification.

AAI Site: The 172-acre portion of land that AAI is leasing from DOE-ID on the INL Site, located approximately 30 miles west of Idaho Falls, Idaho. Although the area is controlled by AAI, it may be frequented by people unacquainted with the AAI facility operations, but such individuals would be trained on allowable activities within the *INL exclusion area* (see definition below). [AAI]

action drill: A drill that tests the integrated capability of the EP, or one or more components thereof, and may include instruction periods to develop and maintain skills in a particular operation. [NUREG-0849; AAI]

controlled area**:** Area with restrictive barriers (i.e. fence) within the *AAI Site*, access to which can be limited by AAI for any reason. The controlled area also constitutes the *operations boundary*. Within this area, AAI directly initiates emergency activities. [10 CFR 20.1003; ANSI/ANS-15.16; AAI]

emergency action level (EAL): Specific criteria, such as conditions or personal observations, instrument readings, alarm signals, actual or predicted radiological dose or dose rates, specific contamination levels of airborne, waterborne, or surface-deposited radioactive materials, or other hazardous materials, that may be used as recognized thresholds or triggers that result in protective actions such as: alerting and readying key personnel to a situation that may require some level of response from the Emergency Response Organization; assessing the situation and determining whether the situation warrants declaration of a certain emergency classification; and initiating appropriate emergency response and further notification measures. [ANSI/ANS-15.16]

emergency classes: Emergency classes are classes of abnormal events or conditions grouped by severity level for which predetermined emergency measures should be taken or considered. [ANSI/ANS-15.16]

emergency planning zone (EPZ): Area for which emergency planning is performed to assure that prompt and effective actions can be taken to protect the plant and public in the event of an accident. The EPZ size is dependent on reactor power level, potential dose release during accidents, and the distance beyond the site boundary at which the *protective action guides* could be exceeded. Regardless of whether an EPZ exist, the emergency planning actions within the EP shall be implemented in the case of an emergency. [EPA 2017; ANSI/ANS-15.16; AAI]

emergency: The classification of an abnormal event or condition that meets *EA)* threshold or trigger criteria that may require utilization of onsite Emergency Response Organization members, and possibly offsite depending on the situation, to correct or mitigate the event or condition. [ANSI/ANS-15.16]

INL exclusion area: The geographical area comprising the Idaho National Laboratory (INL) Site and is restricted to access by the public. The geographical land with private nuclear developments located on the INL Site, such as AAI's, is a subset of the INL exclusion area. [AAI]

offsite: The geographical boundary that is beyond the operations boundary**.** [ANSI/ANS-15.16]

onsite: The area that is within the operations boundary. [ANSI/ANS-15.16, AAL]

operations boundary: The area is synonymous with the *controlled area* and is the area that encompasses the *site boundary* which includes the reactor building. It is the area where the facility chief administrator has direct authority over all activities. The area within this boundary shall have prearranged evacuation procedures known to personnel frequenting the area. [ANSI/ANS-15.16]

protective action guides: Projected radiological dose or dose commitment values to individuals that warrant protective action following a release of radioactive or other hazardous material. Protective actions would be warranted provided the reduction in individual exposure expected to be achieved by carrying out the protective action is not offset by excessive risks to individual safety in taking the protective action. The projected dose does not include the dose that has occurred prior to the assessment. [EPA 2017; ANSI/ANS-15.16; AAI]

protective action: Predetermined action that will be implemented in response to abnormal events or conditions based on whether the event or condition meets *EAL* criteria. [AAI]

***restricted area*:** Area within the site boundary where access is limited by AAI for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. [10 CFR 20.1003; ANSI/ANS-15.16]

site boundary: The boundary found within the *operations boundary*, and beyond which is the unrestricted area per 50.34(a)(1)(i), "Contents of applications; technical information." The area has been established at a short distance from the facility as one of the conservative elements in the assessment of potential doses to the public. [ANSI/ANS-15.16; AAI]

***unrestricted area*:** The area that is beyond the site boundary where access is not limited by AAI for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. For Meitner-1, the site boundary fits within the operations boundary, so a portion of what AAI defines as unrestricted is restricted to members of the public, and the only areas that are truly uncontrolled by AAI fall beyond the AAI Site. [10 CFR 20.1003; ANSI/ANS-15.16; AAI]

12B.3 ORGANIZATION AND RESPONSIBILITIES

AAI is responsible for planning and implementing all *emergency* (see Definitions) measures within its operations boundary. This section describes the AAI Emergency Response Organization (ERO) that would be activated to cope with *onsite* (see Definitions) emergencies plus augmentation from external groups. **Figure 12B-1** displays the AAI organizational structure, with emphasis on AAI positions and external interfaces involving emergencies. AAI is negotiating with DOE-ID and INL to determine the allocation of their site resources for emergency communications, facilities (e.g., fire stations, medical facilities, etc.), and services (e.g., fire department, medical personnel, emergency personnel, and security personnel).

Additionally, several *offsite* (see Definitions) agencies are involved with emergency planning, preparedness, and response at INL. As noted above, AAI will coordinate with DOE-ID and INL, as appropriate, regarding emergency topics and interfaces with other offsite agencies, including preparation of mutually approved documents among the various parties involved with emergencies. Examples of documents include agreements for personnel, facility, and equipment resources,

Emergency Plan Implementing Procedures (EPIPs), training activities and materials, integrated drills, etc.

12B.3.1 Offsite Emergency-Related Organizations and Their Role in AAI Emergency Planning, Preparedness, and Response

Offsite emergency agencies and organizations and their roles are briefly summarized below. Once AAI has completed formal agreements with DOE-ID and INL, the details of inter-agency and other organization interactions related to emergency planning, preparedness, and response will be formally described and mutually agreed upon among all applicable parties. The final EP will be provided to the NRC with the operating license application.

Several formal agreements have been completed between AAI and either DOE-ID or INL (BEA). Specifically, AAI's Site Characterization License, DOE-ID-LI-25-001, is binding to AAI and its subcontractors, including AAI and its related companies. Site Characterization License, Exhibit B, Section E, "Environmental Site Assessment, requires AAI to enter into an interface agreement (IAG) with BEA. It requires that any cases where the IAG and the Site Characterization License conflicts, the Site Characterization License terms supersede. Also, it requires that BEA and AAI to update the IAG to reflect any relevant changes in the Site Characterization License or other agreements related to the project. The IAG was approved by BEA and AAI in May 2025, IAG-1136.

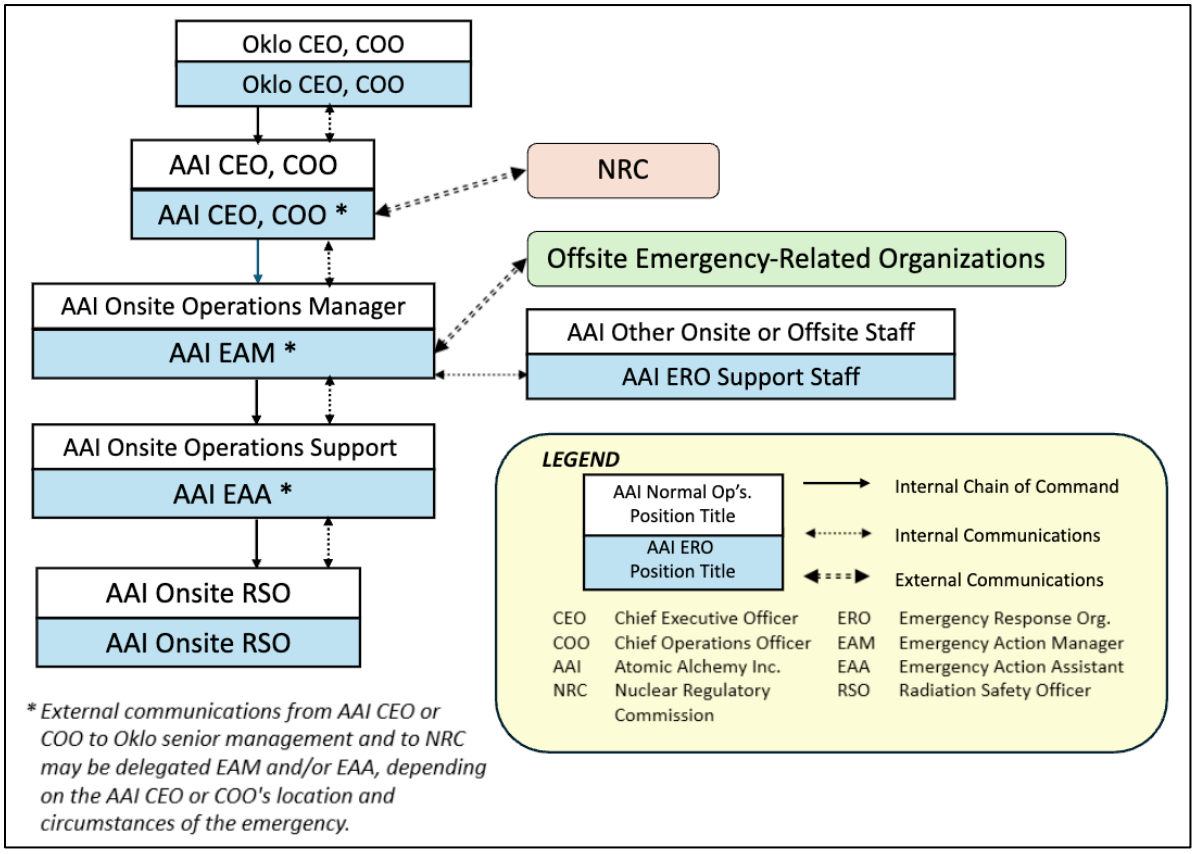

Figure 12B-1: Meitner-1 Emergency Response Organization chart

12B.3.1.1 NRC

As summarized in NUREG-/BR-0342, "Emergency Preparedness and Incident Response," the NRC coordinates with other Federal response partners and State and local entities to ensure that preparedness and response capabilities are in place to protect the public in the event of an incident." AAI will implement notification and reporting requirements to NRC in accordance with its EPIPs for abnormal events or conditions.

12B.3.1.2 Other External Emergency Resources

12B.3.1.2.1 DOE-ID and INL

The DOE-ID, within the DOE Office of Nuclear Energy, provides Federal oversight of the INL emergency management program. BEA is the prime contractor responsible for the site-level emergency management program for INL. Based on preliminary negotiations to-date with DOE-ID and INL, they will be able to support AAI in emergency planning, preparedness, and response.

BEA and other subcontractors staff various emergency support facilities and have capabilities that are expected to be available to support AAI emergency-related needs. These include

- medical facilities, equipment (including fire truck and ambulance), and personnel at the Materials and Fuels Complex (MFC), which is approximately 2 miles from the Meitner-1 facility,
- medical facilities, emergency equipment, and personnel at the Central Facilities Area, which is approximately 20 miles from the Meitner-1 facility,
- security detection, monitoring, and response equipment and personnel at MFC and other INL location,
- fire and hazardous material response facilities, equipment, and personnel at MFC and Central Facilities Area, and
- integrated, multi-organization Emergency Management Program and emergency control centers (ECCs) at various locations on the INL Site, including at MFC and the Central Facilities Area plus the DOE-ID Joint Information Center/Emergency Operations Center and Warning Communication Center which are co-located in Idaho Falls, approximately 40 miles from the Meitner-1 facility.

12B.3.1.2.2 National Oceanic and Atmospheric Administration (NOAA)

Real-time weather data is available to the public and are monitored by stakeholders during normal and emergency operations.

Meteorological conditions are constantly monitored and recorded by NOAA. The Air Resources Laboratory-Field Research Division of NOAA established an elaborate meteorological monitoring network, including 34 fully automated observation stations within the INL boundary and throughout the Eastern Snake River Plain in southeast Idaho. This NOAA/INL "Mesonet" provides an abundance of real-time data that is available via the internet. A description of this

Mesonet and links to the various data sources can be accessed at: https://noaa.inl.gov/projects/INLMet/INLMet.htm.

Information from this resource will be utilized by AAI as needed in plume dispersion modeling to predict potential radiation doses in the event of an abnormal event or condition involving radiation.

12B.3.1.2.3 United States Geological Survey (USGS)

Similar to NOAA, the USGS has seismic monitoring locations throughout the country, including Idaho, and offers an abundance of information via the internet, including near real-time seismic activity notifications as well as historical information.

Information from this resource will be utilized by AAI as needed to assess seismic activity that may be detected or observed at the AAI site.

12B.3.1.2.4 State, County, and Regional Entities

INL and DOE-ID Emergency Management Program incorporates routinely updated agreements and procedures, communications, training and drills, and response and recovery, as applicable, with a variety of local, regional, State, tribal, and Federal organizations. These organizations include:

- Idaho Office of Emergency Management
- Idaho State Police
- Eastern Idaho Interagency Fire Center
- Multiple county sheriffs' departments (INL physically spans 4 counties, including Bingham, Bonneville, Butte, and Jefferson Counties—Meitner-1 is located in Bingham County)
- Mountain Home Air Force Base near Boise, Idaho
- Shoshone Bannock Indian Tribe
- Cities of Idaho Falls, Blackfoot, and Pocatello, and
- Hospitals in these closest cities
- Local news media

Depending on the type of emergency, other agencies may need to be involved, e.g., for security emergencies the Federal Bureau of Investigation or National Nuclear Safety Administration. AAI will prepare formal agreements with applicable organizations, as needed, once the details pertaining to emergency-related services per the land use agreements with DOE-ID and INL are finalized. These agreements will be referenced in the final EP that are planned for completion at the time of the operating license application.

12B.3.2 Onsite ERO and Their Roles in Emergency Planning, Preparedness, and Response

AAI's onsite preliminary ERO is depicted in **Figure 12B-1** above. Emergency-related responsibilities for these positions are described in the following subsections.

12B.3.2.1 All Workers (AAI and Contractor)

- Obtain and maintain applicable training and qualifications related to the AAI Emergency Program. (See Section 12B.10 for additional information pertaining to applicable training and qualifications.)
- Immediately notify the affected facility Shift Supervisor in person or via the Emergency Communications System (ECS) of the observation, involvement in, local equipment, or area alarms, for any abnormal event or condition in accordance with applicable training, facility operating procedures, EPIPs, or facility supervision.
- Respond to instructions from the Emergency Action Manager (EAM), other ERO personnel, and facility supervision, as applicable, during and through the formal termination of the emergency.
- Participate in emergency planning, preparedness, and review of emergency-related documents, as applicable, commensurate with assigned roles and responsibilities.

12B.3.2.2 Chief Executive Officer (CEO) and Chief Operations Officer (COO)

These individuals are informed of emergencies by the AAI CEO, COO or delegate as soon as possible and are kept apprised of the emergency status through its conclusion. Oklo senior management has delegated full authority and responsibility for AAI's facilities and their Emergency Programs to the AAI CEO.

12B.3.2.2.1 AAI CEO

The senior-most, onsite authority for the Meitner-1 facility is the AAI CEO. The AAI CEO has delegated authority and responsibility for managing emergencies to the onsite Operations Manager (OM). External emergency communications with senior Oklo management and the NRC are performed by the CEO or COO when onsite and available. If neither is present, the OM assumes responsibility for external emergency communications. OM responsibilities are described in Section 12B.3.2.3.

12B.3.2.2.2 AAI COO

The second senior-most, onsite authority who collaborates with the CEO for the safe operation of the facility, communications with Oklo senior management as well as NRC. In the absence of the CEO, the COO maintains oversight of the facility and coordinates with the OM accordingly in the case of emergency.

12B.3.2.3 Onsite Operations Manager (OM)/Emergency Action Manager (EAM)

The Meitner-1 onsite OM is responsible for operating and maintaining the facility in accordance with its operating license. The onsite OM is also responsible for the AAI Emergency Program, including development, maintenance, planning, preparedness, and training for the EP, EPIPs, and interfaces with external participants, except as noted above for the CEO or COO. Additional operating staff will be trained and qualified to act for and support the OM when the OM is offsite or unavailable to fulfill the normal onsite OM duties.

In case of an abnormal event or condition that requires "entry" into the AAI Emergency Program[1], the OM transitions to the role of Emergency Action Manager (EAM), in which case may delegate OM responsibilities to a qualified alternate OM if necessary. This turnover allows the onsite OM to focus on the emergency, serving as the EAM. All facility operations personnel will continue with their normal operations duties, except as otherwise directed by the EAM and EPIPs. Upon entry into the Emergency Program, the EAM would typically call for limited continued operations or cessation of operations until further notice.

Once the emergency is terminated and the EAM has released the ERO, the OM will relieve the alternate and resume normal OM duties, which may include certain emergency recovery operations that will have been agreed upon in advance of terminating the emergency.

If the OM is offsite or is otherwise unavailable to serve as the EAM, then the designated onsite Emergency Action Assistant (EAA), who is qualified as an EAM, will serve as the EAM. The Meitner-1 OM is responsible for ensuring that adequate staff for the operating conditions of the facility are always available at the facility—this includes at least two individuals that are qualified as an EAM for all shifts. Key responsibilities of the EAM are as follows:

- Upon notification of an abnormal event or condition, utilize the EP and EPIPs to classify the emergency level, described in Section 12B.4, as applicable based on the initial notification information and input from applicable facility and other staff. This emergency classification responsibility can only be delegated to another qualified EAM, such as the EAA.
- Communicate the emergency to onsite personnel through use of the Emergency Communication System (ECS), (further described in Section 12B.8.4), and to offsite ERO personnel such as fire station, medical facility, ambulance, DOE-ID, INL ERO staff, and NRC, as applicable, in accordance with the EP and EPIPs. Utilize the EAA as necessary for notifications and requests for additional technical assistance to minimize distractions from the immediate response and assessment activities.
- Upon notification via the ECS of a potential emergency, serve as the EAM through its termination, unless relieved by another qualified EAM.
- Instruct onsite personnel to initiate response actions per EPIPs, including other ERO members to report to the onsite primary emergency control center (ECC) or the secondary ECC or an offsite ECC, depending on the location and conditions of the potential emergency, per the EPIPs.
- Direct implementation of onsite pre-determined Protective Actions (PAs), as applicable, based on the most current information about the event. The PAs may change as the event progresses and after assessment of the event (as described in Section 12B.7.2), in which case the updated PAs will be directed by the EAM. The PAs are determined by the type of emergency and the *emergency action levels (EALs)* (see Definitions), which are described in Section 12B.5. Certain PAs may be automatically initiated based on certain facility alarms, such as evacuation of a local

[1] Response to certain abnormal events or conditions is addressed in facility operating procedures or formal programs, and do not require notification of the EAM, such as minor corrective maintenance or housekeeping activities, minor first aid administration, inspection findings, etc. The operating procedures or formal programs will instruct users to the Emergency Plan and EPIPs, when warranted.

area where a radiation alarm sounds. Direction to implement PAs cannot be delegated by the EAM.

- Continue to assess the emergency based on inputs from other members of the ERO and other technical assistance as necessary to determine the proper course of further response or recovery actions.
- As deemed necessary, authorize emergency response workers to incur hazardous material exposures in excess of normal occupational limits, with the concurrence of the AAI CEO, COO, or as otherwise authorized per the EP and EPIPs. The EPA *protective action guides* (PAGs) (see Definitions) and "Planning Guidance for Radiological Incidents," EPA-400/R-17/001 (EPA 2017) will be used to establish the predetermined criteria for authorization of workers to voluntarily incur radiation exposures in excess of normal occupational limits. These criteria will be included in applicable EPIPs.
- Maintain command of emergency response through termination of the emergency, or until an alternate, qualified EAM is briefed and ready to take over emergency command, if needed.
- Direct the implementation of additional or updated response actions.
- Establish and coordinate recovery and facility re-entry efforts, as applicable.
- Evaluate the causes of the emergency and recommend corrective actions to facility operations management before releasing the onsite ERO members, and before authorizing the termination of the emergency and return of the facility to normal operating status under the command to facility management for any post-emergency recovery actions, as needed, and normal operations.

12B.3.2.4 Onsite Emergency Action Assistant (EAA)/ Operations Support Staff

Emergency response actions of the EAA and support staff are to:

- Report immediately to the EAM upon notification of an abnormal event from the EAM or another individual.
- Follow the directions of the EAM to provide assistance in accordance with the EPIPs.
- Provide support that may include, but is not limited to:
- communicating with onsite and offsite personnel to request specialized technical assistance,
- ensuring that onsite and offsite ERO personnel, as well as other onsite staff, receive the latest information about the emergency, and
- assisting in post-emergency evaluations, actions, reports, and improvements, as applicable.
- Obtain and maintain EAM qualifications and serve as an EAM when required.

12B.3.2.5 Other Onsite or Offsite Staff/ERO Support Staff

Various job positions will be assigned to support normal operations onsite or offsite, as needed, e.g., radiological safety, engineering, chemistry, QA, industrial safety, etc. Some of these individuals will be trained and designated as ERO members. Each ERO position from this group will have a qualified alternate in case the primary assignee is unavailable. During normal operations, the designated ERO members will either be stationed onsite or will be on-call, depending on the scope, location, duration, and time of operations being conducted. Offsite, on-call ERO members will be required to

- carry a phone on which they can be reached in the event of an emergency declaration,
- have access to a computer on which the EPIPs and other key facility information is available within 15 minutes of being called to serve as an ERO member, and
- be able to drive to the facility within one hour of being called to serve as an ERO member, if requested by the EAM.

As ERO members, responsibilities include:

- Upon declaration of an emergency by the EAM, or if contacted by the EAM or EAA prior to classification of an abnormal event to an emergency, follow directions from the EAM to provide information to assist the EAM in classification of the event or to implement response, assessment, re-entry, and recovery actions as directed by the EAM and EPIPs.
- As the situation allows, notify the applicable line manager of the situation, and request assistance as needed.
- Assist the EAM and EAA as requested until the emergency is terminated, and the EAM has released the ERO.
- Assist the EAM, EAA, or facility supervision as requested in post-emergency follow-up actions if necessary.

12B.3.2.6 Radiation Safety Officer (RSO)

The RSO is responsible for the AAI Radiation Protection Program and is a key member of the ERO. During normal operations, the RSO is typically onsite. The RSO is responsible for providing adequate onsite radiation protection staffing for the facility during all operations, including qualified back-up or alternate personnel in case the primary assignee(s) are unavailable. The RSO and other radiation protection personnel assess actual and potential radiological conditions during emergencies and provide this information to the EAM as applicable.

12B.4 EMERGENCY CLASSIFICATION SYSTEM

AAI's EP utilizes the standardized *emergency classes* (see Definitions) prescribed in ANSI/ANS-15.16-2015, Table 1, NUREG-0849 "Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors,", and NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," including the Final Interim Staff Guidance (ISG) for NUREG-1537, section 12.7. These emergency classes and definitions are shown in **Table 12B-1** .

Table 12B-1: AAI emergency classifications

Emergency Class	Definition and Key Assumptions
NOUE	Abnormal events or conditions that may occur, are in progress, or have occurred that may be initiated by either man-made events or natural phenomena that can be recognized as creating a significant hazard potential that was previously nonexistent. There is usually time available to take precautionary and corrective or mitigative steps to prevent the escalation of the event or to mitigate the consequences should it occur. No releases of radioactive material requiring offsite responses are expected. One or more elements of the ERO are likely to be activated or notified to increase the state of readiness as warranted by the circumstances. Although the situation may not have caused damage to the reactor, it may warrant a reactor shutdown or interruption of non-essential routine functions. Situations that may lead to this class include: (a) threats to or breaches of security, such as bomb threats or civil disturbances directed toward the reactor; (b) natural phenomena such as tornados in the immediate vicinity of the reactor, hurricanes, or earthquakes felt in the facility; and (c) facility emergencies such as prolonged fires, fuel damage indicated by high coolant fission product activity, or high off-gas activity.
ALERT	Events leading to an alert would be of such radiological significance as to require notification of the ERO and its response as appropriate for the specific emergency. Under this class, it is unlikely that off-site response or monitoring would be necessary. Substantial modification of reactor operating status is a highly probable corrective action. Protective evacuations or isolation of certain areas within the operations boundary may be necessary. Situations that may lead to this class include: (a) severe failure of fuel cladding or of fueled experiments where confinement boundaries exist to reduce releases or less severe cladding failures in situations where fission products are not well contained; and (b) significant releases of radioactive materials as a result of experiment failures where confinement boundaries also exist to reduce releases.
The Site Area Emergency and the General Emergency classes will not be used by AAI, as no credible accident scenarios meet the EPA Protective Action Guideline for these classes per the Chapter 13's accident analysis.	

12B.5 EMERGENCY ACTION LEVELS (EAL)

An emergency action level (EAL) is a pre-determined "trigger point" or specific condition for abnormal events that if reached, activates the emergency process. For each abnormal event or condition that reaches the EAL threshold, certain PAs will be taken early after the discovery and initial communication of such event or condition.

AAI has preliminarily developed a list of potential abnormal events or conditions, organized by similar initiating events or conditions into 6 categories. For each event or condition, the EAL and PA(s) are listed, along with the emergency classification assumed for each. Additionally, potential corrective or mitigative actions are also listed for each event or condition. These emergency classes, EALs, and PAs are based on NRC and EPA guidance as previously discussed, along with facility specific considerations based on actual experience at INL facilities. This table will be updated in the final EP to be submitted with the operating license application, based on final agreements with offsite resources and agencies, final facility design, and development of the EPIPs.

Table 12B-2: AAI Abnormal Events or Conditions, EALs, PAs, Emergency Classes, and Corrective or Mitigative Actions

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions
NATURAL PHENOMENON				
Severe storm conditions, with high winds or funnel clouds in sky, or on ground nearby or onsite	Siting or report of high winds or funnel clouds in sky or on ground nearby, based on personal observation or actual or predicted condition from NOAA weather station.	• Initiate standard actions for activation of onsite ERO. • Initial EAM announcement followed by take cover siren, and subsequent EAM communications.	**NOUE**	Continue to monitor conditions and NOAA weather station data. Assess damage after severe storm activity passes or ends.
Earthquake felt onsite	Onsite personnel feel shaking motion or earthquake sensors activate in facility.	• Initiate standard actions for activation of onsite ERO. • EAM directs personnel to avoid being near items that may fall and cause	**NOUE**	Assess earthquake data from USGS. Assess facility condition for potential damages.

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions
		injury in case of subsequent tremors.		
Extreme winter weather (blizzard conditions) occurring or forecast, with low visibility and drifting snow; road(s) closed or likely to close	Personal observation or report of recent, current, or forecast extreme winter weather with blizzard conditions within past or next 24 hours onsite or in region.	• Initiate standard actions for activation of onsite ERO. • Personnel are instructed to check official updated work and travel conditions (via AAI ECS email or text or phone recording) prior to going home from work or traveling to work.	**NOUE**	Non-essential routine work may be curtailed, and personnel may be sent home early; Personnel may be instructed to use alternate route for travel to or from site; Essential personnel may be instructed to prepare for extended onsite shift(s); Extra essential personnel may be called to site.
RADIOLOGICAL (see note c at end of table)				
Local radiation area monitor (RAM) or continuous air monitor (CAM) or Stack Monitor alarms. Actual or projected radiological effluent at the operations boundary that is calculated (or measured) to result in either of the following	(1) A deep dose equivalent of 0.15 mSv (15 mrem) OR (2) A committed effective dose equivalent of 0.15 mSv (15 mrem) based on the following considerations: • 100 EC × 24 hours = 2.4×10^3 EC-hr ≈ 0.15 mSv (15 mrem) for	• Initiate standard actions for activation of onsite ERO. • EAM announcement followed by take cover siren, and subsequent EAM communications.	**NOUE**	Facility supervision and radiation safety technicians make initial assessment of alarms and likely cause, and report status via ECS. If practicable and if the source or cause of the alarm is known, initial response actions by facility supervision and radiation safety technician may be

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions
conditions, both of which are based on an exposure of 24 hours or less (see next column):	radionuclides other than noble gases • 50 EC × 24 hours = 1.2×10^3 EC-hours ≈ 0.15 mSv (15 mrem) for noble gases			taken to reduce potential exposures, e.g., shield or create more distance from a source, per EPIPs and qualifications.
Actual or projected radiological effluent at the operations boundary that is calculated (or measured) to result in either of the following conditions, both of which are based on an exposure of 24 hours or less (see next column):	(1) A deep dose equivalent of 0.75 mSv (75 mrem) OR (2) A committed effective dose equivalent of 0.75 mSv (75 mrem) based on the following considerations: • 500 EC × 24 hours = 1.2×10^4 EC-hour ≈ 0.75 mSv (75 mrem) for radionuclides other than noble gases • 250 EC × 24 hours = 6.0×10^3 EC-hours ≈ 0.75 mSv (75 mrem) for noble gases	• Initiate standard actions for activation of onsite ERO. • Information will be tailored to specific conditions. Specific PAs could include: evacuate certain area or building; take cover in building away from affected area or building; assemble at a specific location; evacuate site from certain gate.	**ALERT**	Facility supervision and radiation safety technician make initial assessment of alarms and likely cause, and report status to EAM. Initial response actions by facility supervision and radiation safety technician may be taken to reduce potential exposures, e.g., shield or create more distance from a source, per EPIPs and qualifications.
Actual or projected radiation levels at the operations boundary of (see next column): Based on 1 hr.	0.2 mSv/hour deep dose equivalent (20 mrem/hour) for 1 hour OR 1.0 mSv (100 mrem) to the thyroid (committed dose equivalent)	Same as row 5	**ALERT**	Same as row 5

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions
CHEMICAL (see note c at end of table)				
Hazardous material spill, leak, or explosive reaction in a building or outdoors; extent of conditions not immediately known	Cause or source of spill, leak, or explosive reaction may not be known, and facility personnel are not able to stop the spill, leak, or explosive reaction per facility or operational procedures without support from ERO. The event may be affecting other areas of the building or other buildings or outdoor area(s).	• Initiate standard actions for activation of onsite ERO. • EAM directs evacuation of affected building to Primary Assembly Area [or other] until further notice from the EAM. • If the event occurs outdoors or is affecting the outdoors in typically occupied outdoor areas, the EAM will direct personnel to Take Cover in a building AWAY from the affected area; the take cover siren will be activated.	**NOUE**	Facility supervision will make initial assessment of alarms and likely cause, and report status via ECS. Stop or minimize spill, leak, or explosive reaction to the extent practicable, per EPIPs and qualifications. Assist with emergency decontamination per EPIPs and qualifications if needed.
SECURITY (see note d at the end of the table)				
Receipt of bomb threat affecting any part of the facility	Receipt of a bomb threat via discussion, phone, text, email, or note.	• Initiate standard actions for activation of onsite ERO. • EAM directs evacuation of all facilities through a specific gate, and board emergency bus.	**NOUE**	Personnel accountability will be performed on the evacuation bus. Security and other ERO personnel will perform assessment activities until threat is validated or dismissed utilizing

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions
		Follow instructions from EAM, and ERO members. Evacuation siren will be activated.		special response resources. Subsequent corrective or mitigative actions may be taken depending on the threat details and subsequent assessment activities.
Credible physical or cyber security threat affecting any part of the facility	Security determines a credible physical or cyber security threat exists; and provides specific instructions to EAM for subsequent action.	• Initiate standard actions for activation of onsite ERO. • An EAM announcement may or may not be made, depending on details of the threat, and instructions from Security.	**NOUE**	Depending on the type of security threat, various actions may be directed by the EAM (based on Security direction), such as curtailment of operations, evacuation of a certain area or building, no use of computers by any personnel, etc.
Physical or cyber security breach affecting any part of the facility	Security determines that a credible physical or cyber security breach exists; and provides specific instructions to EAM for subsequent action.	• Initiate standard actions for activation of onsite ERO. • Security will provide specific PA instructions to EAM, which could include as an example, a take cover or evacuate directive and respective siren	**ALERT**	Depending on the type of security breach, various corrective or mitigative actions may be directed by the EAM based on Security direction.

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions
		activation; or instruction to shut down all computers and cell phones in the event of a cyber-attack.		
FIRE				
Smoke or fire detected or observed in an AAI building or outdoor area within the operations boundary	Smoke or fire is detected or observed in an AAI building or outdoor area within the operations boundary. The fire protection system may or may not activate an alarm to the ECS. Cause or source of smoke or fire may not be known, or facility or observer is not able to extinguish the fire within 15 minutes.	• Initiate standard actions for activation of onsite ERO. • Offsite fire department would be summoned for potential assistance. • EAM notifies personnel of affected building and instructs affected personnel to evacuate building and to assemble in primary assembly area.	**NOUE**	Observer or facility personnel attempt to promptly determine the source or cause of the smoke or fire prior to evacuation. Take action to stop a fire from igniting, or extinguish the fire, if practicable, per EPIPs and qualifications.
TRANSPORTATION (see note e at end of table)				
Transportation accident within AAI operations boundary with potential injuries, fires, or spills	Vehicle accident occurs within AAI operations boundary with potential injuries, fires, or spills.	• Initiate standard actions for activation of onsite ERO. • Based on initial report and assessment, offsite fire and	**NOUE**	As applicable and if practicable, per EPIP and qualifications: Turn off vehicle(s); Extinguish fire; Get personnel out of vehicle(s);

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions
		medical services may be called. • EAM will direct personnel to stay away from the accident area until further notice.		Move to a safe location away from vehicle(s); and Administer first aid or CPR until paramedics arrive.

TABLE NOTES:

a. All onsite AAI staff and contractors will be trained in how to recognize and respond to abnormal events or conditions, including how to use the ECS, what types of alarms, sirens, and announcements may occur (local in facilities, and sitewide), including those that may be categorized as an emergency class, and what actions to take until the situation is resolved. See Section 12B.10.1 for additional discussion of the training and qualification program for the Emergency Program.

b. The following are standard actions for activation of onsite ERO actions when an abnormal event or condition is identified:

   i. Observer of abnormal event or condition communicates via the ECS (which could be via phone or radio, or in-person to facility supervisor, security, or EAM, or EAA).

   ii. Observation is communicated to EAM via ECS.

   iii. EAM verifies initial report based on confirmation from observer and determines if EAL threshold is met.

      1. If EAM determines that NOUE threshold is not met at the time, but likely would soon be met, EAM activates onsite ERO to stand-by status and continues to monitor situation from applicable sources. If NOUE threshold not met and threat diminishes, EAM directs ERO to stand-down, and potential emergency is terminated.

      2. If EAM determines that NOUE threshold is met, then EAM:

         a) Declares Emergency and makes warning announcement to all onsite personnel,

         b) Assigns emergency class,

         c) Activates onsite ERO,

         d) Requires curtailment of certain operations by going to safe-standby mode based on the type of emergency, per the EPIPs,

         e) Either makes additional notifications to senior AAI and Oklo management and to offsite ERO support organizations, or directs the EAA to make such additional notifications,

Abnormal Event or Condition	Emergency Action Level	Protective Action (see notes a and b at end of table)	Emergency Class	Corrective or Mitigative Actions

f) EAM determines necessary further assessment, response, and recovery actions, based on initial report and assessment results,

g) ERO implements further assessment, response, and recovery actions per EPIPs and as directed by EAM,

h) EAM terminates emergency when appropriate.

c. Effluent concentration (EC) is listed in 10 CFR 20, Appendix B, Table 2 "Annual Limits on Intake (ALIs) and Derived Air Concentrations (DACs) of Radionuclides for Occupational Exposure; Effluent Concentrations; Concentrations for Release to Sewerage". If the exposure time is <24 hours, the EC multiplier can be increased proportionately, provided that the values of 2.4 E+3 and 1.2 E+3 EC-hour are used to declare a notice of unusual event; the proportional increases are 5 for an alert and 25 for a site area emergency.

d. Federal or local law enforcement may be requested to intervene as needed.

e. Per the ISG for NUREG-1527, Part 2, Section 12.7, transportation accidents more than 1.61 km (1 mi) from the facility should not be classified.

12B.6 EMERGENCY PLANNING ZONE (EPZ)

AAI's accident analyses show that even for the maximum hypothetical accident (MHA) (which bounds the credible accidents, including maximum credible accident (MCA)), described in Chapter 13, the consequences do not result in offsite plume exposures exceeding 10 mSv deep dose (1 rem whole body) or 50 mSv (5 rem) thyroid per the EPA-2017 PAGS.

The MHA was evaluated at 150 m from Meitner-1 over 24 hours to comply with the 1 rem public dose threshold of 10 CFR 50.34(a)(1) and resulted in a dose of 0.34 rem effective dose equivalent (TEDE). The MCA was evaluated to comply with the requirements of the EPA-2017 PAGs at 150 m over 96 hours for members of the public and resulted in a dose of 2.08E-03 rem TEDE. The Thyroid dose was also evaluated for the MCA at 150 m over 96 hours for members of the public and resulted in 4.33E-02 rem. Based on these results, AAI is not required to have an *EPZ* (see Definitions).

12B.7 EMERGENCY RESPONSE

Emergency response measures will be identified for each emergency based on the emergency class and action levels that specify what measures are to be implemented in each case. EPIPs will be developed to provide specific instructions to workers and the ERO. The instructions will address activation of the ERO, assessment of the situation to make decisions regarding escalation or de-escalation of response actions, communications and notifications, and immediate protective actions to be taken based on the assessment of the situation. Preliminary protective actions, plus corrective or

mitigative actions are listed in **Table 12B-2**The following sections address specific criteria for emergency response.

12B.7.1 Activation of ERO

AAI's facility includes an Emergency Communication System (ECS). The ECS facilitates communication and data collection and monitoring capabilities for use in emergency notification, assessment, and response activities throughout the emergency life cycle. The EPIPs and specific administrative and operating procedures will define specific protocols for monitoring the ECS for an incoming initial notification of an abnormal event or condition, and ensuring the EAM promptly receives the initial information to determine the appropriate response.

The ECS receives signals from various other systems to inform AAI ERO classification response processes. Each separate building and separate area within the facility will include capability, e.g., phone, radio, video, fire alarm activation, or other, to allow personnel to report abnormal events or conditions to appropriate locations and individuals. ECS workstations will be included in the

- primary onsite ECC (Administrative Building)
- secondary onsite ECC (Shipping and Receiving Module)
- Main Control Room (MCR),
- Security Command Post,
- onsite Facility Operations Manager office (who serves as the EAM, as described in Section 12B.3.2.3), and
- Radiation Safety Office.

The AAI ECS will include two-way communication capability with INL and DOE-ID Emergency Response Organizations. An interface agreement between AAI and INL (INL-2025, IAG-1136) describes responsibilities for various activities related to environment, safety and health, and quality, including emergency response. Specific information from this approved interface agreement will be included in the AAI EPIPs, as applicable.

Part of emergency preparedness activities includes development and maintenance of an official Notification List which will identify the names, titles, office and home locations, and phone numbers of individuals that serve as ERO members, and technical authorities in specific disciplines, such as radiation safety, industrial safety, engineering, security, etc. The primary contacts in each position will be included along with at least 2 back-up contacts in each position. The official Notification List will be physically posted at each ECS workstation, and in each building and module. It will also be posted online for AAI personnel and contractors. The Notification List will be updated in accordance with the EPIPs and AAI's Document Control Program.

The EPIPs and personnel training will include specific information to be initially reported upon discovery or observation of an abnormal event or condition, as well as for subsequent notifications to external organizations, e.g., NRC, DOE-ID, and INL. Specific language for notifications to onsite and offsite personnel will be included in the EPIPs to ensure that at least the minimum information is consistently included in notifications. The communication protocols will also include verification of the notification content and receipt by appropriate organizations or individuals.

12B.7.2 Assessment Actions

Assessment of initial conditions and updates on conditions throughout the emergency life cycle is paramount to emergency response. The final EP and EPIPs, including personnel training, will describe and include specific checklists to be used by ERO members in assessing abnormal events or conditions. Other assessment tools will include, but are not limited to, site, facility, and system information reported or signaled from various site and facility locations including the Main Control Room. Portable instrumentation for radiation monitoring and other conditions, such as temperature and oxygen concentration, will also be available to ERO members. For weather or seismic abnormal events or conditions, information from offsite agencies such as NOAA or USGS will be monitored as part of assessment activities. Additionally, personnel and computing resources will be available to predict potential radiation doses (and other hazardous chemical exposures, as applicable) at the operations boundary and other locations based on current weather and operational data.

12B.7.3 Summary Description of Mitigative or Corrective Actions for Each Emergency Class

Table 12B-2 includes a brief description of mitigative or corrective actions, along with predetermined protective actions that will be implemented if an Emergency Action Level condition is reached for each Emergency Class (NOUE or Alert). The specific mitigative or corrective actions taken will depend on the nature of the event. Examples are included in **Table 12B-2**.

All personnel will receive training on mitigative or corrective actions that may be taken when practicable, provided the actions are within the individual's capability and do not increase risk to personnel or facility safety. Training will emphasize recognizing conditions where such actions are appropriate and ensuring that personnel act within their level of qualification and authorization.

12B.7.4 Protective Actions Appropriate for Each Emergency Class

Protective Actions are listed in **Table 12B-1** for each abnormal event or condition. Protective Actions vary from notifying onsite personnel of an abnormal event or condition to the extreme of evacuating personnel from the site.

Emergency Response Organization members will be specifically trained and qualified in their respective roles and will provide expertise in assessing the situation and implementing protective, mitigative, and corrective actions at the onset and throughout the emergency, in accordance with the EPIPs. Examples include:

- Isolating and controlling access to facility areas to minimize exposures to radiation and the spread of radioactive contamination
- Segregating potentially contaminated personnel
- Administering first aid and initial decontamination assistance to injured or contaminated (radioactive or other hazardous materials) personnel
- Measuring and monitoring source terms, concentrations, radiation doses, dose rates and contamination levels, and other hazardous material concentrations, exposures, and exposure rates, both onsite and offsite, including providing the data to those members assessing potential future conditions

- Recognizing and being prepared to deal with complicating factors and possible onsite and offsite consequences, including releases of nonradioactive hazardous chemicals incident to the processing of licensed material, that could impact emergency response efforts

AAI will develop a standard template for the EPIPs to ensure they contain necessary and helpful information to respond to abnormal events and conditions readily, systematically, and effectively throughout the emergency life cycle. Use of checklists, concise and consistent language and information to be used in notifications to onsite and offsite personnel, and separation of responsibilities between normal activities and emergency activities, will be utilized in the EPIPs. The EPIPs will address

- estimating and measuring source terms, concentrations, release rates, dose or exposure rates, doses or exposures at key, applicable locations onsite and offsite pertinent to the specific event or condition,
- valid computer codes to be used in assessment activities to project doses or concentrations to workers, public, or environment and their associated assumptions, along with adequate justifications to show the validity of the assumptions,
- types, methods, frequencies, implementation times, and other details of onsite and offsite sampling and monitoring that will be performed to assess a release of radioactive materials or hazardous chemicals incident to the processing of licensed material, and
- method(s) for assessing collateral damage to the facility and structures, systems, and components including those considered important-to-safety.

It is expected that all exposures of emergency personnel responding to events will be within the criterion of 5 rem TEDE, based on the EPA-2017 PAGs for early-phase response for emergency workers. The EAM can authorize exposures greater than these values to facilitate the rescue of injured personnel or take corrective or protective actions that mitigate the consequences of the emergency event. As outlined in the EPA-2017 PAGs for emergency workers, the criterion of 5 rem TEDE can be exceeded for protecting critical infrastructure necessary for public welfare, lifesaving, or protection of large population. Dose exposures that exceed 5 rem TEDE are on a voluntary basis and are restricted to a once-in-a-lifetime exposure.

12B.8 EMERGENCY FACILITIES AND EQUIPMENT

12B.8.1 Description of Emergency Control Center (ECC)

The primary ECC will be located within the Administration Building on the Meitner-1 site. The ECC will be the primary location where onsite ERO members assemble when the ERO is activated. If the ECC is not a safe location due to the nature of the emergency, the ECC function will be moved (or initially directed) to a secondary onsite location within the receipt and shipping module, where minimal ECC capability will be functional.

The AAI onsite ECC will be equipped with an ECS to facilitate incoming and outgoing communications throughout an emergency and with multiple computer workstations where pertinent event or condition information can be obtained from and shared with authorized onsite and offsite individuals and organizations, including NRC, INL, DOE-ID, and other offsite organizations. Paper copies of vital

documentation will be maintained in the ECC in accordance with the AAI Document Control Program, such as the Emergency Plan, EPIPs, notification lists, FSAR, key facility and program documents, maps, etc., in cases the electronic versions may not be available. The ECC provides a space where ERO members can assemble and serves as the command center for emergencies on the AAI Site.

The ECS will include the capability to receive and monitor specific data and alarm signals from various facility locations and systems, such as radiation detectors within the facility, the stack, and the operations boundary, fire protection system, reactor protection system, ventilation systems, INL emergency communications system, NOAA, USGS, etc. The ECC is not staffed unless the ERO is activated. ERO supplies and portable equipment, described below, are located within the ECC or in an adjacent storage room, where it can be easily issued to ERO members, as necessary.

12B.8.2 Representative Types of Monitoring and Sampling Equipment for Accident Assessment and Their Locations

Several radiation detection instruments (RAMs and CAMs) are planned to be located within Meitner-1 and within and around the operations boundary. These instruments will have various alarm settings depending on their respective locations and specific purpose. Alarm signals from a subset of them will be fed to the ECS to facilitate initial assessment and appropriate response to abnormal events or conditions. Additional portable radiation detection and quantification instruments will be available to the ERO as needed to support further assessments of and response to radiological conditions. Fixed and portable instrumentation to detect the potential release of other hazardous materials will be included, depending on the specific hazardous materials and their locations which may vary based on isotope manufacturing campaigns.

Instruments and supplies that may be needed for emergency assessment and response will be stored in specially marked cabinets or containers in at least 2 separate areas of the facility. Besides radiation, other portable instruments will be included in ERO cabinets or containers to measure parameters such as temperature and oxygen (or other gas) concentrations. Fixed instrumentation for other parameters that may be pertinent to abnormal events or conditions, e.g., smoke and fire detectors, earthquake sensors, oxygen monitors, etc. which provide signals to the ECS, is also provided in the AAI facility. All ERO instruments and supplies will be routinely inventoried, and calibrations will be maintained and verified, as applicable.

Meteorological and seismic conditions are constantly monitored and recorded by NOAA and USGS, respectively. This information is available for use by ERO personnel. The EP and EPIPs will include maps and diagrams showing where all Emergency Program resources are located, and key information about how to contact or obtain the resources.

12B.8.3 Measures for Injured or Exposed Personnel

AAI's facility will include capability for at least minimally decontaminating personnel within or adjacent to the Radiation Safety office. This capability will include standard supplies used in the nuclear industry for personnel decontamination. Included will be an enclosed decontamination sink and shower from which potentially contaminated water used for decontaminating personnel, or their personal items will be collected, sampled, and managed as waste, as applicable. For individuals needing more thorough

decontamination, they will be placed in appropriate clothing or covers and transported via an AAI vehicle, or an ambulance to an offsite facility at INL or one of the hospitals in Idaho Falls, depending on their condition.

Eye wash stations and an emergency shower will be located within the laboratory area to use in emergencies such as a chemical splash or spill that affects personnel. Potentially contaminated liquid from this safety equipment will be collected, sampled, and managed as waste, as applicable.

AAI will also designate an area where minorly injured personnel can be given first aid. For individuals needing more than standard first aid, an ambulance and paramedics will be summoned from an offsite location (such as MFC that is only two miles from the AAI site), or they will be taken via an AAI vehicle, or an ambulance as necessary to an offsite facility at INL or one of the hospitals in Idaho Falls, depending on their condition. For extreme injuries, several of the regional hospitals in Idaho Falls and Pocatello have life-flight helicopter services if needed.

12B.8.4 Emergency Communications Systems for Onsite and Off-Site

Telephones, radios, digital devices (e.g., computers, instruments) comprise AAI's ECS, as described in Section 12B.7.1. The key functional criteria for the ECS are:

- Provide capability for personnel to report their observation of an abnormal event or condition in each module, separate area, and building of the facility, e.g., via phone, radio, video link, etc.
- Provide capability for any reports of abnormal events or conditions from individuals or from alarm signals to be received at the locations listed in Section 12B.7.1.
- Provide capability for 2-way, real-time communications between locations from where abnormal events or conditions were reported and the locations indicated in paragraph b) above
- Provide capability for 2-way, real-time, mobile communications among ERO personnel working in the field and personnel manning the locations in paragraph b) above
- Provide capability to "link in" offsite locations (e.g., NRC, DOE-ID, INL, other) to AAI's ECS, as appropriate
- Provide capability to make real-time site-wide announcements, including evacuation and take-cover sirens, to all personnel that can be heard in all facility areas, including outdoor areas where personnel may be occasionally located
- Provide capability for key parameters or alarms that could indicate a radiological or other hazardous material release, such as RAMs and CAMs alarms throughout the facility and outdoor locations, including the operations boundary, stack monitor, earthquake sensors, smoke or fire alarms, reactor scram, etc., to be reported via the ECS
- Provide capability for AAI employees, contractors, and routine visitors to be able to receive emergency announcements via automated e-mail and text alerts from offsite locations; and
- Ensure the ECS capabilities listed above are always available and reliable

12B.8.5 Contingency Planning

Each major INL facility includes a facility emergency operations center and DOE-ID also has an emergency operations center in Idaho Falls. These could be contingent locations to support AAI

emergency activities in the event AAI's ECCs are not safe locations. AAI EPIPs will specifically address interfaces with INL and DOE-ID during emergencies, including use of offsite emergency operations center, as applicable.

12B.9 RECOVERY

Recovery from abnormal events and conditions will vary considerably depending on the location, type, and severity details obtained from assessment and re-entry activities. AAI will develop and implement approved recovery instructions as part of the EPIPs. The EPIPs will be coordinated with facility-specific and organization-specific procedures, as applicable. Prior to terminating any emergency event, at least a summary level recovery plan for promptly and effectively restoring the affected facility or portions thereof to a safe status after an emergency will be agreed upon by the EAM and facility management, with inputs from the other ERO members and other technical specialists, as necessary.

In accordance with AAI's Quality Assurance Program and implementing procedures, AAI will critique the applicable emergency program elements for each emergency drill and each actual emergency to identify strengths and weaknesses and promote performance improvement. Causes, additional corrective actions, and preventative actions to preclude recurrence of actual emergencies or of negative actions or outcomes in future drills or actual emergencies, will be determined, documented, and reported, accordingly. This EP and the EPIPs will be updated accordingly, as applicable.

12B.10 MAINTAINING EMERGENCY PREPAREDNESS

AAI will establish the necessary elements of its Emergency Program to maintain emergency preparedness prior to the start of operations. The AAI Meitner-1 Operations Manager is responsible for the overall Emergency Program, including emergency preparedness. The preparedness element activities will include training and drills, critiques of drills and assessment of training effectiveness, routine reviews, updates when needed, and audits, to training materials, EPIPs and the EP, and maintenance and verification of readiness for supplies, instruments, equipment, and locations. These preparedness activities will also include incorporation of lessons learned from prior AAI events or other similar events at other facilities, such as those at INL or at other facilities whose scope is similar to AAI.

The following sections describe AAI's preliminary emergency preparedness elements, which are based on NRC guidelines.

12B.10.1 Emergency Response Personnel Training Program

All AAI personnel receive some level of training regarding the Emergency Program, such as

- individual responsibilities and expectations for being situationally aware,
- hazards in various parts of the facility,
- observation and communication of abnormal events or conditions,
- allowable and unallowable response actions for abnormal events or conditions (e.g., stopping a spill, using a fire extinguisher, closing a fume hood cover, etc.), and
- meaning of various local and site-wide alarms and sirens and how to respond to them.

AAI will implement specific training and qualification elements for personnel assigned to the ERO. Element details will vary in terms of ERO personnel responsibilities and qualifications when serving in the ERO capacity. ERO member training would include

- responsibilities, authorities, and limitations and required training and qualification of ERO member responses in actual or simulated emergencies,
- facility familiarization for offsite ERO members, such as ingress/egress paths, hazards, and locations of key emergency-related equipment, instruments, and supplies, and
- responsibilities, authorities, and limitations and required training and qualification of personnel involved in planning, training, and observing, controlling, and evaluating emergency drills.

Both onsite and offsite ERO personnel, as listed below, will be provided with pertinent training and information necessary to support the AAI Emergency Program.

- Personnel responsible for providing emergency program training, critiques, observation, and evaluation
- Personnel responsible for accident assessment
- Radiological monitoring and analysis teams
- First aid and rescue personnel
- Medical support personnel,
- Police, security, ambulance, and firefighting personnel

Training and qualification program documentation will include position descriptions, training curriculum, exams, and requirements for entry-level, initial, and continuing training, qualification, and requalification, including schedule and frequency, as applicable. These documents and other training records will be generated, managed and controlled in accordance with the AAI QAP and implementing programs and procedures.

12B.10.2 Emergency Drills and Critiques of Drills

AAI's training and qualification program for the EP will include drills conducted in a manner that demonstrates the capability of the organization to plan and perform an effective response to an emergency, including

- annual onsite emergency drills, to be conducted as *action drills* (see Definitions),
- inclusion of offsite ERO personnel and facilities, as appropriate,
- provision for critiques of all drills, including designation of observers, observer tools such as checklists, timely reporting and evaluation of observer comments, and correction of identified deficiencies, and
- development of written scenarios for conducting annual action drills.

12B.10.3 Biennial Review and Update of the EP and EPIPs and Agreements with Offsite Support Organizations and Agencies

AAI's EP, EPIPs, and agreements with offsite support organizations and agencies, will be reviewed and updated, if necessary, at least every 2 years by personnel responsible for emergency planning and preparedness. The routine reviews will consider lessons learned from emergency activities since the

last review/update of the documents, as well as changes to the facilities or other factors that could affect the Emergency Program, including audit results. All of AAI's Emergency Program documents will be maintained as controlled documents and will be managed in accordance with the AAI QAPD and its implementing programs and procedures. This includes timely distribution of updated documents to those onsite and offsite personnel who implement the Emergency Program. The Emergency Program will be audited every 2 years.

12B.10.4 Provisions to Ensure Operational Readiness of Emergency Communications and Emergency Health Physics Equipment

AAI's emergency preparedness activities include provisions for maintaining and verifying emergency communications systems and the equipment, instruments, and supplies necessary for emergency response and assessment. AAI's communications systems and equipment will include an onsite public address system for announcements and instructions, including take-cover and site evacuation sirens that can be heard in all onsite facilities and normally occupied outdoor locations, along with facility-specific and position-specific capability for 2-way communications. Back-up means for communications will also be available, such as 2-way radios, bullhorns, telephones (hard-wired and mobile), intercoms, etc. Normal and back-up communication capability with offsite ERO members will also be available and routinely verified (at least quarterly).

Key emergency program instruments and supplies, such as various types of radiation detection instruments, thermal detectors, oxygen monitors, personnel protective equipment (PPE), first aid supplies, etc. will also be available in multiple locations of the facility. The emergency program training curriculum will include classroom and hands-on use of these items. These communication systems and other equipment, instruments, and supplies will be routinely inventoried, maintained, calibrated, and functionally tested, as applicable, in accordance with the EP, EPIPs, readiness checklists, and manufacturer recommendations, which include the frequency for each of these preparedness measures.

12B.11 REFERENCES

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12B.12 APPENDICES

Appendix A: List of Emergency Plan Implementing Procedures

This appendix will be included in the final EP provided to NRC with the AAI operating license application.