



# **WEAPONS SAFETY ASSESSMENT**

Volume One: Template Instructions

Chapters 1 and 2

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# **Weapons Safety Assessment**

Volume One: Template Instructions

Chapters 1 and 2

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## **ABSTRACT**

The regulations of the U.S. Nuclear Regulatory Commission (NRC) require an applicant for combined preemption authority and enhanced weapons authority to submit a Weapons Safety Assessment (WSA) as part of its application. This document sets forth a process that the NRC staff finds acceptable for use by an applicant in developing a WSA. The information in this document can be used by an applicant to evaluate the potential onsite and offsite safety hazards, safety impacts, or safety risks and any onsite security risks that could arise from the deployment and potential use of enhanced weapons (e.g., machine guns) as part of a licensee's protective strategy for defending against malevolent acts. Based on its assessment of these hazards, impacts, or risks, an applicant should identify preventive or mitigative measures that it intends to implement upon the deployment of enhanced weapons.

Volume 1 of the WSA document consists of Chapter 1, "Introduction," and Chapter 2, "Template Instructions."

## FOREWORD

This NUREG describes an approach that the U.S. Nuclear Regulatory Commission (NRC) considers acceptable for use by licensees (hereafter referred to as an “applicant”) in developing a weapons safety assessment (WSA) when applying for combined preemption authority and enhanced weapons authority. The NRC’s regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) 73.15, “Authorization for use of enhanced weapons and preemption of firearms laws,” require a completed WSA as a component of an application for such authority. The purpose of a WSA is to evaluate the onsite and offsite risks associated with the deployment and potential use of a specific enhanced weapon and identify needed preventive or mitigative measures to address those risks.

Applicants may wish to, but are not required to, use this NUREG to complete a WSA. If an applicant elects to develop its own weapons safety assessment process, the NRC staff recommends an applicant review this NUREG for guidance on the types of information that should be addressed in a completed WSA.

Under 10 CFR 73.15(c), the Commission has designated the classes of facilities, radioactive material being transported, and other property that are eligible to apply for combined preemption authority and enhanced weapons authority. Only an applicant within the designated classes of licensed facilities and activities is eligible to apply for combined preemption authority and enhanced weapons authority. Under 10 CFR 73.15(f)(1)(i) and (f)(2)(iv) an applicant must also include a new weapons safety assessment for each type of proposed enhanced weapon. The NRC staff will evaluate an applicant’s WSA to: 1) determine if the potential risks associated with the use of a specific enhanced weapon have been properly identified and any necessary mitigative measures implemented; 2) take into account the risks and proposed mitigative measures; and 3) determine whether an applicant’s requested enhanced weapon in specific deployments is appropriate.

In addition to this NUREG, applicants should also refer to the NRC’s regulatory requirements in 10 CFR 73.15 and supporting guidance in Regulatory Guide (RG) 5.86, “Preemption Authority, Enhanced Weapons Authority, and Firearms Background Checks.” This RG includes information on the application process and requirements for possessing, transferring, transporting, and using authorized enhanced weapons.

This WSA NUREG document consists of four publicly available volumes. The contents of each volume are as follows:

- *Volume 1: Template Instructions*—This volume provides detailed instructions for an applicant’s use in completing a WSA Volume 2 template.
- *Volume 2: Template*—This volume provides a template an applicant may use for evaluating the potential onsite and offsite safety hazards, safety impacts, or safety risks that could arise from the use of specific enhanced weapons.
- *Volume 3: Review Criteria*—This volume describes the criteria that the NRC staff will use in evaluating a WSA developed using the Volume 2 template process in an application for combined preemption authority and enhanced weapons authority.

- *Volume 4: Sample Template*—This volume provides an example of a completed WSA using the Volume 2 template process at a hypothetical power reactor site. Consequently, this sample template. is intended only as a tool and visual aid to an applicant.

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# ACRONYMS AND INITIALISMS

AAHs	armored attack helicopters
ACP	Automatic Colt Pistol
ADR	area danger ring
AP	armor piercing
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
BMG	Browning Machine Gun
cal	caliber
CFR	<i>Code of Federal Regulations</i>
CQBR	Close Quarters Battle Receiver
CQC	Close Quarters Combat
CRISAT	Collaborative Research into Small Arms Technology
DA	Department of the Army
DBT	design-basis threat
DEA	U.S. Drug Enforcement Agency
DG	design guide
DODIC	Department of Defense Identification Code
DOE	U.S. Department of Energy
DOS	Day Optic Sight
DWM	Deutsche Waffen und Munitionsfabriken (German weapons manufacturer)
ETL	engineering technical letter
FBI	Federal Bureau of Investigation
FAA	Federal Aviation Administration
FLETC	Federal Law Enforcement Training Center
FM	field manual
FMJ	Full Metal Jacket
FMJBT	Full Metal Jacket Boat Tail
FN	Fabrique Nationale or Five-seven
FPS	feet per second
FY	fiscal year
HB	heavy barrel (machine gun)
HB	Brinell hardness; pertains to armor plating (sometimes designated as HBW, BN, or BHN)
H&K	Heckler & Koch
HPT	high-pressure test
IADR	initial area danger ring
IR	Items at Risk
MADR	mitigated area danger ring
MK	Mark
mm	millimeter
MP	machine pistol
MRBF	mean rounds between failures
NATO	North Atlantic Treaty Organization
NRC	U.S. Nuclear Regulatory Commission
NVDs	night vision devices
PA	protected area
PDC	Protective Design Center of USACE
POC	point of contact
QD	quick detach
RG	regulatory guide
RHA	rolled homogeneous armor
ROWS	remotely operated weapon system

RPM	rounds per minute
SAAMI	Sporting Arms and Ammunition Manufacturers' Institute
SAS	Special Air Service, the principal Special Forces organization of the British Army
SAW	Squad Automatic Weapon
SCAR	SOF Combat Assault Rifle
SCAR-H	SCAR Heavy
SCAR-L	SCAR Light
SDZ	Surface Danger Zone
SLAP	Saboted Light Armor Penetrator
SLAP-T	Saboted Light Armor Penetrator-Tracer
SMG	submachine gun
SOF	Special Operations Forces
SPR	special purpose rifle
SRTA	Short Range Training Ammunition
STANAG	NATO abbreviation for Standardization Agreement
SUA	special use airspace
SV	Sniper Version or Sniper Variant
TM	technical manual
UCP	Ultimate Combat Pistol
UMP	Universal Machinen-Pistole = Universal Submachine Gun
USACE	U.S. Army Corps of Engineers
U.S.C.	<i>United States Code</i>
USMC	U.S. Marine Corps
Win Mag	Winchester Magnum
WSA	Weapons Safety Assessment

# GLOSSARY OF TERMS

**Area Danger Ring (ADR)** (not to be confused with surface danger zones)

**Initial (IADR)**

An encompassed area that represents the worst-case scenario of a fired round of ammunition's potential range (i.e., maximum range without considering any physical limitations on the flight of a round).

**Mitigated (MADR)**

An encompassed area that represents a fired round of ammunition's potential range (i.e., maximum range considering any physical limitations on the flight of a round) with mitigative measures in place to reduce the potential range or effect of the round.

**Blowback**

A system in which automatic or semiautomatic firearms operate through the energy created by combustion in the chamber and bore acting directly on the bolt face through the cartridge. Other operating systems are recoil operation, gas-actuated, Gatling, and chain.

**Blowback System**

A system in which there is no positive lock between the bolt and the barrel. The mass of the bolt and force of its recoil spring act to keep the breech closed. The expanding gases from the fired round overcome this inertia and "blow back" the breech. The breech must be kept closed until the round has left the barrel and gas pressures have subsided.

**Breech Block**

The block in breech-loading firearms that closes the rear of the barrel against the force of the charge and prevents gases from escaping.

**Brinell Hardness (HB)**

The hardness of a metal or alloy measured by hydraulically pressing a hard ball under a standard load into the specimen. Brinell hardness may also be designated as HBW, BN, or BHN.

**Cannelure**

(1) Ring-like groove in the jacket of a bullet, which provides a means of securely crimping the cartridge case to the bullet, analogous to the crimping groove in artillery ammunition. (2) Ring-like groove for locking the jacket of an armor piercing bullet to the core. (3) Ring-like groove in the rotating band of a gun projectile to lessen the resistance offered to the gun rifling. (4) Ring-like groove around the base of a cartridge case where the extractor takes hold. (5) Ring-like groove cut into the outside surface of a water-cooled machine gun barrel into which packing is placed to prevent the escape of water from the breech end of the water jacket.

**Collaborative Research into Small Arms Technology (CRISAT)**

The NATO standard in the manufacture of military equipment. The CRISAT Target is defined as a 1.6-millimeter titanium plate (UK IMI Ti 318) supplementing 20 layers of Kevlar (UK/SC/4468) as defined in STANAG Agreement 4512. Weapons are measured against this standard in respect to their ability to penetrate, and protective equipment is manufactured to adhere to it.

### **Designated Firing Position**

A designated firing position predetermined by the security operating procedures. These positions can be redeployable based on the security strategy.

### **Enhanced Weapons**

As defined in 10 CFR 73.2(b),<sup>1</sup> enhanced weapons are “short-barreled shotguns,” “short-barreled rifles,” and “machine guns.” These terms have the same meaning as defined in ATF regulations under 27 CFR 478.11.<sup>2</sup> Enhanced weapons do not include destructive devices as defined in 18 U.S.C. § 921(a)(4).<sup>3</sup>

### **Fixed Firing Position**

A firing position where the weapon is fired only from a fixed mount; may include multiple fixed positions from which the weapon can be moved to another fixed mount.

### **Foot-Pound**

A unit of work equal to the work done by a force of 1 pound acting through a distance of 1 foot in the direction of the force.

### **Frangible**

Capable of being broken; breakable. Frangible, or “soft,” rounds are designed to break apart when they hit walls or other hard surfaces to prevent ricochets during close-quarters combat. Also known as the Advanced Energy Transfer (AET) round.

### **Handgun**

Any firearm including a pistol or revolver designed to be fired by the use of a single hand. The term also includes any combination of parts from which a handgun can be assembled. See 18 U.S.C. § 921(a)(29).

### **Joule**

A unit of work or energy equal to the work done by a force of 1 newton acting through a distance of 1 meter.

### **Pintle**

A usually upright pivot pin on which another part turns. The pin on which a gun carriage revolves.

### **Rolled Homogeneous Armor (RHA)**

Armor having uniform composition and heat treatment throughout. RHA is frequently characterized as “hard” or “soft.” Homogeneous hard armor typically has a Brinell hardness in excess of 400 and is unmachinable, except with special tools. Homogeneous soft armor typically has a Brinell hardness of 350 or less and is machinable. RHA is sometimes referred to as “homogeneous rolled armor.”

### **Sabot**

(1) A lightweight carrier in which a projectile of a smaller caliber is centered so as to permit firing the projectile within a larger caliber weapon. The carrier fills the bore of the weapon from which the projectile is fired; it is normally discarded a short distance from the muzzle. (2) A thrust-transmitting carrier that positions a missile in a gun barrel or launching tube and that prevents the escape of gas ahead of the missile. (3.) Aluminum body of a high-velocity,

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<sup>1</sup> 10 CFR 73.2, “Definitions.”

<sup>2</sup> 27 CFR 478.11, “Meaning of terms.”

<sup>3</sup> Title 18 of the U.S. Code, “Crimes and Criminal Procedure”; Chapter 44, “Firearms”; § 921, “Definitions.”



armor-piercing tracer projectile having a tungsten carbide core; in this case, the core may be considered as the subcaliber projectile.

**Stray Round**

Misdirected or accidental firing and ricochets.

# 1. INTRODUCTION

## 1.1 Purpose

The regulations of the U.S. Nuclear Regulatory Commission (NRC) in Title 10 of the *Code of Federal Regulations* (10 CFR) 73.15, "Authorization for use of enhanced weapons and preemption of firearms laws," require a completed weapons safety assessment (WSA) as a component of an application for combined preemption authority and enhanced weapons authority. The purpose of a WSA is to evaluate the onsite and offsite risks associated with the deployment and potential use of a specific enhanced weapon and the need to implement preventive or mitigative measures to address those risks.

## 1.2 Background

This NUREG describes an approach that the NRC considers acceptable for use by licensees (hereafter referred to as an "applicant") in developing a WSA when applying for combined preemption authority and enhanced weapons authority. Under 10 CFR 73.15(c), the Commission has designated the classes of facilities, radioactive material being transported, and other property that are eligible to apply for combined preemption authority and enhanced weapons authority. Only an applicant within the designated classes of licensed facilities and activities is eligible to apply for combined preemption authority and enhanced weapons authority.

Under 10 CFR 73.15(e) and (f), eligible applicants applying for such authority are required to submit a WSA containing specified information to the NRC for prior review and approval. The NRC staff will evaluate an applicant's WSA to: 1) determine if the potential risks associated with the use of a specific enhanced weapon have been properly identified and any necessary mitigative measures implemented; 2) take into account the risks and proposed mitigative measures; and 3) determine whether an applicant's requested enhanced weapon in specific deployments is appropriate. Additionally, under 10 CFR 73.15(f)(1)(i) and (f)(2)(iv) an applicant must submit a new WSA if a licensee previously approved for combined preemption authority and enhanced weapons authority seeks to obtain new or different types or calibers or gauges of enhanced weapons.

Applicants may wish to, but are not required to, use this NUREG to complete a WSA. Volume 2 of the NUREG contains a template for completing a WSA. Applicants are not required to use the template in Volume 2 of this NUREG to complete a weapons safety assessment. However, if an applicant elects to develop its own weapons safety assessment process, the NRC staff recommends as a good practice an applicant review this NUREG for guidance on the types of information that should be addressed in a completed WSA. For applicants using the Volume 2 template process, the NRC staff recommends a submitted WSA contain a cover page and the completed Chapters 3 and 4. Submission of the Volume 2 unchanged front matter (e.g., forward, tables of contents, glossary, etc.) is not necessary.

In addition to this NUREG, applicants should also refer to the NRC's regulatory requirements in 10 CFR 73.15 and supporting guidance in Regulatory Guide (RG) 5.86, "Preemption Authority, Enhanced Weapons Authority, and Firearms Background Checks." This RG includes information on the application process and requirements for possessing, transferring, transporting, and using authorized enhanced weapons. The NRC staff notes that applicants for stand-alone preemption authority under 10 CFR 73.15(d) are not required to complete a WSA as part of their application for that separate authority under Section 161A of the AEA.

### **1.3 Limitations**

The items in the WSA Volume 2 template and these instructions encourage an applicant to focus on the safety impacts of using an enhanced weapon—either in a training setting or in actual use in defending the facility or transportation activity. With these powerful weapons, the potential for a stray round (i.e., a misdirected round, a ricochet, or an accidental firing) within an applicant’s facility, leaving an applicant’s facility, damaging a facility asset, or causing human injury – including death – can be great. Large caliber ammunition may pass through normal building materials and when unhindered may travel for hundreds of meters (thousands of feet).

The guidance in the WSA Reference Information volume contains information pertaining to firing range design, safety, surface danger zones, training plans for specific weapons, and maintenance of weapon systems. The NRC staff has provided this reference information only as an aid to an applicant. The WSA Reference Information volume is not publicly available, because this information was developed under the auspices of other departments or agencies of the U.S. Government and has dissemination restrictions. An applicant is responsible for creating range designs, training plans, or weapon maintenance plans that are appropriate for the specific types of enhanced weapons to be deployed.

An applicant’s development of “surface danger zones” is not specifically performed as part of the WSA process. Instead, the WSA process uses area danger rings (ADRs) to define the ballistic range of the enhanced weapons and to identify potential items at risk. For training ranges employing enhanced weapons (specifically machine guns), applicants may use elevation limits, controls, or structures to prevent off-range impacts. Where elevation limits, controls, or structures are not used at the firing ranges for such weapons, an applicant should discuss with its local Federal Aviation Administration (FAA) office any considerations associated with the designation of special use airspace (SUA), especially for larger caliber weapons (e.g., 7.62 millimeters (mm) or larger). For hand-held weapons, applicants should incorporate considerations of fire-discipline techniques regarding down-range implications as part of a weapons training plan.

### **1.4 WSA NUREG Structure**

This WSA NUREG document consists of four publicly available volumes. The contents of each volume are as follows:

- *Volume 1: Template Instructions*—This volume provides detailed instructions for an applicant’s use in completing a WSA Volume 2 template.
- *Volume 2: Template*—This volume provides a template an applicant may use for evaluating the potential onsite and offsite safety hazards, safety impacts, or safety risks that could arise from the use of specific enhanced weapons.
- *Volume 3: Review Criteria*—This volume describes the criteria that the NRC staff will use in evaluating a WSA developed using the Volume 2 template process in an application for combined preemption authority and enhanced weapons authority.

- *Volume 4: Sample Template*—This volume provides an example of a completed WSA using the Volume 2 template process at a **hypothetical power reactor site**. This sample template represents a **fictional facility** and is intended only as a tool and visual aid to an applicant.

To assist applicants in developing an application, the NRC staff has also compiled a supporting WSA Reference Information volume. This document is not publicly available. Consequently, eligible licensees should contact their licensing project manager or the NRC staff via e-mail at [WSA\\_requests.resource@nrc.gov](mailto:WSA_requests.resource@nrc.gov) to request a copy of the WSA Reference Information volume. The WSA Reference Information volume contains information on the following:

- weapons performance, design, and maintenance guidance,
- ammunition performance and ballistic characteristics,
- training considerations, and
- firing range design and safety considerations.

## **1.5 WSA Process Overview**

To successfully complete a WSA Volume 2 template, an applicant should first understand the overall WSA process.

The numbered list below outlines the NRC staff's recommended steps for an applicant to complete when using the WSA template:

- (1) An applicant provides general information (i.e., site name, address, points of contact).
- (2) An applicant specifies the weapon system desired and types of ammunition to be used.
- (3) An applicant provides a discussion of the anticipated uses of the weapon system.
- (4) An applicant obtains maps of the facility and the surrounding community.
- (5) An applicant creates a map of the initial area danger ring (IADR).
- (6) Using the IADR map from step 5, an applicant will analyze the area encompassed by the IADR for buffers or encroachments and identify any risk items. Additionally, an applicant will identify mitigation measures used to reduce risk for specific risk items.
- (7) An applicant identifies features that will limit the potential travel of rounds.
- (8) An applicant creates a map of the mitigated area danger ring (MADR) considering features that limit the travel of rounds. (If there are no such features, the IADR is used as the MADR in the following steps.)
- (9) With the completed MADR map, an applicant then returns to Section 2.8 of the template and identifies the risk items that fall outside the MADR boundaries.

- (10) An applicant documents the training, maintenance, and range modifications needed for the new weapon system.
- (11) An applicant submits the completed WSA Volume 2 template to the NRC.

## **1.6 Sensitivity of Information**

As discussed above, an applicant may use the Volume 2 template or its own process to complete a weapons safety assessment. Once an applicant begins to populate a WSA with information for a specific facility or transportation activity, then the document must be controlled to an information security level consistent with the information security level of the associated licensee's physical security plan and contingency response plan. Typically, this is either Controlled Unclassified Information (i.e., Safeguards Information) or classified information (i.e., either Confidential or Secret National Security Information). This information security consideration applies whether an applicant is using the Volume 2 template or its own process to complete a WSA.

Eligible licensees choosing to use the Volume 2 template should contact their licensing project manager or the NRC staff via e-mail at [WSA\\_requests.resource@nrc.gov](mailto:WSA_requests.resource@nrc.gov) to request a copy of the correct information security version of the template to develop an application that is appropriate to their facility or transportation activity. Upon receipt of a blank template, an applicant must upload the template and its associated help files into the licensee's appropriate secure information technology system to complete the template with the necessary information. Applicants using their own process should also develop their WSA on the licensee's appropriate secure information technology system.

Furthermore, an applicant must transmit an application, including a completed WSA, either a Volume 2 template or an alternative process, to the NRC via an approved secure transmission method as specified under 10 CFR Part 73, "Physical Protection of Plants and Materials," or 10 CFR Part 95, "Facility Security Clearance and Safeguarding of National Security Information and Restricted Data," as applicable.

Consequently, for applicants using the Volume 2 template process, the NRC staff has developed three separate versions of the template in their native electronic format (i.e., as a macro-enabled MS-Word document and associated help files) for an applicant's use. For each separate version, the NRC staff has preinstalled the appropriate information security banner markings (e.g., SAFEGUARDS INFORMATION, CONFIDENTIAL, or SECRET) and a cover page with the appropriate warning messages and a designation block or a classification determination block, as applicable. However, an unpopulated Volume 2 WSA template may be treated as an uncontrolled or unclassified document.

## 2. WSA TEMPLATE INSTRUCTIONS

This chapter of the WSA NUREG provides detailed instructions for completing the Volume 2 template. The section numbers and titles in Chapter 2 correspond to the section numbers and titles in the fillable Volume 2 template (Chapter 4, “Fillable Template”). That is section 2.6 in Chapter 2 corresponds to section 4.6 in Chapter 4.


Chapter 3 is unprotected, and applicants may enter information as desired. In Chapter 3, an applicant should enter the licensee’s name, docket number(s), license number(s), and any other relevant information not called out in Chapter 4. However, Chapter 4 is controlled as protected text, and applicants may enter data only through drop-down lists or text fields. Chapter 4 also contains embedded macros to perform the mathematical summation of the individual risk information; applicants may not make changes to these macro formulas.

Because the NRC staff created Volume 2 as an MS-Word® macro-enabled document (which uses a file extension “.docm”), applicants should save the unpopulated file in their secure information technology system using the same “.docm” file extension, rather than the more typical “.docx” file extension used in MS-Word. The NRC staff also recommends that applicants export a final completed template as a “.pdf” document in their application to the NRC for combined preemption authority and enhanced weapons authority to avoid any unintended changes during the review process.

The NRC staff recommends that for applicants using the Volume 2 template process they should submit only the completed Chapters 3 and 4 of the Volume 2 template to the NRC to provide the information required by 10 CFR 73.15(f). The NRC staff recommends that an applicant omit the front matter of Volume 2 preceding Chapters 3 and 4. That is, the Volume 2 title pages, abstract, foreword, table of contents, acronyms, and glossary. These provisions are considered extraneous information for the NRC staff’s review of a completed WSA.

The NRC staff recommends as a good practice that an applicant complete the development of a WSA using a multidisciplinary approach. The NRC staff recommends that the assessment include at least one subject matter expert familiar with the usage of the proposed type of enhanced weapons to assist with the selection, risk evaluation, documentation, planning, training, and possible training range modifications for the use of the specific envisioned enhanced weapons.

While the WSA process (e.g., the use of maps and ADRs) focuses on the deployment of enhanced weapons at a fixed site, an application to use enhanced weapons may also apply to the transportation of radioactive material (e.g., escorting shipments of spent nuclear fuel). In such cases, the NRC staff recognizes that the completion of certain provisions of the WSA process along a rail route is impractical (e.g., inclusion of map and ADRs). Accordingly, applicants applying to use enhanced weapons for transportation-escort purposes should list in Chapter 3 any sections of the Chapter 4 fillable template that it deems not applicable (i.e., not accomplishable).

In the Volume 2 template, holding the control key and clicking on an  symbol will open the help file instructions for the specific section in Chapter 4. The help files are numbered using the same numbering system in Chapter 4. That is help file 4-1 corresponds to section 4-1.

## **2.1 General Information**

In this section of the template, an applicant should provide basic (i.e., reference) information about an applicant's facility or transportation activity.

1. **Facility name**

Enter the facility name.  
(This is a text input field.)

2. **Submittal Date**

Enter the date (mm/dd/yyyy) this form was submitted for review.  
(This is a text input field.)

3. **Physical Address**

Enter the facility's physical location (not a P.O. box or applicant's headquarters address).  
(This is a text input field.)

4. **Is this a resubmittal for this facility and weapon?**

Yes or No. This response will alert the review team to check the previous package for comments.  
(This field is a drop-down selection.)

5. **City, State, Zip**

Enter the name of the city where the facility is located, the two-letter abbreviation for the State, and the zip code.  
(This is a text input field.)

6. **Facility Phone Number**

Enter the phone number (including area code) for the facility's physical address.  
(This is a text input field.)

7. **Mailing Address**

Enter the facility's mailing address if different from the physical address.  
(This is a text input field.)

8. **City, State, Zip**

Enter the city, two-letter State abbreviation, and zip code for the mailing address.  
(This is a text input field.)

9. **Mailing Address Phone Number**

Enter the phone number (including area code) for the facility's mailing address.  
(This is a text input field.)

10. **Applicant Point of Contact (POC)**

Enter the POC's name.  
(This is a text input field.)

11. Position Title of Applicant POC

Enter the position title for an applicant's POC.

(This is a text input field.)

12. Work Phone Number

Enter the POC's work phone number (including area code).

(This is a text input field.)

13. Alternate Phone Number

Enter a secondary phone number, such as the POC's mobile phone number (including area code).

(This is a text input field.)

14. POC's E-Mail Address

Enter the POC's office e-mail address.

(This is a text input field.)

15. Alternate POC

Enter the name of the secondary POC.

(This is a text input field.)

16. Position Title of Alternate POC

Enter the position title for an applicant's alternate POC.

(This is a text input field.)

17. Work Phone Number

Enter the alternate POC's work phone number (including area code).

(This is a text input field.)

18. Alternate Phone Number

Enter a secondary phone number such as a mobile number for the alternate POC (including area code).

(This is a text input field.)

19. Alternate POC's E-Mail Address

Enter the alternate POC's office e-mail address.

(This is a text input field.)

20. Applicant's Plant Manager

Enter the name of an applicant's plant manager.

(This is a text input field.)

21. Work Phone Number

Enter the plant manager's work phone number (including area code).

(This is a text input field.)

22. Alternate Phone Number



Enter a secondary phone number such as a mobile number for the plant manager (including area code).

(This is a text input field.)

**23. Plant Manager's E-Mail Address**

Enter the plant manager's office e-mail address.

(This is a text input field.)

**2.2 Desired Weapon for Submission**

In this section of the template, an applicant should select the enhanced weapon category (i.e., a machine gun, short-barreled shotgun, or short-barreled rifle) and identify a weapon that is representative of the weapon desired.

If an applicant is seeking weapons of the same type (i.e., short-barreled shotgun, short-barreled rifle, or machine gun) using the same type of ammunition (e.g., ball, hollow point, armor piercing) but of different caliber, an applicant may complete a single WSA for the weapon with the largest caliber or gauge. However, if an applicant is proposing to use different caliber enhanced weapons in its application (e.g., a single 7.62x51 millimeter (mm) fixed position machine gun in an antivehicle role and multiple 5.56x45 mm hand-held machine guns that can be fired from multiple locations in an antipersonnel role), then an applicant should submit two separate WSA templates to address differing onsite and offsite considerations for each of these different caliber and ballistic range weapons.

**24. Select an enhanced weapon category.**

Choose the type of enhanced weapon category.

For weapons classified as both short-barreled shotgun and machine gun, select short-barreled shotgun. For weapons classified as both short-barreled rifle and machine gun, select short-barreled rifle. Weapons capable of either fully automatic or select-fire (burst) modes in addition to semiautomatic are classified as machine guns.

(This field is a drop-down selection.)

**25. Identify a model or type, and caliber/gauge representative of the weapon desired.**

Specify only one weapon that matches the selected weapon category. An applicant may use a specific manufacture and model (e.g., an H&K SCAR-L automatic carbine) or a more generic description (e.g., an M-4 style automatic carbine).

(This is a text input field.)

**26. Enter the maximum range (meters).**

Enter the weapon's maximum range in the cell.

Table 2-1.1 of the WSA Reference Information volume shows the maximum range for various types of ammunition.

(This is a text input field.)

## 2.3 Ammunition Selection and Weapon Use

In this section of the template, an applicant should describe the types of ammunition that may be used with a specific enhanced weapon. This may involve multiple types of ammunition for a single type of enhanced weapon.

**27. Check all of the ammunition types below that are to be used with this weapon.**

Select all that apply.

The weapon requested may use many types of ammunition. The ammunition proposed for use (see Figure 2-1) should match the intent of use for the weapon. If a weapon will be used in an environment of sensitive equipment or explosive chemicals, a frangible round may be the proper choice; if a weapon will be used against material targets or to penetrate defenses, an armor-piercing round may be appropriate. As an applicant selects the type(s) of ammunition for use with a weapon, the maximum range of the ammunition should be considered. The NRC will use this information to assess risk when reviewing the WSA.

Table 1-1.1 in the WSA Reference Information volume lists weapons with associated recommended ammunition.

Applicants should perform further research on any types of ammunition they intend to use. The reference material listed at the end of this document can assist an applicant in this effort. Applicants may also use ammunition manufacturer’s literature.

**NOTE:** The use of frangible and other reduced range ammunitions should be evaluated taking into account the overall threat and protective strategy to ensure that no degradation of the security capability results from their prospective use.

(This is a checkbox selection/text input field.)

**Figure 2-1 Example of the Question 27 Checkbox for Types of Ammunition Used**

2-3: AMMUNITION USED					
NOTE: The user should consult the weapon manufacturer’s documentation for recommended/acceptable ammunition for the selected weapon system.					
<b>27. Check all of the ammunition types below that are to be used with this weapon.</b>					
	Type of Ammunition				
<input type="checkbox"/>	Ball	<input type="checkbox"/>	Tracer	<input type="checkbox"/>	Plastic (less-lethal)
<input type="checkbox"/>	Armor Piercing	<input type="checkbox"/>	Hollow Point	<input type="checkbox"/>	Frangible
<input type="checkbox"/>	Slug	<input type="checkbox"/>	Buckshot	<input type="checkbox"/>	Birdshot
<input type="checkbox"/>	Other (specify):				

## 2.4 Weapons Deployment and Training

In this section of the template, an applicant should describe the potential deployment of enhanced weapons at a fixed facility or during transportation activities and the associated training and qualification.

### 28. Check all types of deployment for the weapon.

Check all that apply

Check all of the boxes that describe how an applicant plans to use the selected weapon system. Item 31 is for the narrative description of the weapon deployment.

Firing positions are defined as follows:

**Fixed:** In a fixed firing position, the weapon is fired only from a single fixed-mount position or multiple fixed-mount positions to which the weapon can be moved as required by the security strategy.

**Designated:** A designated firing position is predetermined by the security organization's security operating procedures. These positions can be redeployable as required by the security strategy.

(This field is a checkbox selection.)

### 29. Additional description of weapon deployment.

*(Describe how and where this weapon will be used to implement the licensee's protective strategy. Include fixed positions or how the weapon will be carried, either by dismounted individuals or roving patrols (i.e., "locked in a rack" or "loaded with unchambered round," etc.). Also note if the weapon will be replacing a different caliber weapon.)*

Applicants should, at a minimum, consider the following questions in the discussion:

- (1) Will the weapon be mounted in several fixed positions, inside a building, or used by roaming security personnel?
- (2) Is there a chance of creating a dangerous crossfire situation during a security contingency response?
- (3) If the weapon is used from an elevated or fixed position, has overshooting of a target been considered?
- (4) Will the weapon itself or the area where it will be used be fitted with physical modifications to limit its field of fire (e.g., elevation, traverse, or both)?
- (5) Are administrative or procedural controls going to be used to limit the weapon's field of fire?

(This is a text input field.)

### 30. Create a Standard Range Card.

This applies to any weapon that is being used from a fixed location or designated firing position. A separate Standard Range Card should be created for each position and each weapon. Submit the range cards with the WSA application. Standard Range Cards and instructions for their use are attached to the WSA Reference Information volume (see Army Field Manual, Combat Skills of the Soldier, Appendix I; Army FM 21-75; and

Standard Range Card, Department of the Army, DA 5517-R). A Standard Range Card is not required for mobile positions but may be considered as appropriate.

**31. Discuss remotely operated weapons system.**

If a remotely operated weapons system (ROWS) will be combined with an enhanced weapon, then provide the following information:

- (a) Describe how many ROWS will be in use at the facility.
- (b) Describe where these ROWS will be placed.
- (c) Describe where the ROWS will be controlled from (location).
- (d) Describe how many ROWs each operator will control.
- (e) Describe any restrictions on field of fire.
- (f) Describe any steps taken or conditions of the site that avoid crossfire.

(These are text input fields.)

**32. Select level of advanced training.**

Choose the level of advanced training and attach supporting documentation describing the advanced training (see Figure 2-2).

**What is Enhanced and Specialized Training:** Training that is more in depth than that required by 10 CFR Part 73, Appendix B, “General Criteria for Security Personnel,” and is intended to support and complement the facility’s existing training and counterterrorism efforts.

The licensee’s training and qualification plan for enhanced weapons must include information from applicable firearms standards developed by nationally recognized firearms organizations or standard-setting bodies or from standards developed by: (1) Federal agencies, such as the U.S. Department of Homeland Security’s Federal Law Enforcement Training Center, the U.S. Department of Energy’s National Training Center, and the U.S. Department of Defense, (2) State law enforcement training centers, or (3) State Division (or Department) of Criminal Justice Services Training Academies.

**Enhanced Training:** Training that is above and beyond that required by 10 CFR Part 73, Appendix B. An applicant should justify enhanced training with documentation and explain how it will mitigate the ADR. Areas of enhanced training include, but are not limited to, the following:

- advanced shooting positions
- shooting from cover
- stance and grip
- shooting from a vehicle
- multiple shots
- low-light and night shooting
- malfunction drills
- speed and tactical reloads
- failure drills
- close combat/weapons retention
- multiple targets
- concealed carry techniques
- speed and accuracy drills

**Specialized Training:** Training that is more in depth than 10 CFR Part 73, Appendix B, training and enhanced training. An applicant should justify specialized training with


documentation and explain how it will mitigate the ADR. Areas of specialized training include, but are not limited to, the following:

- terrorist operations/criminal attacks analysis and practical exercises
- threat route analysis and practical exercises
- surveillance detection techniques and practical exercises
- limits of fire training and practical exercises

Applicants will receive risk reduction factors of 25 percent (0.25) for enhanced training and 50 percent (0.50) for specialized training at the bottom of each Risk Identification Table for Items 36–40. If the training meets only the base requirements of 10 CFR Part 73, Appendix B, the reduction factor should be entered into the tables as a zero. The risk reduction factors are not intended to eliminate or reduce the need for mitigative measures used to provide protection for risk items.

(This field is a drop-down selection.)

**Figure 2-2 Example of Question 28-32 Weapon Deployment and Training**

	
<b>4-4: WEAPON DEPLOYMENT AND TRAINING</b>	
<b>28. Check all types of deployment for the weapon. Check all that apply.</b>	
<input type="checkbox"/>	The weapon will be used in a remotely operated weapon system (ROWS) from fixed position/s. (If checked, applicant <i>must</i> describe system in Item 31.)
<input type="checkbox"/>	The weapon will be fired from fixed position(s) (i.e., attached to pre-positioned mount or mounts).
<input type="checkbox"/>	The weapon will be used from a designated firing point/s (e.g., guard towers, roof tops, etc.).
<input type="checkbox"/>	The weapon will be used while patrolling the property (e.g., foot patrols, vehicle patrols, etc.).
<input type="checkbox"/>	The weapon will be used inside facility buildings (e.g., interior fighting position, checkpoints, patrols, etc.).
<input type="checkbox"/>	The weapon will be used only within a small defined area of the property.
<input type="checkbox"/>	The weapon will be used in many situations and areas of the property.
<b>29. Additional description of weapon deployment:</b> (Describe how and where this weapon will be used to implement the licensee’s protective strategy. Include fixed positions or how the weapon will be carried, either by individuals or roving patrol (i.e., “locked in a rack” or “loaded with unchambered round,” etc.). Also note if the weapon will be replacing a different caliber weapon.)	
<b>30. Range Cards.</b> Create a Standard Range Card for any enhanced weapon that is being used from a fixed position or designated firing position and attach the card to the end of the WSA. A Standard Range Card is not required for mobile positions but may be considered as appropriate. (See <i>WSA Reference Information volume for guidance; note that all manuals change periodically, and a Web search should be conducted to ensure that the latest version of a given manual is being used.</i> )	
<b>31. ROWS Discussion:</b> If a remotely operated weapons system will be combined with an enhanced weapon, then provide the following information: <ul style="list-style-type: none"> <li>a. Describe how many ROWS will be in use at the facility.</li> <li>b. Describe where these ROWS will be placed.</li> <li>c. Describe where the ROWS will be controlled from (location).</li> <li>d. Describe how many ROWs each operator will control.</li> </ul>	

e. Describe any restrictions on field of fire.	
f. Describe any steps taken or conditions of the site that avoid crossfire.	
<b>32. Advanced Training.</b> Select level of advanced training: documentation describing the advanced training.	Attach supporting

**2.5 Map Information**

In this section of the template, an applicant should provide information about the use of enhanced weapons at a fixed facility that is found on, or illustrated by, maps. These types of maps can include topographical, aerial, grid, or street. Maps can also be used for other purposes (for example, identifying natural barriers, buffer areas, and encroachments and explaining risk mitigation plans).

An applicant should illustrate any buffers and encroachments, risk items, and risk mitigations (Sections 2-7 and 2-8) on maps or facility diagrams. All maps should be adequately detailed; an applicant may use multiple maps of differing levels of detail and scale, if needed for clarification.

Do not insert digital maps into this template. Instead, submit any maps as a separate file in an attachment. Submit all maps in both electronic and hardcopy form.

**33. Provide any pertinent map comments or explanations.**

In this field describe things that are marked or significant on the maps that are submitted with the application.

If comments and explanations are lengthy, include them as a separate attachment and so note in this field.

(This is a text input field.)

**2.6 Initial Area Danger Ring**

In this section of the template, an applicant should create an IADR for an encompassed area that represents the worst-case scenario of a round’s potential range (i.e., the ammunition’s maximum ballistic range). The IADR defines the area to be used for identifying risk items described in Section 2.8. Depending on weapons desired, ammunition used, deployment, and site geometry, the IADR may be composed of multiple individual rings rather than a single continuous ring.

Maximum ballistic range for a specific ammunition occurs when the weapon is fired at an angle of 30–35 degrees above the horizontal. Maximum range data for commercial ammunition are generally not available. An applicant should refer to similar ammunition in Table 2-1.1 of the WSA Reference Information volume for maximum range data. The data in Table 2-1.1 are derived from DOE M470.4-3 Protective Force, Section B, II-7.

Before creating the IADR, an applicant should read all available information in Section 2 of the WSA Reference Information volume pertaining to the ammunition for the weapon system selected.

As a hypothetical example, consider a case in which an applicant will have a 7.62x51 mm weapon firing ball, tracer, and frangible rounds from a single point.

From Table 2-1.1 of the WSA Reference Information volume, the maximum range of these rounds is 4,100 meters (2.55 miles).

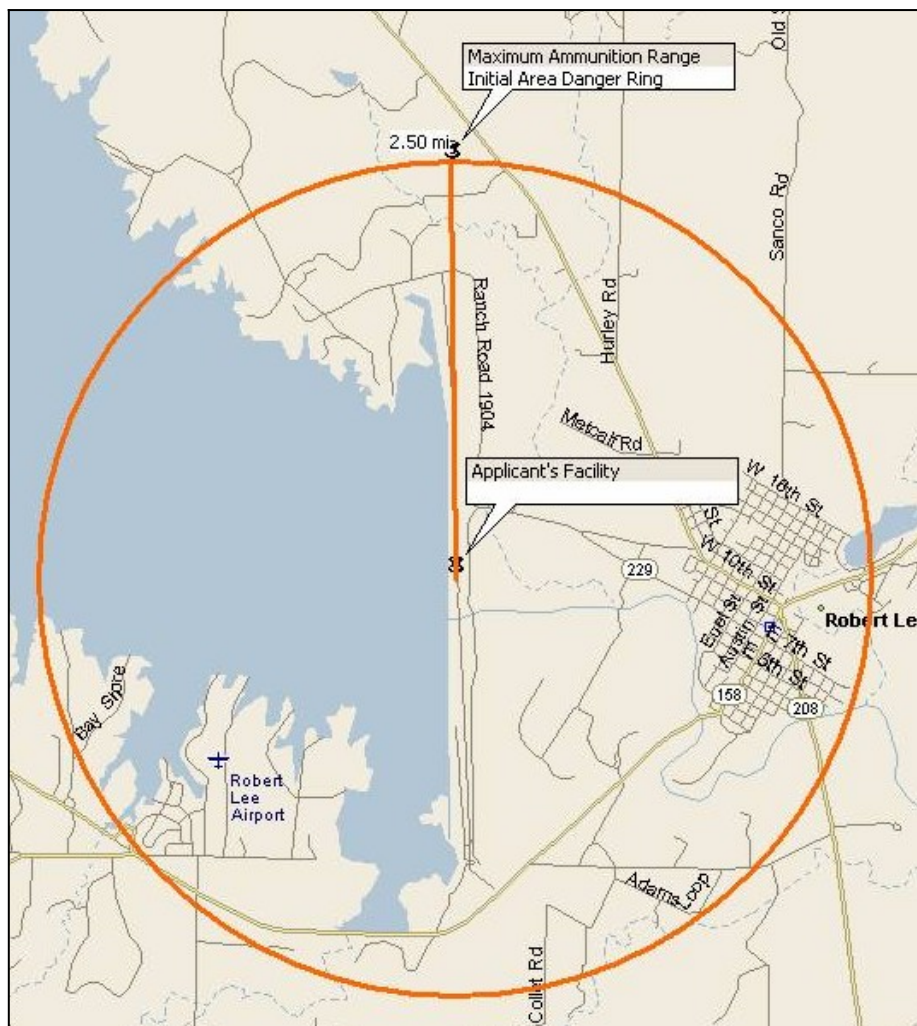
Using a hardcopy or electronic map, satellite photo, or facility diagram, draw a circle with its center at the point of firing and with a radius equal to the maximum range of the ammunition. The circle created is the IADR. It represents (worst case) how far a stray round could travel from the firing positions (see Figure 2-3).

If there are multiple firing positions, or if the enhanced weapons are used within an area rather than a fixed position, the IADR may be a series of circles, or an area enveloping the individual circles. Refer to Appendix A of Volume 4 for further information and examples on constructing IADRs and mitigated area danger rings (MADRs).

Electronic mapping tools, computer-aided design (CAD), or drafting tools may be used to draw the IADR on maps. Ensure that the rings depicted are legible and include the entire IADR.

**NOTE:** An applicant does not create an MADR map until Section 2.9 of the template.

**Figure 2-3 Example IADR for a Single Firing Point at a Hypothetical Facility (not to scale)**



## 2.7 Property Boundary Assessment and Encroachment Issues

In this section of the template, an applicant should analyze the property boundary considerations. The assessment looks for buffers and encroachments. Buffers are typically large undeveloped areas with sparse populations or development. Encroachments are developments of commercial, residential, or recreational activities (both land and aquatic) or more dense populations that are directly adjacent to a property boundary. These areas are important in the assessment of risk items later in the template. An applicant is responsible for ensuring that the total of the percentages entered into Table 2-7 in Item 34 equals 100 (see Figure 2-4 below).

An applicant should indicate buffers and encroachments on maps, satellite photos, or facility diagrams. All maps should be adequately detailed; an applicant may use multiple maps of differing levels of detail and scale, if needed for clarification.

34. Enter the percentage of each type of boundary buffer or encroachment type that surrounds the facility. These percentages should equal 100. Double-click on the table (in Volume 2: Template) to open the object for inputting data.

Table 2-4 automatically generates a risk level indicator and a percent encroachment value (see Figure 2-4). The risk level indicator should indicate to an applicant how much comprehensive and detailed discussion is needed in Item 35 to allow accurate assessment by the NRC. The higher the risk level indicator, the more detailed the discussion should be. The percent encroachment is a value that the NRC will use in the application review process.

Definitions and discussion are provided below to assist an applicant in identifying the various boundary types.

**Buffer Zone:** A buffer zone is any area that serves the purpose of keeping two or more other areas separated from one another, for whatever reason. Common types of buffer zones are certain restrictive easement zones and greenbelts. Buffer zones can be set up to deter violence, protect the environment, and mitigate the risks of industrial accidents or natural disasters from residential or commercial zones.

**River:** A river is defined as a large natural waterway. Rivers come in all sizes, but for this usage, assume that the river is large enough to provide a natural obstacle to approach by foot and wide enough to provide the property with a natural buffer from other properties. Do not consider creeks and small tributaries as part of this percentage.

**Lake:** A lake is defined as a body of water of considerable size surrounded by land. Lakes come in all sizes but for this usage, assume that the lake is large enough to provide a natural obstacle to approach by foot and wide enough to provide the property with a natural buffer from other properties.

**Ocean:** This global, interconnected body of saltwater, called the world's ocean, is generally divided by the continents and archipelagos into the following bodies: the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Southern Ocean, and the Arctic Ocean. Smaller regions of the oceans are called seas, gulfs, straits, and other names.

**Federal Property:** Property is owned by the U.S. Government for a number of uses, such as military installations, training areas, national parks, grasslands or



forests, or historically significant sites. In many cases, this property is scarcely populated and remote enough to provide a buffer to any property along its borders. Some portions of Federal property may experience high civilian use, such as attractions at national parks or the occupied area of a military installation. These high-usage portions of Federal land would represent an encroachment or a risk, not a buffer. If Federal property is adjacent to an applicant's property boundaries, complete and submit a thorough assessment before determining that federally owned property is a buffer.

**State or Local Government Property:** Property is owned by a State government or local government for a number of uses, such as National Guard installations, training areas, parks, recreation areas, piers, grasslands or forests, or historically significant sites. In many cases, this property is scarcely populated and remote enough to provide a buffer to any property along its borders. Some portions of State or local government property may experience high civilian use, such as parks or recreation areas. These high-usage portions of government-owned land would represent an encroachment or a risk, not a buffer. If State or local government property is adjacent to an applicant's property boundaries, complete and submit a thorough assessment before determining that this State or local government-owned property is a buffer.

**Farmland or Undeveloped Property:** This is land used for agriculture (crops or grazing) or property that has not been developed or constructed on. This type of property normally has an extremely low population density and therefore provides a buffer for an applicant's facility.

**Encroachments:** Encroachment issues are the expansion of nonapplicant activity (residential and commercial development) into formerly low-use adjacent areas that are part of the IADR or MADR. For the purpose of this assessment, "encroachment" refers to the expansion or existence of civilian activity (residential, commercial, recreational, and industrial development) along or near the border or perimeter of the facility boundaries. Such encroachments increase the risk to the public in the event that projectiles pass beyond the facility or firing range boundaries.

**Urban Sprawl:** Typically identified as the rapid and expansive growth of a greater metropolitan area; traditionally regarded as suburbs covering a large area.

**Residential Area:** Land where the predominant use is housing. In areas that are zoned residential, buildings may include single-family housing; multiple-family housing such as apartments, duplexes, condominiums, townhouses (or similar configurations); nursing homes and assisted-living facilities; or mobile homes. Additionally, schools and daycare facilities should be considered as residential areas.

**Light Industry:** Usually less capital intensive than heavy industry and more consumer oriented than business oriented (i.e., most light industry products are produced for end-users rather than as products for use by other industries). This is also defined as manufacturing activities that use moderate amounts of partially processed materials to produce items of relatively high value per unit weight. Farmland with structures (e.g., barns or storage bins) may be treated as light industry.

**Heavy Industry:** Manufacturing activities engaged in the conversion of large volumes of raw materials and partially processed materials into products of

higher value. Hallmarks of this form of industry are considerable capital investment in large machinery, heavy energy consumption, and final products of relatively high value per unit weight.

Retail Property: Property used primarily for the sale of goods or merchandise for personal or household consumption from a fixed location such as a department store, shopping mall, or kiosk.

Recreational Area: Property open to general public use for recreational activities such as, but not limited to, hiking, biking, horseback riding, picnics, sports, fishing, and boating.

Other Encroachment: Enter the percentage of an applicant's border that fronts an encroachment that does not fit any of the other encroachment types (e.g., an aerial or maritime encroachment).

**Figure 2-4 Example of Question 34 Quantifying Property Boundary Assessment and Encroachment Issues**

**4-7: PROPERTY BOUNDARY ASSESSMENT AND ENCROACHMENT ISSUES**

34. Enter the percentage of each type of boundary buffer or encroachment type that surrounds the facility. These percentages should total 100. Double-click on the table below to open the Excel object for inputting data. Click outside the table to close.

Buffers	%	Buffers	%
River		Lake	
Ocean		Federal Property	
State Property		Famland or Undeveloped	
Other Buffer		Property	
Encroachments		Encroachments	
Residential Area		Light Industry	
Heavy Industry		Retail Property	
Recreational Areas		Other Encroachment	
		<b>Total</b>	<b>0</b>
	Risk Level	1	Very Low
	Percent Encroachment	0	

35. Describe any pertinent information pertaining to property buffer or encroachment areas (i.e., describe what any Federal, State, or local government-owned property is used for, such as parks, recreation, or military purposes). Describe natural barriers, such as mountains, sloping terrain, manmade earthen berms.

In this field, describe all aspects of the property that would be significant when considering enhanced weapons to be used on the property. This would be the appropriate place to discuss terrain such as sloping ground, cliffs, hills, manmade earthen berms, embankments, or mountains on or near the property that could act as barriers to stop a stray round. Bodies of water can help keep the public at a distance from the facility, but water can cause a high probability of ricochet and should be considered later in the form when identifying risks. Additionally, describe any seasonal

aspects to property buffer or encroachment areas (e.g., hunting, boating, or other intermittent recreational activities). An applicant should add to, or update. Item 35 repeatedly while working through Items 36-40, as map comments may arise throughout the process of completing this template.

(This is a text input field.)

## **2.8 Risk Identification, Evaluation, and Mitigation**

In this section of the template, an applicant should identify all applicable items at risk (i.e., a risk item) and assign a likelihood of a strike and consequence of a strike for each. The NRC staff recommends as a good practice that an applicant's initial risk identification involve multiple knowledgeable staff members from various elements of an applicant's organization.

### **NOTES:**

Items can be mitigated as a group if they are in close proximity to each other and have similar "likelihood and consequences."

This volume (Volume 1) shows only a portion of the input tables from Volume 2.

Primary consideration should be given to a bullet hitting a risk item. An applicant should address the following questions: Will puncturing, igniting, or spalling occur? Will any toxic or hazardous chemicals then be released? What would be the potential consequences?

Refer to Chapter 6 of Volume 3 (see Section 6-2) when considering consequences to risk items inside buildings or behind barriers from different types of enhanced weapons and ammunition.

Assume all buildings are unoccupied in identifying the estimated "Population Distribution" in Item 41, unless occupied 24 hours per day (e.g., a continuously staffed alarm station). Include people who would routinely be in these buildings 24 hours per day under "Population Distribution" in Item 43.

Illustrate risk items and risk mitigations (Sections 2.8 and 2.9) on maps, facility diagrams, or both. Use maps with sufficient detail. Use multiple maps of differing levels of detail and scale, if needed for clarification.

Use the IADR created in accordance with Section 2.6 of this report to identify risk items.

Table 2-1 shows the five potential inputs for likelihood of a strike.

The potential inputs for consequence of a strike depend on the type of risk item considered. Refer to Table 2-2 for impacts to applicant's facilities and Table 2-3 for impacts to the community from hazardous (reactivity, flammability, and health) materials.

The input likelihoods and consequences yield risk levels based on the matrix in Table 2-4. Table 2-5 describes each risk level.

Within the input for Items 36 through 40, applicants must double-click on the table to access the embedded Excel (macro) object. Once in the Excel (macro) object, an applicant should follow these steps:

- Identify the risk item in the appropriate column.
- Select “Yes” in the drop-down menu for inside the IADR. (Selecting “Yes” for inside the IADR will automatically populate “Yes” for inside the MADR. During completion of Section 2.10, an applicant has the opportunity to identify a risk item as outside of the MADR. Additionally, the row will be **highlighted**, denoting that input for the item is not complete; a note will appear at the end of the table indicating that input is not complete until input for all identified risk items is complete.)
- Select the appropriate likelihood of strike and consequence from the drop-downs for the risk item.
- The Excel object will calculate the risk level and automatically populate the numeric and associated description under the “Risk Level” heading. (The row will be highlighted with the colors associated with each level defined in Table 2-5.)
- As each risk item is completed, the average risk in the MADR value and the mitigated risk level are updated.
- After completing all risk items, enter the appropriate mitigation factor for training from the drop-down menu. (The mitigated risk level will automatically be adjusted to reflect the selected value.)

Items 37 and 38 also contain a column with the heading “Rated.” For each risk item in these tables, select “Yes” or “No” from the drop-down menu. When “No” is selected, the row is **highlighted**, and the risk for that item is not used in computing average risk level in the MADR and mitigated risk level. (See discussion under each question for further guidance on the use of the “Rated” column.)

**Table 2-1 Likelihood of Strike Identification (Risk Item)**

Likelihood of Strike Identification		
Level	Descriptor	Description
5	Certain	Risk item will almost certainly be hit each time a weapon is discharged in that direction.
4	Likely	Risk item is likely to be hit, but not every time a weapon is discharged in that direction.
3	Possible	It is possible to hit the risk item, but that would happen only occasionally in many firings.
2	Unlikely	Risk item is unlikely to be hit because of other objects in the line of sight of, or placement of, the risk item.
1	Rare	Unlikely that risk item will ever be hit, or the risk item has been reinforced or protected against bullet penetration.

**Table 2-2 Impact to Individuals and Applicant’s Facility**

<b>Anticipated Consequence and Collateral Damage if Risk Item Is Hit</b>			
<b>Level</b>	<b>Descriptor</b>	<b>Impact to Individuals</b>	<b>Impact to Applicant’s Facility</b>
5	Tragic	Death*	All or portions of the facilities are destroyed and can no longer be used. Rebuild and repairs will be long term.
4	Major	Permanent Injury	All or portions of the facilities will be off-line or unusable for some amount of time.
3	Moderate	Semipermanent Injury	One or more of the facilities sustained damage but no major systems are off-line.
2	Minor	Short-Term Injury	Damage can be repaired in a short timeframe.
1	Insignificant	No Injury or Adverse Outcome	Repair time is insignificant.

\* Lethality of a given round depends on numerous parameters related to the bullet and the person impacted, which will vary from case to case. To ensure a conservative approach, applicants should use an impact energy of 6.779 joules (5 foot-pounds) to a human body as the threshold for lethality.

**Table 2-3 Impact to the Community from Chemical or Petroleum Hit**

<b>Anticipated Consequence and Collateral Damage if the Risk Item Is Hit</b>			
<b>Level</b>	<b>Descriptor</b>	<b>Impact to Community</b>	<b>Chemical or Petroleum Hit</b>
5	Tragic	Significant impact on community with long-lasting consequences	Possible death on site and/or off site, fire or explosion hazards, serious injuries to humans off site and on site, residential evacuations likely
4	Major	Major impact on the community with adverse media coverage and publicity	Fire or explosion hazard on site, human contact hazard off site, possible residential evacuations
3	Moderate	Local adverse publicity	Semipermanent Injury
2	Minor	Minimal impact on the community; short timeframes required for any repairs	Human contact hazard on site, nonhazardous offsite release
1	Insignificant	No impact on the community	Nonhazardous onsite release

**Table 2-4 Input and Associated Risk Levels Relationship**

Likelihood/ Consequence	Tragic	Major	Moderate	Minor	Insignificant
Certain	Very High	Very High	Moderate	Low	Very Low
Likely	Very High	High	Moderate	Low	Very Low
Possible	High	Moderate	Low	Low	Very Low
Unlikely	Moderate	Moderate	Low	Very Low	Very Low
Rare	Moderate	Moderate	Low	Very Low	Very Low

**Table 2-5 Risk Level Description**

Risk Level	Very Low	Low	Moderate	High	Very High
	1	2	3	4	5
Description	No Harm or Damage	Minor Harm or Damage	Moderate Harm or Damage	Major Harm or Damage	Tragic or Catastrophic Harm or Damage

**36. Hazardous (Reactivity, Flammability, and Health) Risks in the ADR.**

Double-click on the table (in Volume 2, “Template”) to open the Excel object for inputting data (see sample Table 2-6).

For evaluating risk items associated with chemicals and the potential release of chemical gases, fire, or explosions (see Figure 2-5), an applicant should consider chemicals and fuels stored at the facility first, but also consider that storage tanks 500–1,500 meters distant can easily be punctured by some of the ammunition listed in Section 2 of the WSA Reference Information volume. Consult a facility chemist or chemical engineer on the assessment of these chemicals. An applicant is responsible for determining the content of the table input and analyzing the risks.

**Table 2-6 Sample Hazardous Risk Portion of Input Table**

36. Hazardous (Reactivity, Flammability, and Health) Risks in the ADR. (Double click on the table to open Excel for inputting data. Enable Macros if screen appears.)							
Item ID	Risk Item	Inside ADR <sup>1</sup>		Likelihood of Strike	Consequence of Strike <sup>2</sup>	Risk Level	
		Initial	Mitigated				
36a				N/A	N/A	0	N/A
36b				N/A	N/A	0	N/A
36c				N/A	N/A	0	N/A
36d				N/A	N/A	0	N/A
36e				N/A	N/A	0	N/A
36f				N/A	N/A	0	N/A
36g				N/A	N/A	0	N/A
36h				N/A	N/A	0	N/A
36i				N/A	N/A	0	N/A
36j				N/A	N/A	0	N/A

**Figure 2-5 Sample Portion of Discussion Items for Item 36**

36. Justify the likelihood and consequence levels for each risk item in the areas provided below. Select the type of mitigation for each risk item. Describe in detail the single or multiple mitigation steps taken to alleviate or lower the risk factor. The “Other Discussion” field can be used for any additional information supporting risk mitigation.			
36a. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			
36b. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			

**37. Key Facilities/Areas inside the PA.**

Double-click on the table (in Volume 2, “Template”) to open the Excel object for inputting data for key facilities or areas inside the facility’s protected area (PA) (see sample Table 2-7). For entered risk items, applicants should discuss mitigative actions taken (see sample Figure 2-6).

Applicants should include those systems, structures, components, and operator actions that, if unable to perform their required function, could lead to accidental criticality, dispersal of special nuclear material, significant core damage, or radiological sabotage or dispersal of spent nuclear fuel. Designate these risk items with “Yes” in the “Rated” column to include them in the determination of average risk level in the MADR and mitigated risk level. For some types of facilities, impacts on operations are also potential national security issues. If so, risk items associated with interruption of normal operations should be included as rated items.

For evaluating risk items associated with key facilities inside an applicant’s PA, consider risk items that are not always obvious, such as a diesel generator that, if destroyed would not be hazardous by itself, but is a backup vital power source. Another example is a communication nexus (node) that, if destroyed, would also not be hazardous itself but could disable offsite communications capabilities.

Applicants may also consider financial impacts of risk items associated with normal operations, if so desired. However, the NRC does not intend to consider potential financial implications for an applicant in the evaluation of the application. Designate these Risk Items with “No” in the “Rated” column to exclude them from the determination of average risk level in the MADR and mitigated risk level.

**Table 2-7 Sample Key Facilities inside the PA Portion of Input Table**

37. Key Facilities/Areas Inside the PA (Double click on the table to open Excel for inputting data. Enable Macros if screen appears.)								
Item ID	Risk Item <sup>1</sup>	Inside ADR <sup>2</sup>		Likelihood of Strike	Consequence of Strike <sup>3</sup>	Rated	Risk Level	
		Initial	Mitigated					
37a				N/A	N/A		0	N/A
37b				N/A	N/A		0	N/A
37c				N/A	N/A		0	N/A
37d				N/A	N/A		0	N/A
37e				N/A	N/A		0	N/A
37f				N/A	N/A		0	N/A
37g				N/A	N/A		0	N/A
37h				N/A	N/A		0	N/A
37i				N/A	N/A		0	N/A
37j				N/A	N/A		0	N/A

**Figure 2-6 Sample Portion of Discussion Items for Item 37**

37. Justify the likelihood and consequence levels for each risk item in the areas provided below. Select the Type of Mitigation for each risk item. Describe in detail the single or multiple mitigation steps taken to alleviate or lower the risk factor. Use the "Other Discussion" field for any additional information supporting risk mitigation.			
37a. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			
37b. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			

**38. Key Facilities/Areas outside the PA but on the Facility's Property.**

Double-click on the table (in Volume 2, "Template") to open the Excel object for inputting data for key facilities or areas outside the facility's PA, but within the facility's site boundary (see sample Table 2-8). For entered risk items, applicants should discuss mitigative actions taken (see sample Figure 2-7).

Applicants should include those systems, structures, components, and operator actions that, if unable to perform their required function, would lead to accidental criticality, dispersal of special nuclear material, significant core damage, radiological sabotage, or dispersal of spent nuclear fuel. Designate these risk items with "Yes" in the "Rated" column to include them in the determination of average risk level in the MADR and mitigated risk level.



Applicants may also consider financial impacts of risk items associated with normal operations if so desired. However, the NRC does not intend to consider potential financial implications for an applicant in the evaluation of the application. Designate these risk items with “No” in the “Rated” column to exclude them from the determination of average risk level in the MADR and mitigated risk level.

For some types of facilities, impacts to operations are a potential national security issue. If so, risk items associated with normal operations should be included as rated items.

For evaluating risk items associated with key facilities outside the PA, consider risk items that are not always obvious (for example, a diesel generator that, if destroyed, would not be hazardous, but is a backup vital power source).

**Table 2-8 Sample Key Facilities outside the PA Portion of Input Table**

38. Key Facilities/Areas Outside the PA but on the Facility's Property (Double click on the table to open Excel for inputting data. Enable Macros if screen appears.)								
Item ID	Risk Item <sup>1</sup>	Inside ADR <sup>2</sup>		Likelihood of Strike	Consequence of Strike <sup>3</sup>	Rated	Risk Level	
		Initial	Mitigated					
38a				N/A	N/A		0	N/A
38b				N/A	N/A		0	N/A
38c				N/A	N/A		0	N/A
38d				N/A	N/A		0	N/A
38e				N/A	N/A		0	N/A
38f				N/A	N/A		0	N/A
38g				N/A	N/A		0	N/A
38h				N/A	N/A		0	N/A
38i				N/A	N/A		0	N/A
38j				N/A	N/A		0	N/A

**Figure 2-7 Sample Portion of Discussion Items for Item 38**

38. Justify the likelihood and consequence levels for each risk item in the areas provided below. Select the type of mitigation for each risk item. Describe in detail the single or multiple mitigation steps taken to alleviate or lower the risk factor. Use the “Other Discussion” field for any additional information supporting risk mitigation.			
38a. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			
38b. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			

39. Key Facilities/Areas outside the Property Boundaries. (Refer to IADR map.)

Double-click on the table (in Volume 2, “Template”) to open the Excel object for inputting data for key facilities or areas outside the facility’s site boundary (see sample Table 2-9).

For entered risk items, applicants should discuss mitigative actions taken (see sample Figure 2-8).

When evaluating risks associated with key facilities outside the property boundaries, refer to the IADR created in Section 2.6. An applicant should create lists of businesses, schools, shopping areas, and facilities within the ring, then discuss how a stray round might affect that item and if there are other barriers that would lessen the likelihood of a stray round reaching the item. This section identifies key facilities or areas within the sectors of fire.

**Table 2-9 Sample Key Facilities outside the Property Boundaries Portion of Input Table**

39. Key Facilities/Areas Outside the Property Boundaries (Double click on the table to open Excel for inputting data. Enable Macros if screen appears.)							
Item ID	Risk Item <sup>1</sup>	Inside ADR <sup>2</sup>		Likelihood of Strike	Consequence of Strike <sup>3</sup>	Risk Level	
		Initial	Mitigated				
39a				N/A	N/A	0	N/A
39b				N/A	N/A	0	N/A
39c				N/A	N/A	0	N/A
39d				N/A	N/A	0	N/A
39e				N/A	N/A	0	N/A
39f				N/A	N/A	0	N/A
39g				N/A	N/A	0	N/A
39h				N/A	N/A	0	N/A
39i				N/A	N/A	0	N/A

**Figure 2-8 Sample Portion of Discussion Items for Item 39**

39. Justify the likelihood and consequence levels for each risk item in the areas provided below. Select the type of mitigation for each risk item. Describe in detail the single or multiple mitigation steps taken to alleviate or lower the risk factor. Use the "Other Discussion" field for any additional information supporting risk mitigation.			
39a. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			
39b. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			

40. Critical Asset Items outside the Property Boundaries (Refer to ADR Assessment).

Double-click on the table (in Volume 2, "Template") to open the Excel object for inputting data on critical asset items outside of the facility's site boundary (see sample Table 2-10). For entered risk items, applicants should discuss mitigative actions taken (see sample Figure 2-9).

When evaluating risks associated with any other critical asset items outside the property boundaries, refer to the IADR created in Section 2.6. An applicant should create lists of any other risk items that have not been covered in the analysis from previous sections. List these items within the ring, then discuss how a stray round might affect an item and describe any other barriers that would lessen the likelihood of a stray round reaching the item. This section identifies critical assets within the sectors of fire. All critical assets should be identified, and an applicant should assess the risks associated with each as pertaining to “Public Health and Safety” or the “Business Category,” with consideration to how the risks affect future facility operations.

**Table 2-10 Sample Critical Asset Items outside the Property Boundaries  
Portion of Input Table**

40. Critical Asset Items Outside the Property Boundaries (Double click on the table to open Excel for inputting data. Enable Macros if screen appears.)							
Item ID	Risk Item	Inside ADR <sup>1</sup>		Likelihood of Strike	Consequence of Strike <sup>2</sup>	Risk Level	
		Initial	Mitigated				
40a				NA	NA	0	NA
40b				NA	NA	0	NA
40c				NA	NA	0	NA
40d				NA	NA	0	NA
40e				NA	NA	0	NA
40f				NA	NA	0	NA
40g				NA	NA	0	NA
40h				NA	NA	0	NA
40i				NA	NA	0	NA
40j				NA	NA	0	NA
40k				NA	NA	0	NA
40l				NA	NA	0	NA

**Figure 2-9 Sample Portion of Discussion Items for Item 40**

40. Justify the likelihood and consequence levels for each risk item in the areas provided below. Select the type of mitigation for each risk item. Describe in detail the single or multiple mitigation steps taken to alleviate or lower the risk factor. Use the "Other Discussion" field for any additional information supporting risk mitigation.			
40a. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			
40b. Justification of Likelihood & Consequence Levels:			
Mitigation Taken:			
Type of Mitigation:	<input type="checkbox"/> Procedural	<input type="checkbox"/> Physical	<input type="checkbox"/> Combination
Other Discussion:			

## 2.9 Mitigated Area Danger Ring

In this section of the template, an applicant should describe the mitigated area danger ring (MADR). The MADR is typically smaller than the initial area danger ring (IADR). The size of the MADR is reduced based on physical limitations on the range, the direction of the ammunition rounds, or both. An applicant should document these limitations in Sections 2.7 and 2.8. An applicant should base all movement of the IADR boundaries to create the MADR map on a thorough assessment of the risk items and effective mitigation planning and implementation.

Depending on the weapons desired, deployment, limitations on round travel (e.g., elevation and traverse limits), and onsite geometry, the MADR may be composed of multiple individual rings rather than a single continuous ring.

Consider only physical features (e.g., concrete walls, terrain features) that will restrict or stop the flight of the round or limit the field of fire (e.g., using physical or mechanical restrictions on the weapon's elevation and traverse) when creating an MADR.

Based on the assessment in Sections 2.7 and 2.8, an applicant should use either a hardcopy or electronic map and draw an MADR map (see sample Figures 2-10 and 2-11). If there are no features reducing the IADR, applicants should answer questions related to the MADR based on the IADR.

Figures 2-10 and 2-11 illustrate two MADRs. Figure 2-10 illustrates mitigation using mechanical or physical limits on the field of fire, thus reducing causing the MADR to conical area. Figure 2-11 illustrates an MADR with multiple mitigation measures taken into account. Refer to Volume 4, Appendix A, for further examples and information on constructing IADRs and MADRs.

After the MADR has been created, an applicant should review Items 36–40 for all risk items and determine if an individual risk item is inside (“Yes”) or outside (“No”) the perimeter of the MADR.

An applicant should document any mitigation measures identified in the application in the licensee’s physical security plan. The NRC may inspect an applicant’s mitigation measures before approving the application or during post-approval implementation.

Items 41–43 assist an applicant’s assessment of how many people could possibly be affected by a stray round. Site emergency preparedness information may aid an applicant in answering these questions. Assume all buildings are unoccupied in estimating the “Population Density” in Item 41, unless the building is occupied 24 hours per day (e.g., a continuously staffed alarm station or a fire station). Adjust the Population Density accordingly to include people who would routinely be in such buildings. However, because a building may only be continuously staff by a small number of persons, their presence may not increase the population density to the next higher increment in the drop-down selection field. Consequently, an applicant should identify any continuously staffed buildings under the “Population Distribution” in Item 43.

**41. What is the estimated population density within the MADR?**

Enter the estimated population density within the MADR. This is the population density inside the MADR not including the site personnel.

(This is a text input field.)

**42. Is the population evenly distributed within the MADR?**

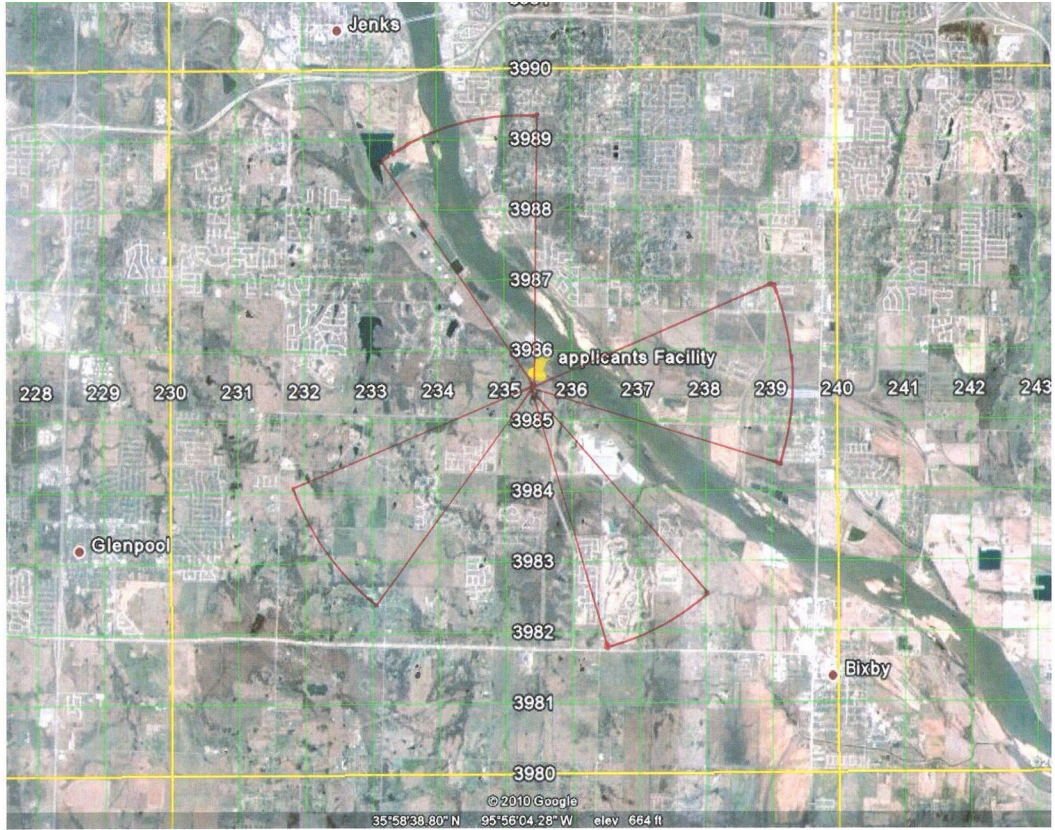
This information is essential for an accurate assessment of potential risk. Since many applicant facilities are located adjacent to a body of water, the population within the MADR will tend to be massed in only part of the ring. If the population is located in only a portion of the area within the MADR, then the average number of people per square kilometer (square mile) may be higher.

(This is a drop-down selection field.)

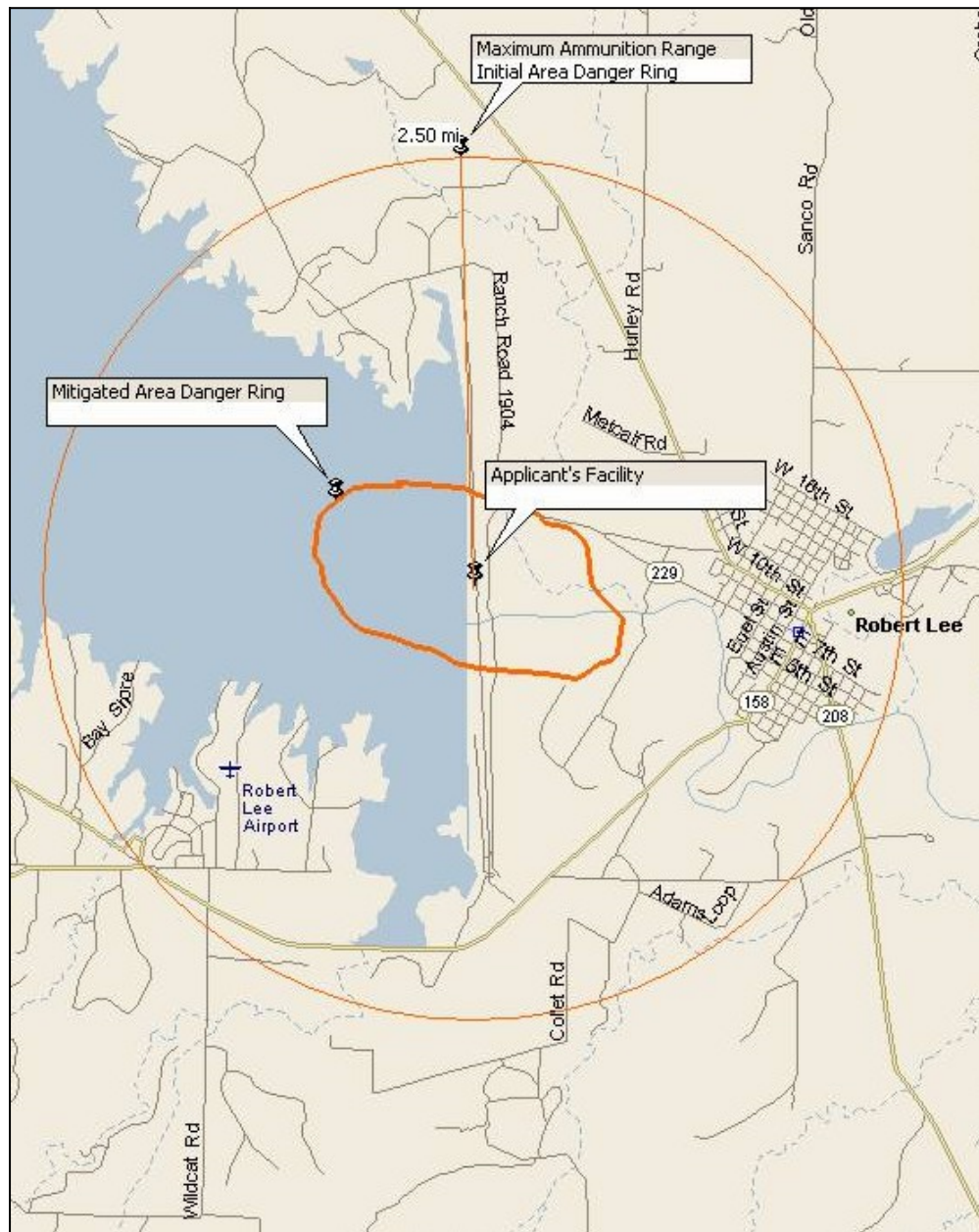
**43. If no, describe population distribution. (For example, since the facility has a lake on the eastern side, most of the population is on the northern, southern, and western sides of the facility.)**

(This is a text input field.)

**Figure 2-10 MADR with Series of Cones at a Hypothetical Facility (not to scale) (satellite photo)**



**Figure 2-11 MADR Map for a Single Firing Point at a Hypothetical Facility (not to scale)**



## **2.10 Training and Weapon Maintenance**

In this section of the template, an applicant should provide information about plans for the location for the training and qualification of security personnel on the specific enhanced weapons. Instructions for developing a training curriculum and formal training plans are not within the scope of this document. Instead, an applicant should refer to RG 5.86 for guidance on training and qualification considerations. Consequently, an applicant should develop an IADR and MADR for a firing range for use in assessing the items at risk under Sections 2.7 and 2.8.

**NOTE:** Applicants may refer to Department of Energy guidance DOE M470.4-3 Protective Force, Section B, II-7, and Department of the Army guidance DA PAM 385-63 Range Safety guidance for training and range considerations. Both of these guidance sources are included in the WSA Reference Information volume. For range design standards, an applicant may also refer to the U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Alabama, (Huntsville Division's) Range Design Guide web page: <https://www.hnc.usace.army.mil/Missions/Installation-Support-and-Programs-Management/Range-and-Training-Land-Program/Range-Design-Guide/>. An applicant should use established standards and designs when modifying its weapon maintenance and training plans and when applying range modifications.

44. Does an applicant have a firearms training range on its property where the enhanced weapons will be used?

(This is a drop-down selection field.)

45. If yes, will training for this enhanced weapon be on the facility's range?

If the answer to Item 45 is "Yes," the following two items must be answered. If the answer to Item 45 is "No," they are not applicable.

(This is a drop-down selection field.)

45a. Has the local Federal Aviation Administration (FAA) office been contacted to determine if special use airspace (SUA) needs to be established in the vicinity of the training range when enhanced weapons are in use?

(This is a drop-down selection field.)

45b. Summarize the results of discussions with the FAA and include information for point of contact (i.e., title, office, name, and telephone number).

(This is a text input field.)

46. Who uses the onsite firing range?

(This is a text input field.)

47. If the existing range will not support training for this weapon, where will training take place?

(This is a text input field.)

48. What reference materials (e.g., military standards, National Rifle Association documents) were used for modifying the existing training and weapon maintenance plans?

(This is a text input field.)

49. Reserved.

(Reserved field.)

## **2.11 Risk Acceptability**

In this section of the template, an applicant should specify the overall safety conclusion regarding the use of, and training on, the proposed enhanced weapons and associated ammunition.

50. An applicant has reviewed the risks associated with using this weapon and these selected ammunition(s). An applicant finds the risks to be \_\_\_\_\_ for this facility or transportation activity.



If an applicant finds the risks associated with using this specific weapon system at the facility or transportation activity are unacceptable, then the Commission may not authorize the requested weapon system. If an applicant determines through the WSA process that the selected weapon system poses an unacceptable risk, options include changing the weapon or ammunition selection, providing additional mitigation measures, or providing additional training to reduce an applicant's risk.

(This is a drop-down selection field.)

## **2.12 Summary of Risk Identification, Evaluation, and Mitigation**

In this section of the template, an applicant should enter the mitigated risk levels, which were calculated in Items 36–40, in items 51–55.

(These are text input fields.)

**BIBLIOGRAPHIC DATA SHEET**

(See instructions on the reverse)

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10. SUPPLEMENTARY NOTES

P. Brochman

11. ABSTRACT (200 words or less)

The regulations of the U.S. Nuclear Regulatory Commission (NRC) require an applicant for combined preemption authority and enhanced weapons authority to submit a Weapons Safety Assessment (WSA) as part of its application. This document sets forth a process that the NRC staff finds acceptable for use by an applicant in developing a WSA. The information in this document can be used by an applicant to evaluate the potential onsite and offsite safety hazards, safety impacts, or safety risks and any onsite security risks that could arise from the deployment and potential use of enhanced weapons (e.g., machine guns) as part of a licensee's protective strategy for defending against malevolent acts. Based on its assessment of these hazards, impacts, or risks, an applicant should identify preventive or mitigative measures that it intends to implement upon the deployment of enhanced weapons.

Volume 1 of the WSA document consists of Chapter 1, "Introduction," and Chapter 2, "Template Instructions."

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

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