DEPARTMENT OF THE AIR FORCE
Thomas N. Barnes Center for Enlisted Education (AETC)
Maxwell AFB, AL 36118

1 Mar 17

AIRMAN LEADERSHIP SCHOOL
STUDENT GUIDE
PART I
COVER SHEET

LESSON TITLE: EA04, NUCLEAR ENTERPRISE

TIME: 1 Hour

METHOD: Guided Discussion

REFERENCES:

Air Force Instruction 13-550, *Air Force Nuclear Command, Control, and Communications (NC3)*, 2 Oct 14.

Air Force Instruction (AFI) 20-110, *Nuclear Weapons-Related Material Management*, 23 Oct 14.

Air Force Instruction (AFI) 21-203, *Nuclear Accountability Procedures*, 12 May 2016.

Air Force Instruction (AFI) 36-2618, *"The Enlisted Force Structure."* 27 Feb 09.

Air Force Instruction (AFI) 13-530, *Intercontinental Ballistic Missile (ICBM) Nuclear Operations*, 8 September 2015.

Air Force Instruction (AFI) 91-101, Air Force Nuclear Weapons Surety Program, 15 Aug 14.

Air Force Policy Directive 13-5, *Nuclear Enterprise*, 6 Jul 11.

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Zimmerman, R. (18 Jun 08). Berlin Airlift a Triumph for Early Air Force. Air Force Print Today. http://www.afspc.af.mil/News/Commentaries/Display/Article/252585/berlin-airlift-a-triumph-for-early-air-force (Accessed 12 Dec 16).

STUDENT PREPARATION: Complete reading and homework assignment (Attachment 1) in the student guide. Be prepared to review the homework and discuss Nuclear Enterprise in class. (9463 words, approx. 38 minutes of reading)

PART IA

GENERAL LEARNING OUTCOME: Students who graduate from Airman Leadership School are prepared to perform first-level supervisory responsibilities, effectively lead individuals and work center teams as evidenced by their comprehension of the Nuclear Enterprise.

The *Nuclear Enterprise* lesson provides information necessary to effectively execute the assigned responsibilities outlined in AFI 36-2618, *The Enlisted Force Structure*.

The *Nuclear Enterprise* lesson supports the AF Core Values:

1. Integrity First
2. Service before Self
3. Excellence in All We Do

TERMINAL COGNITIVE OBJECTIVE: Comprehend Nuclear Enterprise concepts and their impact on NCO, unit, and mission effectiveness.

TERMINAL COGNITIVE SAMPLES OF BEHAVIORS:

1. Explain:
   a. How the U.S. Nuclear Enterprise impacts national security strategy and Air Force Doctrine.
   b. The impact of nuclear surety and deterrence on mission effectiveness.
   c. How accountability impacts the NCO, unit, and mission effectiveness.
2. Identify:
   a. How the U.S. Nuclear Enterprise impacts national security strategy and Air Force Doctrine.
   b. The impact of nuclear deterrence and surety on mission effectiveness.
   c. How accountability impacts the NCO, unit, and mission effectiveness.
3. Predict:
   a. How the U.S. Nuclear Enterprise impacts national security strategy and Air Force Doctrine.
   b. the impact of nuclear surety and deterrence on mission effectiveness
   c. how accountability impacts the NCO, unit, and mission effectiveness

AFFECTIVE OBJECTIVE: Value Nuclear Enterprise concepts and their impact on the NCO, unit, and mission effectiveness.

PART IB

LESSON OUTLINE:

CONTENT
INTRODUCTION: Attention, Motivation, and Overview
MP 1. Aspects of the Nuclear Enterprise A. Overview B. History of the Nuclear Era C. Proliferation and Non-Proliferation D. Regional and Political Concerns E. Organizational structure of the Air Force Nuclear Enterprise
MP 2. Concepts of Nuclear Deterrence and Surety A. Nuclear Deterrence B. Nuclear Surety
MP 3. Nuclear Accountability A. Nuclear related mishaps and mismanagement B. Human Factors C. NCO accountability
CONCLUSION: Summary, Re-motivation, and Closure

STUDENT READING

"To succeed, we must update, balance, and integrate all of the tools of American power and work with our allies and partners to do the same. Our military must maintain its conventional superiority and, as long as nuclear weapons exist, our nuclear deterrent capabilities, while continuing to enhance its capacity to defeat asymmetric threats, preserve access to the global commons, and strengthen partners."

NATIONAL SECURITY STRATEGY- A Whole of Government Approach, May 2010

MP 1. ASPECTS OF THE NUCLEAR ENTERPRISE

A. Overview

The U.S. Nuclear Enterprise encompasses a composite of policies and directives designed to guide military forces in carrying out strategic objectives outlined in the national security strategy. In order to fully appreciate the US nuclear weapons program, we must know the history of nuclear weapons, understand nuclear related regional and political security concerns, as well as understand the Air Force Nuclear Enterprise's role in deterring adversaries, strengthening nuclear surety, and fostering an environment of accountability.

As first line supervisors, it is vital for you to understand the impact that you and your Airman have on the success of the Nuclear Enterprise. Your leadership and support of the nuclear mission whether directly or indirectly helps strengthen the core of our national security and the Air Force mission as a whole.

B. History of the Nuclear Era

The Air Force nuclear mission is an integral part of our Air Force history, culture, and day-to-day operations. Our roots, history, culture, and mission are deeply intertwined with the past, present, and future of nuclear weaponry. Whether or not you work directly with these weapon systems in a nuclear-related career field, you are an integral part of the US nuclear mission, just as you are a part of the Air Force flying mission and contingency operations. The unauthorized movement of nuclear weapons in August 2007, the mishandling of sensitive missile components in March 2008, and the 2014 missile crewmembers' proficiency test cheating scandal created a much-needed refocusing on the Air Force nuclear mission.

In August 2009, Major General C. Donald Alston, Assistant Chief of Staff, Strategic Deterrence and Nuclear Integration stated,

> ***"It doesn't matter what your specialty is, the bottom line is developing a culture of unity about the mission, no matter what the mission is, and that precision and reliability of every day-to-day task are vital to the combat mission and the unique national responsibilities of the Air Force."***

Though you may not serve in a nuclear-related career field, as an Airman, and a member of the Profession of Arms, it is your inherent responsibility to understand that the Nuclear Enterprise is a top priority mission, and to understand the role our Nuclear Enterprise plays in the security of our nation and our allies. Just like our global reach and global strike capabilities, the Nuclear Enterprise is one way the Air Force preserves peace and, when necessary, orchestrates war. This reading addresses several important aspects of the Air Force Nuclear Enterprise.

History of Nuclear Weaponry

When President Truman took office in April 1945, Japan was near defeat. American aircraft were bombing major Japanese cities. One particular firebomb raid in March of 1945 killed an estimated 80,000 to 200,000 inhabitants and injured over a million more in Tokyo. A second air attack on Tokyo killed an additional 83,000. Due to the generally accepted view that the Japanese would fight to the end, only two options existed to end World War II (WWII): initiate a mass, American-led invasion of the Japanese islands or employ an atomic bomb. By mid-1945, the estimated worldwide death toll for World War II reached a shocking 60 million costing the United States more than a million casualties alone. This campaign relentlessly consumed national resources to an extent never experienced before.

Dr. Albert Einstein first described the potential to harness nuclear energy and the dangers it posed in a letter he sent to President Franklin D. Roosevelt in August 1939. Scientists who fled their native countries had requested Dr. Einstein's assistance in bringing attention to Germany's recent efforts to produce their own atomic energy. By early 1942, after suffering a series of military defeats in the Pacific, the United States, prompted by top Washington officials, proceeded to research and develop their own atomic energy and

the creation of the world's first atomic bomb.

These scientists were part of the infamous "Manhattan Project" to produce nuclear bombs in time to affect the outcome of World War II. In 1943, a team of British scientists working on a similar project transferred to the Los Alamos Research and Development Laboratory located in New Mexico to collaborate with the US scientists. On 16 July 1945, the team successfully detonated the first nuclear explosive device at the Trinity Site near Alamogordo, New Mexico. This test led to President Harry S. Truman's decision to use a nuclear bomb against the Japanese in hopes to end the war.

The conflict in Europe finally ended on V-E (Victory in Europe) Day, 8 May 1945; however, the war waged on with Japan in the Pacific with no end in sight. Allied Forces prepared for the pre-determined, difficult, and costly invasion of the Japanese islands until leadership decided to the use the newly tested nuclear weapon.

On 6 August 1945, the Army Air Corps delivered the first atomic bomb, dubbed *Little Boy*, using a B-29 bomber named the *Enola Gay* on Hiroshima, Japan. The attack destroyed 90 percent of the city's buildings and resulted in an estimated 100,000 military and civilian casualties. When the Japanese failed to respond to President Truman's call for surrender, another B-29 bomber, nicknamed *Bock's car*, dropped a second bomb known as *Fat Man* on the city of Nagasaki on 9 August 1945, resulting in another 70,000 dead with countless wounded.

Figure 1. Enola Gay and Figure 2. Bock's car

On 14 August 1945, Japan surrendered. To this day, these atomic bombs remain the only nuclear weapons ever used in combat, with the US as being the only country to have used them and the Army Air Corps (now the US Air Force) the only military branch to have implemented this devastating weapon.

The United States is engaged in a fundamental rethinking of its strategic nuclear arsenal. The international security environment has changed. The current stockpile was developed for very different threats than those that exist today and are expected to emerge in the future. The Cold War is over; regional threats have risen; terrorism has assumed global and destructive proportions; technology has changed; and a significant number of adversaries have acquired Weapons of Mass Destruction (WMD). In addition to enhanced deterrence and military performance, stockpile transformation would also achieve enhanced safety and security of the U.S. nuclear arsenal.

C. Proliferation and Non-Proliferation

For more than 60 years, there has not been a single employment of a nuclear weapon.

Since the first and only use in the summer of 1945, world leaders have concentrated on nuclear proliferation via preventing the production, distribution, and use of nuclear weapons. One of the most effective methods is the use of multi-national treaties with the most successful treaty to date being the Nuclear Non-Proliferation Treaty (NPT).

NUCLEAR NON-PROLIFERATION TREATY 1968	
Nuclear Weapons States	Non-Nuclear Weapons States (NNWS)
-United States -United Kingdom -France -Russia -China	-India -Israel -Pakistan -North Korea

Figure 3. NPT states

Available for signature on 1 July 1968, the NPT provides the definition of a Nuclear Weapon State (NWS), provides security for Non-Nuclear Weapon States (NNWS), and offers incentives to sign. Article IX, paragraph 3, of the NPT defines a NWS as "one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967." The NPT's main objective is comprised of three key areas:

- **Non-proliferation** – Preventing of the further spread and/or transfer of nuclear weapons and weapon technologies.
- **Disarmament** – furthering the goal of achieving nuclear, general and complete disarmament.
- **Peaceful uses of nuclear energy** – recognizing the inalienable right of sovereign states to use nuclear energy for peaceful purposes, and promoting international cooperation on these uses.

The five nuclear weapon states are also permanent members of the UN Security Council. Those members are the **United States, the United Kingdom, France, Russia, and the People's Republic of China**. 189 other countries have subscribed to the treaty with only four sovereign states that have not. They are **India, Israel, Pakistan, and North Korea**. Although these four nations have openly tested and declared they possess nuclear weapons, they remain classified as non-nuclear weapons states (NNWS).

It is also important to note that as we move further into the 21st century, countries such as Iran, Libya and Syria remain hotbeds for terrorist organizations (i.e. al-Qaeda and Islamic State in Iraq and Syria (ISIS)) that have pursued secret nuclear activities directly violating the global treaty terms of non-proliferation. Therefore, the US and its allies must to continue to explore diplomatic strategies and solutions to ensure that nuclear weapons remain out of the hands of our enemies.

D. **Current Regional and Political Concerns**

One of the difficulties enforcing the NPT is the pursuit of nuclear energy as a source of electrical power. When compared to traditionally generated electricity, the electricity generated from the heat of a nuclear reaction is much cleaner with less waste. This makes for a valid case for other countries to pursue their own capability to use nuclear technology for electricity. The concern of the development of nuclear energy by NNWS comes from two steps of the nuclear fuel cycle. These steps are identified in Figure 4.

The first is the highly-enriched uranium (HEU) resulting from the uranium enhancement process that occurs in the early stages of the nuclear fuel cycle. HEU is classified as weapons-grade commonly used for bombs and warheads and not required to generate energy. A low-enriched uranium (LEU) can be used to generate energy and cannot be used in nuclear weapons. The second area of concern is at the later stages of the nuclear fuel cycle. A small amount of the input fuel decays into plutonium as a natural product of the nuclear reaction. If the plutonium was skimmed off, it could be accumulated to build an implosive bomb.

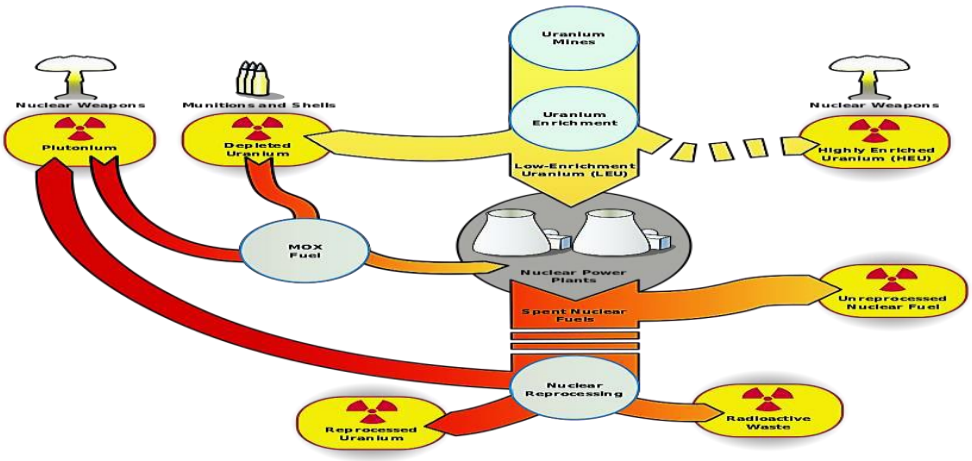

Figure 4. *Nuclear fuel cycle*

These risks can be mitigated by first removing the uranium enrichment process from the fuel cycle; selling fabricated fuel assemblies (nuclear fuel rods) to NNWS desiring nuclear power. Secondly, nuclear reactors have been developed that are "proliferation proof." This basically means that in order to recover the plutonium at the end of the fuel cycle, the reactor must be shut down; this would be visible and allow NPT enforcement.

In one of his last acts as President, George W. Bush administered an agreement for the US to share technology with the United Arab Emirates' (U.A.E.) for nuclear energy development. Proponents of the nuclear technology deal praise the U.A.E for being the first country to pledge not to exercise its right under the NPT to enrich uranium or reprocess plutonium to make nuclear fuel. The U.A.E. has committed to buying nuclear fuel from foreign countries and sending back waste product.[1]

In contrast, Iran which can buy nuclear fuel from Russia or other nuclear suppliers has insisted on

enriching uranium to make its own fuel, raising suspicions that Iran has a hidden agenda. Additionally, the US has offered to replace North Korea's current nuclear reactors with "proliferation proof" reactors. Initially, the North Korean government accepted the offer but later refused and withdrew from the Treaty in 2003 as well as performed its first nuclear device test in 2006.

To further our study of regional nuclear security issues, we will examine four specific regions of concern: Iran, North Korea, India-Pakistan and Russia.

Iran

For decades, the Islamic Republic of Iran has endangered the security of the region and the United States and failed to live up to its international responsibilities. In addition to its illicit nuclear program, it continues to support terrorism, undermine peace between Israelis and Palestinians, and deny its people their universal rights. Many years of refusing to engage Iran failed to reverse these trends; on the contrary, Iran's behavior became more threatening. Engagement is something we pursue without illusion. It can offer Iran a pathway to a better future, provided Iran's leaders are prepared to take it. But that better pathway can only be achieved if Iran's leaders change course, act to restore the confidence of the international community, and fulfill their obligations. The United States seeks a future in which Iran meets its international responsibilities, takes its rightful place in the community of nations, and enjoys the political and economic opportunities that its people deserve. Yet if the Iranian Government continues to refuse to live up to its international obligations, it will face greater isolation.[2]

Nonetheless, diplomacy remains the key to ensuring that Iran does not obtain nuclear weapons. In November 2013, the P5+1 council (which is comprised of France, Russia, Great Britain, China, the United States and Germany) met with Iranian leaders to take the first steps towards a nuclear resolution that would halt the progression of Iran's nuclear program. [3]

Consequently, negotiations are still in a fragile state but the US and its allies must continue to pressure the Iranians to change their course of action in order for peace and stability to be achieved in the Middle East.

North Korea

For years, the United States and the international community have tried to negotiate an end to North Korea's nuclear and missile development and its export of ballistic missile technology. Those efforts have been replete with periods of crisis, stalemate, and tentative progress towards denuclearization.[4] North Korea remains a key challenge as diplomatic leaders strategize on ways to prevent a nuclear arms race.

The possibility of a regional arms race increases as North Korean defiance continues to unsettle regional stability. As Japan and South Korea still consider developing their own nuclear deterrent and missile defense system in the Cold War-like environment of north-east Asia, China will naturally regard itself as the real target. Furthermore, the current crisis again underlines the critical need for an international consensus in the nuclear non-proliferation realm. This must be

framed in an updated collective structure that reflects contemporary realities and transcends short- term national interests, and also addresses the long-term international interest in global stability and order. Parallels can be drawn to the Iran nuclear challenge, which similarly threatens a regional arms race in the Middle East.

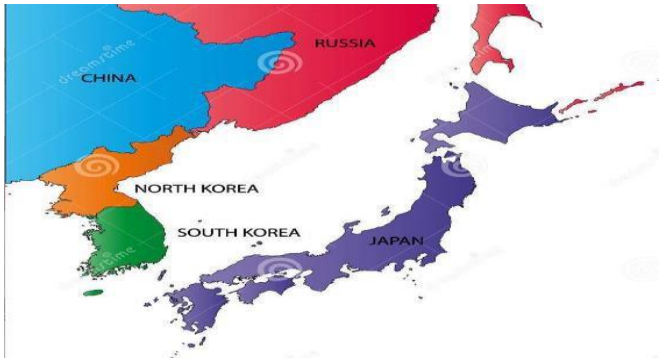

Figure 5. *North Korea*

India-Pakistan

The history of this region shows that non-proliferation is not guaranteed in a security void. Compelling security concerns have to be discussed together with measures to promote the goals of non-proliferation. Global non-proliferation regimes can best be promoted by addressing the very factors that impel proliferation. It is in this context that South Asia's problems are no longer an exclusive concern of the region itself. They now have a worrisome global dimension raising major powers' stakes in the issues of peace and security in this region.

The Pakistan-India nuclear dimension is the only nuclear equation that grew up in history totally unrelated to the Cold War. It is the offshoot of the legacy of outstanding India-Pakistan disputes and their perennial mode of conflict and confrontation. In a larger perspective, the cause of non-proliferation will also not be served without addressing the underlying causes of conflict in this region. Durable peace between India and Pakistan is also crucial as a factor of regional and global stability. It should be noted that durable peace between the two countries would come only through mutual dialogue and cooperation, not through conflict and confrontation.

Russia

Following the Cold War that lasted almost 45 years, the U.S. and Russia sought to build a stable, substantive and multidimensional relationship based on mutual interests. The United States is interested in a strong, peaceful, and prosperous Russia that respects international agreements. On 4 June 1990, the United States and the Soviet Union issued the Joint Statement on Non- Proliferation, in which both reaffirmed their commitment to nonproliferation and, specifically to the Treaty on the Non-Proliferation of Nuclear Weapons.[5]

As the two nations possessing the majority of the world's nuclear weapons, we are working together to advance nonproliferation,

both by reducing our nuclear arsenals and by cooperating to ensure that other countries meet their international commitments to reducing the spread of nuclear weapons around the world.[6] On 8 April 2010, both countries agreed to continue agreements negotiated under the *START treaty* aimed at reducing ballistic missile capabilities, nuclear warheads, and launch systems.

Figure 6. *START Treaty Weapons Reduction*

E. Organization Structure of the Air Force Nuclear Enterprise

The **Air Force Nuclear Enterprise** consists of the people, organizations, processes, procedures, infrastructure, and systems that are used to conduct, execute, and support Nuclear Deterrence Operations (NDO). The Air Force Nuclear Enterprise is a forward looking, responsive and sustainable enterprise that yields nuclear strategic deterrence and extended deterrence capabilities that are safe, secure, and effective. As outlined in AFPD 13-5 *Nuclear Enterprise (NE)*, the Air Force ensures and maintains a nuclear deterrent force in a safe, secure, and effective condition to meet mission needs.

Additionally, the ***Flight Plan for the Air Force Nuclear Enterprise*** provides a long-term strategic vision for the nuclear force. It provides an Airman's perspective on deterrence, extended deterrence, and assurance of allies and partners and describes vectors in order to monitor the overall health of the force. To ensure oversight and strengthen the nuclear environment, General Mark A Welsh III, Chief of Staff of the Air Force, established five strategic vectors providing high-level guidance to the Nuclear Enterprise.

Vector 1: Deliberately develop and manage an experienced cadre of Airmen with nuclear expertise to support and conduct nuclear deterrence operations.

Vector 2: Build, mature, and sustain robust Air Force organizations and processes to provide advocacy, support, and guidance for NDO.

Vector 3: Ingrain continuous, rigorous self-assessment and improve throughout the NE.

Vector 4: Establish and maintain an integrated, strategic approach to meet the Nation's needs for Air Force- provided deterrence and assurance capabilities.

Vector 5: Develop and foster Air Force critical thinking on deterrence and assurance.

Organizational Structure

Under the direction of the Air force Secretariat, Vice chief of Staff and Air staff leaders, the Air Force Nuclear Enterprise Senior Steering group establishes policies and guidance for the NE. The NE is comprised of the Nuclear Oversight Board (NOB), the Nuclear Issues Resolution and Integration (NIRI) Board, and the Nuclear Working Group (NWG) as shown in figure 7.

Figure 7. Nuclear Enterprise Senior Steering Group

MAJCOM Responsibilities

The 2008 Schlesinger Report found that no single command within the Air Force had operational ownership of the nuclear deterrence and nuclear global strike mission. [7] To address this issue, the Air Force instituted the Air Force Global Strike Command (AFSG) as the overarching authority for nuclear operations, the AF/A10- Assistant Chief of Staff

Strategic Deterrence and Nuclear integration, and expanded the Air Force Nuclear Weapons Center (AFNWC).

Air Force Global Strike Command (AFGSC). AFGSC provides combat ready forces for deterrence and global strike operations in support of POTUS and CCDRs. AFGSC is responsible for ICBM systems, nuclear-capable bombers, gravity nuclear weapons, nuclear cruise missiles, and specified NC2 capabilities and NC3 systems. AFGSC aligns Continental United States (CONUS) nuclear operational units under a single command with clear lines of nuclear authority and responsibilities.

AF/A10 Assistant Chief of Staff Strategic Deterrence and Nuclear Integration. Leads planning, policy development, advocacy, integration, and assessment for the Airmen and the weapon systems that perform Nuclear Deterrence Operations.

Air Force Nuclear Weapons Center (AFNWC). AFNWC is the AF's centralized agency for sustainment of nuclear weapons across the Nuclear Enterprise.

Additionally, MAJCOMs enhance and reinforce nuclear partnerships with each other to ensure the training, security, credibility, and viability of the Air Force Nuclear Enterprise remains strong.

Nuclear Weapons Systems

The most important aspect of understanding the Air Force Nuclear enterprise is having an understanding of the weapon systems, nuclear weapons-related material (NWRM), and nuclear mission areas. Our nuclear weapons systems include Intercontinental Ballistic Missiles (ICBM) and nuclear-capable bombers. Our ICBMs are Minuteman III and our nuclear capable strategic bombers are the B-52 and B-2 aircraft. Additionally, we have dual capable aircraft: the F-15E and F-16.

The Air Force defines **NWRM** as: "Classified or unclassified assemblies and subassemblies (containing no fissionable or fusionable material) identified by the Military Departments that comprise or could comprise a standardized war reserve nuclear weapon (including equivalent training devices) as it would exist once separated/removed from its intended delivery vehicle."

NWRM includes such items as:

- Certain Circuit Card Assemblies
- Cable Assemblies
- Nuclear Training Bombs
- Nuclear Training Warheads
- Printed Wiring Boards
- Fuse Assemblies
- Power Supplies

Figure 8. Nuclear weapons systems

Prime examples of specific nuclear mission areas are:

Weapons Storage Areas (WSAs):

Heavily secured areas, inside the perimeter of a base. Igloos are examples of WSAs.

-Flight lines with nuclear bombers and missile alert facilities are also considered nuclear mission areas.

Weapons Storage Security System (WS3):
Includes electronic monitoring and controls and weapons storage vaults built into the floor of a protective aircraft shelter.

Launch Control Center (LCC):

Deep underground structure of reinforced concrete and steel in a blast and pressure protected hardened capsule.

Missile Silo:

Underground, vertical cylindrical container; physically hardened and protected by a large "blast door" on top.

Prime Nuclear Airlift Force (PNAF):
Peacetime support of logistical airlift; specially trained C-130 and C-17 aircrews and support personnel.

Nuclear Employment

Presidential decisions on national security matters are issued through National Security Presidential Directives (NSPD). NSPDs provide the President's general direction on how to plan for the employment of nuclear weapons. This is further amplified through the DoD Nuclear Weapons Employment Guidance (NUWEP)

and the Joint Staff Nuclear Supplement to the Joint Strategic Capabilities Plan (JSCP). The Combatant Commanders take this guidance and formulate their operational plans, which may or may not include nuclear weapons, to support their objectives.

It's important to remember that physical employment of nuclear weapons is a form of strategic attack. Strategic attack is offensive action specifically selected to achieve national strategic objectives. Air Force assets account for two-thirds of the United States Nuclear weapons arsenal. During the Cold War, nuclear employment consisted simply of ICBMs, bombers, and submarine-launched ballistic missiles (SLBMs).

Currently, the strategic offensive and defensive capabilities of the Nuclear Enterprise includes nuclear and non-nuclear strike capabilities for both active and passive defenses; and robust research and development of industrial infrastructure in order to build and maintain offensive forces and defensive systems. These strategies are supported by enhanced nuclear command control, and communications (NC3), and intelligence, surveillance and reconnaissance (ISR) capabilities that provide flexibility of employment to deter emerging threats and ensure global stability. These capabilities are critical for the proper employment of nuclear weapons.

Figure 9. Nuclear Employment

Nuclear Command Control and Communications (NC3) Is the exercise of authority and direction by the President, as Commander in Chief of the U.S. Armed Forces, through established command lines, over nuclear weapon operations by military forces; as chief executive over all government activities that support those operations; and as Head of State over required multinational actions that support those operations

Intelligence Surveillance and Reconnaissance (ISR) An activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations.

This is an integrated intelligence and operations function.

The employment of nuclear weapons at any level requires explicit orders from the President of the United States. Working with the Secretary of Defense, the President may determine if nuclear weapons are required to resolve a situation. Planning and employment factors include: political objectives, knowledge of enemy force strength and

disposition, the number, yields, and types of weapons available; the status/disposition of friendly forces at the time; the strategic situation; the type and extent of operations to be conducted; military effectiveness; damage-limitation measures; environmental and ecological impacts; and precise calculations as to how all these factors interact.

Employment planning also considers the characteristics and limitations of available nuclear forces to optimize force survivability and combat effectiveness.

The President will issue the execution order through the Chairman of the Joint Chiefs of Staff (CJCS) to the combatant commander (CCDR) and ultimately to the forces in the field who exercise direct control over the weapons.

MP 2: CONCEPTS OF NUCLEAR DETERRENCE AND SURETY

The end of the Cold War shed light on the utility and role of nuclear weapons in US national security. Though not an obvious component of today's national security as they were during the Cold War, nuclear weapons and operations continue to underpin U.S. deterrence and surety initiatives.

A. Nuclear Deterrence

The nuclear deterrence mission has its origin in the very founding of our Air Force. Stewardship of these weapons and weapon systems require extraordinary focus and extraordinary leadership. Professional and dedicated Airmen, deployed worldwide, execute the nuclear mission 24/7 to ensure safe, secure, and effective nuclear forces. Furthermore, we are responsible for the security, accountability, safe-handling, transport, readiness and employment of the world's largest known nuclear weapons inventory.

According to Joint Publication (JP) 1-02, ***deterrence*** *is "the prevention of action by the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits."*

The primary purpose of maintaining the US nuclear arsenal is to discourage an enemy from pursuing, procuring, and employing nuclear weapons or other weapons of mass destruction (WMD). Nuclear weapons create massive amounts of damage and suffering to intended targets and surrounding areas. The fear of counteraction and the consequences involved are the active ingredients in nuclear deterrence. Nuclear weapons also yield political effects.

Deterrence theory is a state of mind brought about by the existence of a credible threat of unacceptable counteraction. Deterrence can be viewed as a product of three inter- related factors determining a nation's *capability*, multiplied by its *credibility*, multiplied by *communication*.

Capability* x *Credibility* x *Communication* = *Deterrence

1. **Capability** – having the means to influence behavior. This is achieved through the

   U.S. nuclear weapon systems, joint force operations and systems reliability. (i.e. ICBM's, B-2 Bombers, Submarines, ISR and NC3 capabilities)

2. **Credibility**- maintaining a level of believability that the proposed actions may actually be employed. (i.e. sustainment of U.S. nuclear stockpile and nuclear infrastructure)
3. **Communication** – transmitting the intended message to the desired audience. (i.e. presidential directives)

Not only does nuclear deterrence support national security strategies, the US also extends deterrence to uphold the security of other friendly nations. Simply stated, extended deterrence is less about retaliation and more about posturing to convince an enemy that they are unlikely to achieve political and military objectives by attacking the US or its allies.

This international protection, known as the "nuclear umbrella," grants security and confidence to our allies. As the guardian of freedom and justice, the US Air Force's effective management and execution of our nuclear responsibilities is critical to our allies' perception of our capability and will to suppress, prevent, and avenge a nuclear attack on any nation that is protected under the nuclear umbrella.

The Air Force contribution to US nuclear capability is vital to national security, nuclear deterrence, and the defense of its allies. These responsibilities demand dedication and expertise from various career fields and thousands of Airmen every single day. Therefore, leaders and supervisors, regardless of duty location or Air Force Specialty, must communicate to their subordinates the importance of every task and activity, no matter how small, and emphasize the importance of military discipline as part of our national security, capability, and deterrence.

B . <u>Nuclear Surety</u>

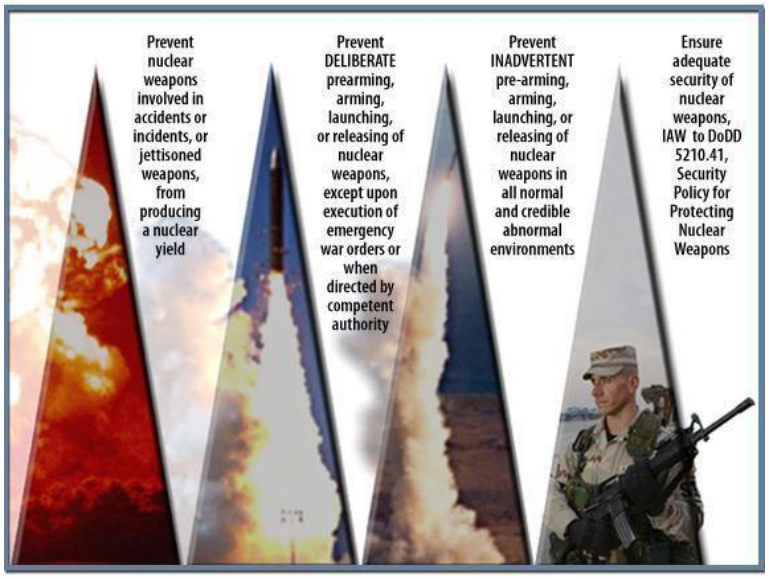

Figure 10. *Nuclear Surety*

Today, just as in the days of the Strategic Air Command, perfection is the standard for the safety, security, and reliability of nuclear weapons operations. The Air Force accomplishes this through a stringent nuclear surety program. The Nuclear Surety program consists of materiel, personnel, and procedures that contribute to the safety, security, reliability, and control of nuclear weapons. It applies to all nuclear-related materials, personnel, and procedures to ensure no nuclear accidents, incidents, loss, theft, or unauthorized or accidental employments occur. The three key elements of nuclear surety are safety, security, and reliability.

Safety is the application of engineering and management principles, criteria, and techniques to protect nuclear weapons against the risks and threats inherent in their environments within the constraints of operational effectiveness, time, and cost throughout all phases of their life cycle**.** The DoD Nuclear Weapon System Safety Program consists of four qualitative surety standards and key elements for program guidance, system evaluation, safety assurance, and for the conduct of safe nuclear weapon system operations.

Surety Standards. Four qualitative surety standards are used in the evaluation of the safety of nuclear weapon system, beginning as early as possible during development and continuing throughout a weapon system's life cycle. Those standards are:

1. There shall be positive measures to prevent nuclear weapons involved in accidents, incidents, or jettisoned weapons, from producing a nuclear yield.
2. There shall be positive measures to prevent DELIBERATE pre-arming, arming, launching, or releasing of nuclear weapons, except upon execution of emergency war orders or when directed by competent authority.
3. There shall be positive measures to prevent INADVERTENT pre-arming, arming, launching, or releasing of nuclear weapons in all normal and credible abnormal environments.
4. There shall be positive measures to ensure adequate security of nuclear weapons, under DoD Directive 5210.41-M, *Nuclear Weapon Security Manual*.

DoD Nuclear Weapon System Safety Policy. DoD safety policy is based on years of experience with nuclear weapons and the scientific development of new and innovative technologies and assessment techniques. It is developed jointly between the Offices of the Secretary of Defense, Chairman of the Joint Chiefs of Staff, the Defense Agencies, the Military Services, and in cooperation with DOE, who all share the common goal of providing maximum safety consistent with operational requirements.

***DoD Nuclear Weapon Safety Design Criteria*.** Quantitative safety design criteria are established by the Department of Defense, issued in weapon specific Military Characteristics (MCs), and implemented by the Department of Energy (DOE) in coordination with the Project Officers Group (POG). They are used during nuclear

weapon design to ensure one- point safety and to lower premature detonation probabilities and component malfunctions.

Positive Measures. Positive measures are design features, safety rules, procedures, accident prevention or mitigation measures, or other controls including physical security and coded control systems, used collectively or individually, to enhance safety and to reduce the likelihood, severity, or consequences of an accident, unauthorized act, or deliberate threat. Positive measures do not provide absolute assurance against an accident or unauthorized act, but provide acceptable assurance for continuing safe operation of the nuclear weapon system.

Safety Rules. Safety rules are comprised of general and specific provisions applicable to a nuclear weapon system for conducting approved operations, while ensuring maximum safety consistent with operational or logistic requirements.

Technical Procedures. Technical procedures are the explicit directions which must be followed to conduct operations with nuclear weapons. Technical procedures are documented in Service technical publications and Joint Nuclear Weapons Publication System (JNWPS) Technical Publications (TP).

Security is the total spectrum of procedures, facilities, equipment, and personnel employed to provide the protection against loss of custody, theft, or diversion of a nuclear weapon system, the protection against unauthorized access, and the protection against unauthorized actions, vandalism, sabotage, and malevolent damage. Security involves active and passive protective measures laid out by the DoD and executed by the individual Services. This is accomplished through the implementation of the Nuclear Weapons Security Standard**.**

Reliability has two key components: Nuclear Weapons System Reliability and Individual Reliability.

Nuclear Weapon System Reliability is maintained through an exhaustive testing, inspection, and maintenance program to guarantee the weapons will work if ever called upon by our nation's leaders. The specific elements of these testing, inspection, and maintenance programs are outlined by the individual Services and their respective nuclear configurations.

Nuclear weapon delivery systems are tested routinely by the individual Services through test- launches conducted under operational conditions from nuclear- capable aircraft, ICBM test silos, and submarines. These tests use dummy or instrumented warheads on test ranges to monitor bomb or missile performance and accuracy. Each weapons delivery platform, therefore, has extensive testing data through years of flight tests to demonstrate the reliability of the weapon delivery system.

Nuclear warhead reliability is a complex challenge during an era in which the U.S. is not currently conducting underground nuclear tests. The key to warhead reliability is the DOE/NNSA's Stockpile Stewardship Program (SSP). Confidence in the predicted performance of the nuclear warheads is maintained through an ongoing process of surveillance, assessment and certification, and refurbishment.14

1. ***Individual Reliability*** encompasses two processes. The Personnel Reliability

2. Program (PRP) ensures that only those persons whose behavior demonstrates integrity, reliability, trustworthiness, allegiance, and loyalty to the US shall be allowed to perform duties associated with nuclear weapons.

3. The ***two-person concept*** requires the presence at all times of at least two persons, each certified under PRP, knowledgeable in the task to be performed, familiar with applicable safety and security requirements, and each capable of promptly detecting an incorrect act or improper procedure throughout the task performed.

MP 3. NUCLEAR ACCOUNTABILITY

The U.S. Nuclear Enterprise is heavily dependent on its military services' ability to maintain its infrastructure, safeguard its nuclear arsenal and more importantly, ensure the integrity of its nuclear arsenal sustainability overtime. Over recent years, there have been several incidents within the Air Force Nuclear Enterprise that warrant further discussion of potential problems and solutions to solve them.

Nuclear weapons accountability is the most important aspect in safeguarding the Nation's nuclear capabilities. Conserving nuclear weapons as national resources and ensuring the safety of the public, operating personnel, and property are most important during maintenance, storage, handling and logistics movement, and operational employment of nuclear weapons. Regulations for nuclear accountability procedures are outlined in AFI 21-203.

Accountability is defined as, ***"the obligation imposed by law or lawful order or instruction on an officer or other person for keeping accurate, reliable and auditable record of property, documents, or funds".*** The person having this obligation may or may not have actual possession of the property, documents or funds. Accountability is concerned primarily with records, while responsibility is concerned primarily with custody, care and safekeeping.

A. <u>Nuclear related Mishaps and Mismanagement</u>

Misshipment of Sensitive Missile Components in March 2005 - 2008

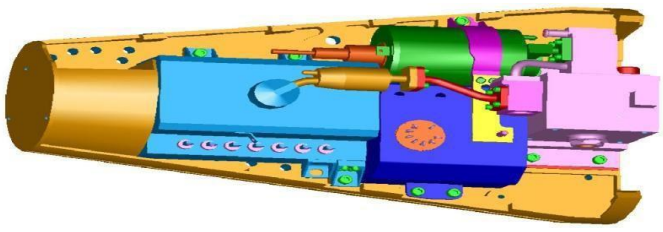

Figure 11. *Mk12 Forward Section*

This is a diagram of the Mk12 forward section. It contains the arming device for the Minuteman III reentry vehicle. The forward section does not contain any nuclear components; however; it's classified material. For shipping purposes, it's also considered a hazardous item because of the battery used to power the sensors. This is

the story of how, through a series of errors, this classified item from the Air Force's inventory found its way to Taiwan in 2006, and was not discovered until 2008.

In February 2005, an automated stock leveling system determined a base needed 11 Mk12 missile forward sections. Since this base only had one on hand, the system generated a transaction to ship ten units. In March 2005, ten were shipped via FedEx special ground service. DOD policy is to ship classified material that's also hazardous via couriered ground service to maintain positive control. They are still categorized and recorded as Mk12 forward sections at this point.

Mistake #1: This base received the ten forward sections and stored them in a classified warehouse. Four days later, an item manager with four months' experience determined the base had too many forward sections and the base was directed to return four.

Mistake #2: The base initiated a local shipping transaction in the system to ship four units, a process the item manager should have initiated in the system.

There is no record that documentation took place notifying the receiver that a classified item was shipped, which is against established Air Force policy.

Mistake #3: Personnel prepared the item's transfer by printing shipping documents and affixing them to the outside of the container and included a Material Safety Data Sheet (MSDS). As there are many items in the same class of hazardous materials, they incorrectly selected the MSDS of a helicopter battery and included its MSDS and hazardous declaration on the outside of the container.

Mistake #4: The units were shipped via Air Express although DOD policy requires that classified hazardous material be shipped via ground special service.

Mistake #5: The items were then placed in a central receiving warehouse instead of a classified warehouse. It was unknown to the dispatching personnel that there were two different storage areas.

Mistake #6: An individual tried to scan the external shipping label. For some reason, the scan did not process so the member referred to the MSDS to determine the container's contents. He or she found and entered the helicopter battery's national stock number (NSN) from the MSDS into the supply system. A helicopter battery label was placed on the outside of the container; the Mk12 forward sections are now mislabeled as helicopter batteries and stored in an unclassified warehouse.

If this member had followed proper procedures when the scan did not register, he or she would have opened the container to confirm its contents. Once verified, the correct condition code tags and documentation would have been generated for the classified Mk12 forward sections.

Figure 12. A helicopter battery compared to Mk12 Forward Section

In June 2006, Taiwan initiated a Foreign Military Sales request for 135 helicopter batteries. On 1 August 2006, four units were shipped from the unclassified warehouse (three on one ship and one on another). In November 2006, Taiwan received the items. In January 2007, Taiwan personnel opened the containers, discovered the Mk12 forward sections, and submitted a discrepancy report stating the batteries were not received. In June 2007, Taiwan submitted a web-based discrepancy report with photographs. The receiver of the report researched the discrepancy and could not find the units in the applicable supply system. In July 2007, Taiwan was instructed to dispose of the items. In September, Taiwan's account was credited with four "batteries." In March 2008, Taiwan reported they cannot dispose of the items because they are, in fact, classified forward sections. It is at this point that the units were recovered and transported to an Air Force classified warehouse in the United States where positive control was finally restored.

What would we think if Russia accidentally shipped warhead fuses to Tehran? To eliminate any misunderstandings, China and Russia were immediately notified of the incident.

The greatest concern to senior US officials is that classified nuclear items left US control, landed in the hands of a foreign military, and went without notice for so long. This incident could easily be considered a violation of nuclear non-proliferation agreements.

There were several infractions that contributed to this major breach in nuclear materials security that relate directly to compliance and accountability. There were errors in control and packaging procedures by Air Force specialists throughout the transfer. To add insult to injury, due to the deficiencies in supply chain management, the components were not recovered and secured until March 2008.

In the case of the misshipment of sensitive missile components in March 2008, Air Force personnel made a series of mistakes at the execution level. In this case, the lesson learned was a violation of process discipline, which requires following standard operating procedures to accomplish routine missions.

For day-to-day operations, Air Force personnel at your rank are responsible for process discipline. Ultimately, leaders at all levels are responsible. The lack of process discipline that caused the incident contributed to the removal of key Air Force leaders and nearly caused an international incident.

Unauthorized Movement of Nuclear Weapons in August 2007

This incident occurred between Minot Air Force Base and Barksdale Air Force Base. Six AGM-129 Air-to-Ground (ACM) cruise missiles, each fitted with a W80-1 variable nuclear yield warhead, were mistakenly loaded on a B-52 at Minot AFB, North Dakota and flown to Barksdale AFB, Louisiana. The missiles with the nuclear warheads were not reported missing and remained mounted to the aircraft (and improperly guarded) at both Minot and Barksdale for a period of 36 hours.

The task of moving cruise missiles between Minot AFB and Barksdale AFB was part of a cruise missile reposturing program. This means warheads are removed from the advanced cruise missiles at Minot and the now nuclear-inert missiles are transported to Barksdale AFB. Some of the missiles are moved via B-52 aircraft. B-52s are equipped with pylons, one underneath each wing, to transport cruise missiles. These pylons hold six missiles each. On 30 August 2007, a Barksdale assigned B-52 with two such loaded pylons took off from Minot AFB.

The procedures for movement of a nuclear weapon or nuclear capable cruise missile are explained below. This illustration depicts the mutual understanding of the procedures in effect at the time, based on a review of existing directives and checklists and discussions with leadership at both bomber wings. It does not necessarily represent the processes that were in routine use by individual teams.

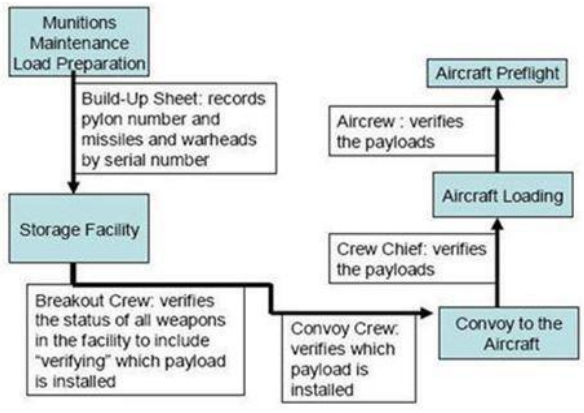

Figure 13. Process for moving nuclear weapons

Air Force directives require all members of the flight crew to examine each missile and its warhead before takeoff. In this instance, one person completed the inspection

examining only the six "dummy" missiles on the right, skipping the nuclear armed missiles on the left. Eventually, a flight officer signed the manifest that listed a dozen unarmed AGM-129 missiles and did not notice the six missiles on the left contained nuclear warheads, each with the destructive capability of up to 10 Hiroshima bombs.

The aircraft, which had flown to Minot AFB for this mission, departed for its return trip to Barksdale, Louisiana the next morning. According to the investigation, when the bomber landed at Barksdale at 1123 hrs, the air crew signed out and left the aircraft and payload for lunch. This was the first known flight by a nuclear-armed bomber over U.S. airspace without special high-level authorization in almost 40 years.

This nuclear incident played a significant role in the resignation of two of the Air Force's top leaders to include Secretary of the Air Force Michael Wynne and Chief of Staff of the Air Force T. Michael Mosley but also numerous commanders and Airmen at both installations. Not only did this incident place doubt into the safety and security of our nuclear weapons systems, it also violated the Non-Proliferation Treaty agreement but also tarnished the reputation of the U.S. in the international community.

Regrettably, events of this magnitude could have been prevented if all involved personnel followed in-place procedures. A consistent pattern of complacency was uncovered during the incident's investigation and, as a result, many of our fellow Airmen learned a hard lesson.

Fortunately, the results of the unauthorized movement of nuclear weapons and the misshipment of sensitive missile components revealed significant vulnerabilities in our handling of nuclear weapons and not in large-scale disaster. As guardians of America's nuclear arsenal, it is our inherent responsibility to ensure we strive for excellence in every task, maintaining the highest standards of compliance and professionalism.

Disciplinary acts against Air Force Nuke Officers 2013-2014

In 2013, the Air Force took swift action against several top ranking nuclear officers and subordinates. The string of inappropriate actions on the part of the officers revealed major flaws in the discipline of our service members and was an eye-opening event for the Air Force. The Air Force continued to aim for stricter oversight and tougher standards within the Nuclear Enterprise. The commanders of the 10^{th}, 12^{th}, and 490^{th} Missile Squadrons were all removed, as was the commander of the 341^{st} operation support squadron[8]. None of the individuals were directly involved in the incidents however, their failure of oversight in leadership and supervision was a root cause.

Key events:

- In 2013, 17 officers from the 91^{st} Missile Wing at Minot Air Force Base, North Dakota, were reprimanded for multiple failed inspections on the teams mastery of the Minuteman III missile launch operation systems.
- March 2014, the Air Force relieved nine officers, allowed a commander to retire

- and disciplined 91 others as a result of cheating scandal among intercontinental ballistic missile launch officers at Malmstrom Air Force Base, Montana.

In an interview, Secretary of the Air Force Deborah Lee James stated,

"Integrity means taking action when you see something in your environment that's not right—in your unit, among your peers, (with) your subordinates and your superiors".

To reemphasize the importance of core values and provide resources to commanders and senior non-commissioned officers, key plan components included stand-down Wingman Day, evaluation of current curriculum at formal education and training venues and a launch of resource centers on the Air Force Portal all aimed at changing the culture and mentality of the nuclear community.

B. Human Factors

Human factors are contributors in almost all mishaps. Knowing what human factors exist in your day-to-day operations can minimize errors and strengthen standards. Being able to identify potential factors of inappropriate actions and intervening before they result in a mishap is an essential part of nuclear weapons surety. Understanding the internal and external variables within the organization that can contribute to mishaps allows first-line supervisors to target safety, training and security vulnerabilities.

Human errors are more frequent in systems having low levels of availability or redundancy, abnormal conditions such as weather, extended shifts and when information that is transferred during shift changes. As NCO's and Wingmen, your commander and the Air Force rely heavily on your ability to identify root causes of potentially inappropriate actions or standards and intervene before they result in a mishap.

Self-Reflection: By examining figure 14. *Human Factors model* can you identify internal and external variables in your own organization that could potentially lead to mishaps? If so, what can you do or suggest in order to correct your environment before a mishap occurs?

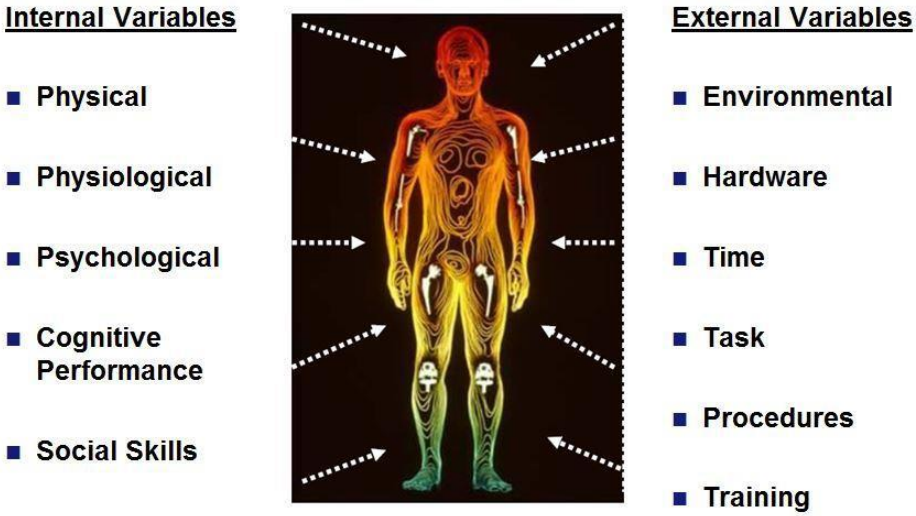

Figure 14. Humans Factor Model courtesy of MSgt Erik Kuhlmann HQAF Safety Center

While the previous reading primarily focused on the discipline and misconduct of officers, we must understand that every Airman plays a major role in protecting the integrity of the U.S. nuclear arsenal and that we are all impacted by outcomes of negative behavior and lack of discipline, especially those Airmen serving in direct support of nuclear related missions.

C. NCO Accountability

In retrospect, could the mishaps and mismanagement within the Nuclear Enterprise have been avoidable? As NCOs we must ask ourselves, "Is this same type of erosion occurring in our own areas of responsibility?"

According to AFI 36-2618, *The Enlisted Force Structure*, it is the inherent responsibility of all NCOs to "epitomize excellence and lead by example through exhibiting professional behavior" and to "instill professional behaviors in subordinates" to provide highly effective leadership. An NCO's primary purpose is mission accomplishment which requires, among other things, training subordinates to follow instructions and hold them accountable when they fail to do so, and to take pride in the unit…and to value the mission…always.

The loss of focus on the Nuclear Enterprise has taught us that when supervisors (enlisted and officers) stop valuing the mission, everything else soon follows. Discipline breaks down, standards no longer mean anything, training becomes lax and very soon mission readiness suffers to the point of failure. All of these things don't happen at once, they occur over time, often at such a pace that no one realizes just how bad things are until some significant, and potentially catastrophic, event occurs, like the unauthorized movement of nuclear weapons. As enlisted leaders, we must learn from the lessons of the past and use those experiences to put in play actions that prevent mistakes from occurring in the future.

As disciplined Airmen and members of the profession of arms, it is easy to see that both the unauthorized movement of nuclear weapons in August 2007 and the misshipment of sensitive missile components in March 2008 revealed a blatant disregard of our moral standards. The Air Force Core Values specifically emphasize the importance of living with integrity every day, to selflessly serve for the sake of others, and to strive for excellence in every throughout every task we perform. As the guardians of the world's largest nuclear weapons arsenal, we simply *must* comply with the instructions and regulations that enable us to meet and exceed the highest standards of safety, security, and reliability. Every Airman regardless of rank, specialty, or assignment shares this tremendous responsibility to pursue excellence, or in the case of nuclear surety, perfection, as we defend the freedom and peace of the United States and its allies.

Figure 15. Associations to the *Air Force Core Values*

Summary

As Airmen, we must never forget that, regardless of specialty, the consequences of one of us not properly performing our assigned duties can be catastrophic to the overall safety and security of our nation. As military service members, we are held to a much higher standard than our civilian counterparts and our professionalism, discipline, and vigilance must permeate throughout our Air Force culture every day, at every installation…worldwide.

Will deterrence work in the future? How many rogue nations will thwart our non-proliferation efforts and obtain nuclear weapons or other weapons of mass destruction? How do you discourage an unknown enemy and eliminate all threats that threaten our national security and way of life? These are the challenges we face and for which we currently have no definitive answers. Therefore, me must engage in strong deterrence, surety, accountability and last but not least, diplomacy.

HOMEWORK ASSIGNMENT **Attachment 1**

WRITTEN QUESTIONS: Fill in the correct terms from your reading assignment for the definitions listed below.

1. Heavily secured areas, inside the perimeter of a base, commonly referred to as igloos.

   _____

2. Multi-national treaty with objectives that focus on non-proliferation, disarmament, and peaceful use of nuclear energy.

   _____

3. A state of mind brought about by the existence of a credible threat of unacceptable counteraction.

   _____

4. Material, personnel, and procedures that contribute to the safety, security, reliability, and control of nuclear weapons.

   _____

5. One which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967.

   _____

MATCHING QUESTIONS: Match the descriptions in the right column with the corresponding term or phrase on the left. Use all answers only once.

	Term/Phrase	**Description**
1. ___	Non-Proliferation	a. An activity that synchronizes and integrates the planning and operation of sensors, assets, and processing, exploitation, and dissemination systems in direct support of current and future operations. This is an integrated intelligence
2. ___	Air Force Nuclear Enterprise	b. Ensures only those persons whose behavior demonstrates integrity, reliability, trustworthiness, allegiance, and loyalty to the US shall be allowed to perform duties associated with nuclear
3. ___	Personnel Reliability	c. Capability x Credibility x Communication
4. ___	Intelligence Surveillance and Reconnaissance	d. Consists of the people, organizations, processes, procedures, infrastructure, and systems that are used to conduct, execute, and support Nuclear Deterrence Operations.

5. ___ Inter-Related Factors of

e. Preventing of the further spread and/or transfer of nuclear weapons and weapon technologies.

MULTIPLE CHOICE QUESTIONS: Select the correct answer for the choices listed below.

1. The presence at all times of at least two persons, each certified under PRP, knowledgeable task performed, familiar with safety and security requirements, capable of detecting an incorrect act or improper procedure.

   a. Deterrence theory
   b. Two-Person Theory
   c. Non-Proliferation
   d. Launch Control Center

2. Underground, vertical cylindrical container; physically hardened and protected by a large "blast door" on top.

   a. Missile Silo
   b. Non-proliferation
   c. Weapons storage area
   d. Launch Control Center

3. Peacetime support of logistical airlift; specially trained C-130 and C17 aircrews and support personnel.

   a. Prime Nuclear Airlift Force
   b. Air Force Nuclear Enterprise
   c. Nuclear Surety Program
   d. Nuclear Weapons State

4. Is the exercise of authority and direction by the President, as Commander in Chief of the U.S. Armed Forces, through established command lines, over nuclear weapon operations by military forces; as Chief Executive over all government activities that support those operations; and as Head of State over required multinational actions that support those operations.

   a. Nuclear Command, Control and Communications
   b. Nuclear Weapons State
   c. Nuclear Proliferation Treaty
   d. Launch Control Center

5. Deep underground structure of reinforced concrete and steel in a blast and pressure protected hardened capsule.

   a. Two-Person Concept
   b. Deterrence Theory
   c. Launch Control Center
   d. Non-Proliferation