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The Application of the Graded Approach to Physical Protection of Radioactive Sources in the United States

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Abstract:

Development and oversight of security measures that account for the overall risk posed by radioactive materials requires integration of safety and security programs. Implementing a graded approach to security allows the United States Nuclear Regulatory Commission (NRC), along with our Agreement State partners, to ensure adequate protection without unnecessary burden. This allows the United States (US) to realize and take full advantage of the benefits of the various uses of radioactive materials. The NRC will present on its efforts to utilize a graded approach in the establishment of a strong regulatory framework to ensure the safety, security, and control of radioactive sources – from allowing exemptions from regulations for specific items, through sources and uses for which prudent management practices or existing safety requirements are sufficient, to the highest activity sources and practices that deserve the tightest control.

The US regulatory framework relies on various safety and security analyses, including threat, vulnerability, and consequence, to determine the appropriate policies and requirements for each circumstance. These analyses form the basis for the graded security for all civilian radioactive and nuclear material in the US. For example, sources that present minimal to negligible hazard, such as smoke detectors and gunsights, are exempt from licensing entirely for the end-user, while still other sources, such as those in robust devices, are subject to registration and notifications of transfers to the regulatory agency. For the majority of licensed civilian radioactive and nuclear material in the US the physical protection measures can be found in 10 CFR Part 20, in sections 1801 and 1802. Although, in short, these paragraphs state only that licensees must secure their material while in storage and that it must be under constant surveillance while in use – they do not specify exactly what means a licensee must use to accomplish those objectives. Thus, licensees must develop processes and procedures that are subject to inspection, to meet these objectives.

For other licensed material, and for specific modalities of use, additional (not replacement) requirements apply. An example of this is a well logging licensee who possesses a category 3 americium-241/beryllium source. This licensee must comply with the security requirements in 10 CFR Part 20, but also must comply with the additional requirements in 10 CFR Part 39 that are specific to well logging operations and, among other things, include prescriptive requirements for source control and security.

For sources or aggregated quantities of radioactive material that the US has determined to be risk-significant, that is that meet or exceed the category 2 threshold, further requirements of 10 CFR Part 37 must be implemented by the licensee to ensure additional physical protection. An example of this situation is an industrial radiography licensee who possesses a (or multiple) radiographic exposure device (camera) containing a category 2 iridium-192 source who must comply with 10 CFR Part 20, the additional specific safety requirements for radiography in 10 CFR Part 34 such as personnel wearing alarming dosimetry, and further security requirements in 10 CFR Part 37 such as providing extra barriers for their mobile source(s). These examples demonstrate the commitment to maintaining adequate protection of workers, the public, the environment, and the security of the US, but also demonstrate a recognition of the differences among the large population of users of radioactive and nuclear material within the US

The NRC has conducted multiple efforts to evaluate this framework in the past 3 years, has made revisions to further enhance its source protection program, and continues to monitor the threat environment to proactively

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identify any need for changes to ensure the security of these materials from potential terrorist threats. This paper will present this graded approach to the integrated safety and security framework that the NRC and Agreement States utilize, expanding on specific examples of this application, and will briefly describe efforts to evaluate and enhance this approach over the years.

Key words: graded approach, integrated, safety-security interface

Introduction

Development and oversight of security measures that account for the overall risk posed by radioactive materials requires integration of safety and security programs. Implementing a graded approach to security allows the US Nuclear Regulatory Commission (NRC), along with our Agreement State partners[1], to ensure adequate protection without unnecessary burden. This allows the United States (US) to realize and take full advantage of the benefits of the various uses of radioactive materials, while simultaneously protecting the public and the environment from the potential consequences of both accidental and intentional releases of radioactive materials.

For this paper the NRC will describe the application of a graded approach in the establishment and maintenance of a strong regulatory framework to ensure the safety, security, and control of radioactive sources – from allowing exemptions from regulations for specific items, through sources and uses for which prudent management practices or existing safety requirements are sufficient, to the highest activity sources and practices that deserve the tightest control. In the interest of space allowed only the high-level subject documents and regulations are referenced – this paper is in no way to be construed as a complete list of applicable practices of the NRC or Agreement States, or of all regulations that a licensed entity is subject to.

Discussion

The US regulatory framework relies on various safety and security analyses, including threat, vulnerability, and consequence, to determine the appropriate policies and requirements for each circumstance. These analyses form the basis for the graded security for all civilian radioactive and nuclear material in the US.[2]

The regulatory framework for licensed radioactive materials in the US can be visualized, see Figure 1, as additive layers of requirements that translate to increasing mechanisms for control (i.e., safety and security measures integrated). Limited resources need to be expended to adequately control small activities of radioactive material as they pose low or appreciably

[1] The regulation of radioactive materials in the US is implemented by the NRC and 39 Agreement States. The NRC and Agreement States regulatory programs are compatible with each other resulting in the implementation of equivalent regulatory programs that provide the same level of protection for the safety and security of radioactive materials across the entire country. The NRC routinely evaluates Agreement States' and its own program to ensure the regulatory programs are adequate to protection safety and security, compatible with NRC requirements, and are consistent across the US.

[2] The NRC process for the development of the national threat assessment for radioactive materials was presented at the 2018 IAEA International Conference on the Security of Radioactive Material: The Way Forward for Prevention and Detection, paper 377.

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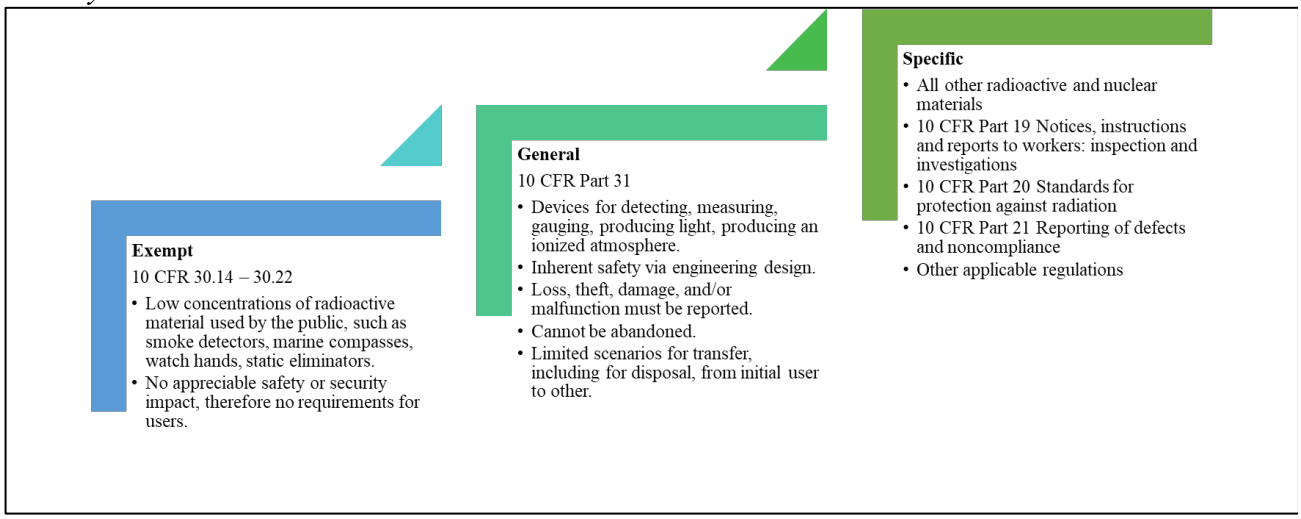
no adverse risk to people or the environment. Conversely, more control is necessary for a higher activity of radioactive material, as well as for uses that pose the highest overall risk to workers and the public. To ensure both adequate protection of the public and the environment the NRC and Agreement States have developed a robust regulatory framework that includes a combination of prescriptive and performance-based integrated safety and security requirements, that is confirmed by a cadre of experienced and highly knowledgeable license reviewers and inspectors, and supported by a comprehensive enforcement program.

Not all radioactive material or activities are subject to licensing. NRC specifies exempt populations: certain activities of other US government agencies in Title 10 of the *Code of Federal Regulations* (10 CFR) 30.12; carriers in 10 CFR 30.13; concentrations or quantities in 10 CFR 30.15 and 30.18, respectively; and certain products listed in 10 CFR 30.15 and 30.19-22.

Figure 1: Increasing levels of control and licensing for radioactive materials based upon safety and security risk



A number of consumer products are exempt from regulation for the user and fulfill a number of purposes both necessary and historical. Like other listed exemptions, these products pose no appreciable detriment neither to the user nor to the environment in which they will be used or disposed. An example is the widespread use of household smoke detectors that utilize americium-241. These ionization-type detectors can be purchased in the United States at most hardware, home improvement, general retailers (for example Wal-Mart and Target), and can even be available at some grocery stores. When the prescribed lifetime has been reached, the homeowner can dispose of the device in the household trash.

Some items that contain radium-226 can be acquired, received, possessed, used, and transferred by people under a general license described in 10 CFR 31.12 and are exempt from most other licensing and requirements of the NRC. Examples of applicable items are timepieces that have faces and/or hands painted with radium-226 to allow them to be seen in darkness. and water vessels, some made with uranium glass, that contain radium-226 that were popular early in the 20th century and were touted as providing medical prevention and cure for multiple ailments. These too can be held under general licenses. Although new

timepieces manufactured this way have been discontinued and any benefit of drinking radium water has been debunked, due to the long half-life of radium-226, items like these still exist and are traded as antiques and historical oddities. Similar to the beneficial ionizing smoke detector, the dose to the public or the environment is extremely low and poses no safety or security risk. Thus, these items can be possessed and traded by the public.

The next level of safety and security control under the regulatory framework is the general license under 10 CFR Part 31, "General Domestic Licenses for Byproduct Material." This general license allows receipt, possession, and use of a certain device that has been evaluated and approved by the NRC or Agreement State based upon engineered safety controls. This evaluation ensures that the device, many of which are fixed gauges used in industrial settings such as coal or cement plants, can be safely operated without radiation safety training, because under normal conditions of use the radioactive material will not be released or removed from the device, and that in an accident there will be no external radiation dose above those listed in Table 1 (below).

Table 1: Dose limits for generally licensed devices. Adapted from 10 CFR 32.24.

Part of the body	**Dose limit**
Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	15 rem (150 mSv)
Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	200 rem (2 Sv)
Other organs	50 rem (500 mSv)

The requirements for a user are that they:

- register the device with the NRC or Agreement State annually
- perform tests and keep records of testing performed
    - leak
    - shutter
    - on/off mechanisms
- notify the appropriate regulator of information changes such as responsible person or business name
- cannot move, transfer, or service the device themselves
- cannot keep stored and unused devices longer than 2 years
- cannot abandon the device
- must report to the appropriate regulator any loss, theft, and damage

A specific license is required for all radioactive and nuclear material, and/or related activities, that are neither exempt nor approved for use under a general license. As of August 2019 there are approximately 19,300 licenses for medical, academic, industrial, and other uses of radioactive and nuclear materials in the United States [1]. The regulations for a specific license are in 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," and specify additional parts of regulation that must be followed. Together, these parts of regulation (listed in Table 2) specify the minimum safety and security measures that must be followed by all licensees and are specific to the type of activities they are authorized to carry out.

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Table 2: Additional requirements for specific licensees. 10 CFR Part [##][3]

19	Notices, instructions and reports to workers: inspection and investigation
20	Standards for protection against radiation
21	Reporting of defects and noncompliance
32	Specific domestic licenses to manufacture or transfer certain items containing byproduct material
33	Specific domestic licenses of broad scope for byproduct material
34	Licenses for industrial radiography and radiation safety requirements for industrial radiographic operations
35	Medical use of byproduct material
36	Licenses and radiation safety requirements for irradiators
37	Physical protection of category 1 and 2 quantities of radioactive material
39	Licenses and radiation safety requirements for well logging
40	Domestic licensing of source material
61	Licensing requirements for the packaging and land disposal of radioactive waste
70	Domestic licensing of special nuclear material
71	Packaging and transportation of radioactive material

For the majority of licensed civilian radioactive and nuclear material in the US the explicit physical protection measures can be found in 10 CFR Part 20, "Standards for Protection Against Radiation," in sections 1801 and 1802.

> *§ 20.1801 Security of stored material.*
> *The licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.*
>
> *§ 20.1802 Control of material not in storage.*
> *The licensee shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.*

Although, in short, these paragraphs state only that licensees must secure their material while in storage and that material must be under constant surveillance while in use – they do not specify exactly what means a licensee must use to accomplish those objectives. Thus, licensees must develop processes and procedures, that are subject to inspection, to meet these objectives in addition to all other applicable radiation safety requirements.

The licensing process that an applicant must submit to prior to receiving a license from the NRC or Agreement State is very thorough, and includes providing information on all processes, procedures, and infrastructure the applicant intends to rely on in the course of their operations. Applicants are provided publicly-available information on the licensing process by the NRC in NUREG-1556 [2]. All items in the application should be completed in enough

[3] There are other Parts of NRC regulation for both safety and security (e.g., 10 CFR Part 50, 10 CFR Part 73) that are applicable to other types of facilities (e.g., power reactors, fuel cycle facilities) that are outside the scope of this paper.

detail for the regulator's license reviewer to determine whether the proposed equipment, facilities, training and experience of personnel, and radiation safety and security programs satisfy regulatory requirements and are adequate to protect public health and safety and minimize danger to life and property. Applicants are expected, when developing the application, to consider the concepts of keeping radiation exposure as low as is reasonably achievable[4] (ALARA), minimizing contamination, and maintaining control of radioactive materials. This guidance also specifies information that an applicant need not supply in advance but that will be subject to inspection.

A number of examples, beginning from the licensing process and progressing though inspection and enforcement, will help to illustrate how this integrated safety and security framework functions. The application for a specific license for radioactive materials from the NRC or an Agreement State is similar across the various modalities of use of radioactive materials. That is, the license application may be slightly different for various user types but largely the information that must be provided is the same.

For this first example, an applicant seeking to utilize portable gauges[5] will use [2] volume 1 to compile relevant information and to both understand applicable regulations and what types of information will be subject to inspection. The applicant may submit to the NRC or Agreement State information including (but not limited to):

- the name and address of the legal entity who is responsible for the radioactive material
- the purpose(s) for which the material will be used, and the locations where the material will be used, stored, or possessed – this includes permanent and field locations
- the individual(s) responsible for the radiation safety program and their training and experience
- the training that will be provided and verified for individuals who will work in restricted areas
- details of the radiation safety program, including:
    - audit program
    - radiation monitoring instrumentation
    - material receipt and accountability
    - occupational dose control and record keeping
    - limiting public dose
    - operating, emergency, and security procedures
    - leak testing and maintenance

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[4] As defined in 10 CFR 20.1003, ALARA is an acronym for "as low as (is) reasonably achievable," which means making every reasonable effort to maintain exposures to ionizing radiation as far below the dose limits as practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

[5] The NRC categorizes sources by activity rather than by modality of use. Portable gauges, as used in this example, are category 4 or category 5 depending upon the specific isotopes and activity level included in the device.

- acknowledgement of the requirements for future gauge transfer or disposal, and timely notification of such disposition
- necessity of utilizing a minimum of two independent physical barriers whenever the device is not under the control or constant surveillance of the licensee

In this example, for a device that is designed to be used in various locations, additional information on the requirements for safe and secure transport that are mandated by both the NRC and the US Department of Transportation (DOT) is provided as well. Such requirements include correct labeling of transport containers, the provision of certified packages, proper blocking and bracing of packages to limit movement during transport, and the development and maintenance of transport shipping records.

Assuming the applicant is issued a license to use and possess radioactive materials in portable gauges they will be inspected by the NRC or Agreement State to ensure compliance with all applicable regulations. For the physical protection requirements noted above – 10 CFR 20.1801 and 10 CFR 20.1802 – the inspector will use Inspection Procedure 87124, "Fixed and Portable Gauge Programs," [3] to evaluate the implementation of these performance-based requirements. Specifically, the inspector will directly observe and verify that all facility entrances are closed and locked, or otherwise secured, to prevent unauthorized entry, and that devices in storage are secured with a minimum of two independent physical controls that form tangible barriers to secure gauges from unauthorized removal. The inspector will also observe processes and procedures for limiting and controlling access to the radioactive materials, including ensuring that the facility is configured to separate working or storage areas from unrestricted areas. Such an inspection will include licensee management and control of keys, access codes, or other measures relied upon to ensure only authorized individuals have access to the radioactive material.

Since devices in this example are portable by nature, inspectors will plan to inspect licensed activities occurring at temporary job sites to verify that constant surveillance is provided or that the temporary jobsite has adequate security measures in place to ensure that gauges are not removed by unauthorized persons. The inspector will also observe licensee practices and procedures for securing gauges in transport and in storage, including ensuring that gauges are secured with at least two independent physical controls that form tangible barriers while in vehicles that are parked at restaurants or hotels, as needed. The requirement for licensees to use at least to two barriers to secure portable gauges when not under the direct surveillance of authorized personnel was one of the first regulations for physical protection enacted by the NRC for radioactive materials after September 11, 2001.

Although the license application process is very similar for fixed sources/devices, the regulatory requirements vary dependent on the operating environment. For this example, consider a high dose rate (HDR) brachytherapy remote afterloader unit used for solid tumor cancer treatment. These devices typically utilize a category 3 source of iridium-192 and are generally confined to a specific treatment room within a fixed site such as a hospital or outpatient medical clinic. A license applicant will refer to [2] volume 9 to complete and submit their application and to ensure they understand all the applicable requirements, including how they will be inspected to ensure compliance by the NRC or Agreement State.

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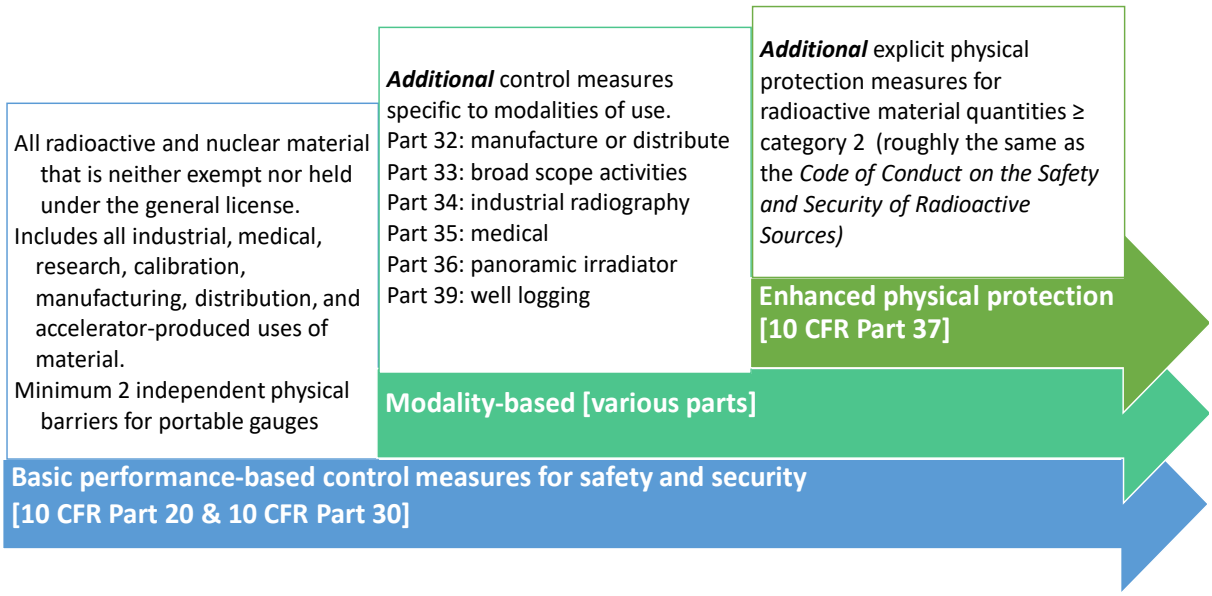
A licensee authorized to use this device must comply with the same physical protection requirements noted above for the portable gauge case – 10 CFR 20.1801 and 10 CFR 20.1802. However, since the operating environment is so very different, including the fact that patients[6] are in close proximity to the device, exactly how those security measures are implemented will be necessarily different. This is also a good demonstration of a situation where existing safety requirements provide a security benefit. Specifically, 10 CFR 35.615(f)(2) requires physical presence of authorized licensee personnel, in this case designated authorized user, authorized medical physicist, and physician, to be physically present or within speaking distance while patients are undergoing treatment. Uniquely, this requirement protects licensee personnel from receiving unnecessary radiation exposure while maintaining control over the source, and ensures the patient receives the prescribed treatment while maintaining capability to attend to them to if any acute emergency arises.

Figure 2: Increasing safety and security measures are required for higher activity and certain practices authorized under a specific license



To determine the adequacy of security measures implemented by the licensee the NRC inspector will use Inspection Procedure 87132, "Brachytherapy Programs," [3]. Specifically, the inspector will observe the locations where radioactive materials are used and stored, in this case including treatment rooms, to verify that the storage areas are locked and have limited and controlled access mechanisms. The inspector will also review, and may ask the

[6] It is important to note that the NRC does not regulate the practice of medicine. Therefore, while the NRC considers patients members of the public and doses must remain below established limits for incidental exposures, dose that is prescribed by a physician is not under the regulatory authority of the NRC. Established medical practice and licensing of medical facilities and practitioners are the responsibility of other organizations and regulatory bodies that the NRC coordinates with on a regular basis.

licensee to demonstrate, procedures for securing radioactive material at any time that it is not under the direct supervision of authorized personnel. This includes demonstrating that interlocks, treatment room door locks, and keys or keycard access controls are functional, appropriate for the application, and controlled. During inspection the inspector must also ensure that their presence does not interfere with patient care or a patient's privacy

Since iridium-192 has a short half-life these devices need to have their sources replaced periodically. Thus, the licensee will also have to plan for maintaining control during the time that a licensed service provider will be at their facility replacing the older decayed source with the new source. Given that this source exchange is a regular occurrence and could present a higher safety and security risk, since the source will be removed from its normal shielding and prepared for transport, inspectors often will make a point of observing such operations. This is also a case where inspectors may have the opportunity to expand their inspection activities beyond the licensed medical facility – possibly to the licensed service provider, a contracted transport company, or to the waste storage facility, as applicable - and encompass a larger portion of the lifecycle of a radioactive source.

For discrete sources or aggregated quantities of radioactive material that the US has determined to be risk-significant, that is that meet or exceed the category 2 threshold, the further explicit physical protection requirements of 10 CFR Part 37, "Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material," must be implemented by the licensee. An example of this situation is an industrial radiography licensee who possesses a camera (or multiple cameras) containing a category 2 iridium-192 source. This type of licensee must comply with 10 CFR Part 20, the additional specific safety, security, and control requirements for radiography in 10 CFR Part 34, "Licenses for Industrial Radiography and Radiation Safety Requirements for Industrial Radiographic Operations," such as personnel wearing alarming dosimetry and controlling access to areas where higher exposures are possible during operations, and further security requirements in 10 CFR Part 37 such as providing extra barriers for their mobile source(s).

Again, the license application procedures may be very similar for an entity seeking a license to conduct industrial radiography as for those seeking to perform cancer treatments in a hospital. But since, in this example, the possession of even a single radiography source is likely to exceed the category 2 threshold additional steps are taken by the NRC or Agreement State before deciding to issue a license. The NRC and Agreement States have developed pre-licensing guidance[7] that enables the screening of license applicants to provide greater assurance that the radioactive material will be used as intended, and includes the following features:

- "Unknown" applicants, and existing licensees who request an increase in their possession limits, are subject to pre-licensing site visits
- All new applicants are subject to screening to verify their legitimacy

[7] The pre-licensing guidance is not publicly available and is only summarized here for informational purposes.

- Personnel that will have unescorted access to licensed material greater than category 2 are subject to a security background check (including fingerprinting) prior to being granted access to risk-significant radioactive material

Additionally, neither the NRC nor an Agreement State will authorize receipt of greater than category 2 quantities of material until confirmation that the licensee/applicant is prepared to implement the additional security requirements of 10 CFR Part 37.

To determine the adequacy of security measures implemented by the licensee the NRC inspector will use Inspection Procedure 87137, "10 CFR Part 37 Materials Security Programs," [3]. Specifically (but not exclusively), the inspector will review the licensee's documented security plan and related procedures, will examine records of and the process (fingerprinting, background check, and final assessment) for determining what personnel will be granted unescorted access to radioactive material, and will observe capabilities to protect sensitive information. The inspector will also observe the locations where radioactive materials are used and stored. For both fixed and mobile radiography operations, the inspector will verify that controlled areas are designated appropriately and that storage areas are locked and have limited and controlled access mechanisms. The inspector will also review, and may ask the licensee to demonstrate, procedures for securing radioactive material at any time that it is not under the direct supervision of authorized personnel. This includes demonstrating the securing and blocking of equipment during transport, and the disabling of vehicles that may be carrying to storing radiography sources and equipment at restaurants or hotels, as necessary.

A licensee who conducts well logging operations for geologic exploration utilizing multiple tools containing category 3 sources of americium-241/beryllium will also be inspected against 10 CFR Part 37 using the same inspection procedure (87137) [3] because their possession (in this example) likely exceeds the category 2 threshold. While in a permanent storage location a licensee may utilize operational controls and additional barriers to prevent aggregation of lower activity sources to the category 2 threshold, when in transport that allowance does not apply. They will also be inspected utilizing Inspection Procedure 87123, "Well Logging Programs," at both permanent and temporary job sites and storage locations.

Similar to the other examples provided here, multiple layers of requirements are applicable to a well logging licensee, including 10 CFR Part 20, the additional specific safety, security, and control requirements for well logging in 10 CFR Part 39, "Licenses and Radiation Safety Requirements for Well Logging," such as ensuring the physical presence of a logging supervisor at all times and ensuring that licensed material is protected from fire and explosion, and further security requirements in 10 CFR Part 37 such as conducting background checks on all personnel before they are granted unescorted access to sources and providing extra barriers for their mobile source(s).

A licensee who possesses a category 1 quantity of radioactive material went through a similar license application procedure as has been noted in the previous examples but must comply with even more specific security measures than that for the lower categories of material. An example of this case is an oncology center who uses a stereotactic radiosurgery device relying on a category 1 quantity of cobalt-60. For this example the licensee would have to comply with 10 CFR Part 20, the additional specific safety, security, and control requirements for a

medical facility in 10 CFR Part 35, “Medical Use of Byproduct Material,” such as ensuring that written directives for patient treatments are developed and followed and ensuring patients are monitored throughout their treatments, and further security requirements in 10 CFR Part 37 including designating a security zone around the radioactive material and that the licensee can detect, assess, and respond to any unauthorized entry or suspicious activity. The category 1 quantity in this example also makes applicable additional security measures such as maintaining the capability to detect the removal of a source from the device and advanced notification with route planning for transport.

Again, the NRC or Agreement State inspector will use the previously-mentioned inspection procedure for 10 CFR Part 37, but in addition will use Inspection Procedure 87133, “Medical Gamma Sterotactic Radiosurgery and Teletherapy Programs.” This is used to, among other things, ensure that device calibrations and safety systems have been maintained and that they are checked prior to use on a patient and that area radiation surveys have been conducted so that personnel and members of the public are not subject to exposure unintentionally.

Maintaining such a varied and integrated licensing, inspection, and enforcement program for the almost 20,000 licensees, and estimated 2,000,000 devices, that use radioactive materials in the US requires investment and constant monitoring. The NRC regularly collects, summarizes, and distributes information (to licensees, the general public, and others) various types of information, including on events and incidents. The NRC also has the authority to respond quickly to increase or alter required control measures if the national situation justifies it – such as increase in threat or new technologies are introduced.

Conclusion

The US has had decades of experience with controlling radioactive materials so that society may benefit from their varied and extensive use, and recognized early on that licensees make up a large population of varied activities, sizes, capabilities, knowledge, and budget. Thus this regulatory infrastructure has evolved over the years to include new uses of radioactive materials and to incorporate new challenges – such as physical protection - without impacting the beneficial use of these materials. The NRC and Agreement States have conducted multiple efforts to evaluate this framework, especially in the past few years, has made revisions to guidance and procedures to further enhance its source protection program, and continues to monitor the threat environment to proactively identify any need for changes to ensure the security of these materials from potential terrorist threats.

These brief examples demonstrate the commitment to maintaining adequate protection of workers, the public, the environment, and the security of the US, but also demonstrate a recognition of the differences among the large population of users of radioactive and nuclear material within the US. Applying an appropriate and consistent graded approach to safety, security, and control of radioactive materials in the US demonstrates this commitment.

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