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Written testimony of DNDO Director Huban Gowadia for a House Committee on Transportation and Infrastructure, Subcommittee on Coast Guard and Maritime Transportation hearing titled "Prevention of and Response to the Arrival of a Dirty Bomb at a U.S. Port"

Release Date: October 27, 2015

2167 Rayburn House Office Building

Chairman Hunter, Ranking Member Garamendi and distinguished Members of the Subcommittee. Thank you for the opportunity to testify with my colleagues from the Department of Homeland Security (DHS) on the Domestic Nuclear Detection Office's (DNDO) efforts to prevent and respond to the arrival of a radiological device at our Nation's maritime ports.

Radiological and nuclear terrorism remains one of the greatest threats to our Nation's security. An attack with a radiological dispersal device, also known as a "dirty bomb," at a U.S. port would have profound and prolonged impacts to our Nation and the world.

Since its inception, DNDO has built essential partnerships, developed strategies, and deployed capabilities to detect and interdict radiological and nuclear threats posed to the homeland. Additionally, DNDO, in partnership with our interagency partners from the Departments of Defense (DoD), Energy (DOE), State (DoS), Justice (DOJ), and the Office of the Director of National Intelligence (ODNI), has advanced national technical nuclear forensics to trace nuclear and other radioactive materials back to their source. My testimony today focuses on work to strengthen the operational readiness of our maritime partners and efforts to improve the technical nuclear forensics capabilities of the U.S. government (USG).

In both nuclear detection and forensics, we rely on the critical triad of intelligence, law enforcement, and technology. Thus, to maximize our Nation's ability to detect and interdict threats in the maritime domain, it is imperative that we apply detection technologies in operations driven by intelligence indicators, and place them in the hands of well-trained law enforcement and public safety officials. The USG also must ensure that information from law enforcement, intelligence, and technical nuclear forensics is synthesized to identify the origin of the material or device and the perpetrators.

DNDO was established in 2005 by presidential directive and subsequently codified in the SAFE Port Act (P.L. 109-347) amending the Homeland Security Act of 2002. DNDO is responsible for the coordination of federal efforts to detect and protect against attempts to import, possess, store, develop, or transport nuclear or other radioactive materials out of regulatory control that may be used as weapons against the Nation. Necessarily, our efforts are collaborative with federal, state, local, tribal, territorial, and international partners, as well as with academia, the national laboratories, and industry. DNDO with its interagency partners coordinates the development and enhancement of the global nuclear detection architecture, which is a framework for detecting, analyzing, and reporting on nuclear and other radioactive materials that are out of regulatory control. DNDO is responsible for implementing the domestic portion of the global nuclear detection architecture. The architecture presents a layered, multi-faceted, defense-in-depth framework to ensure prospective terrorists face multiple obstacles. Our goal is to prevent nuclear terrorism by making it a prohibitively difficult undertaking for the adversary.

Our efforts to secure the homeland from the threat of nuclear terrorism begin overseas. A global nuclear detection architecture relies largely on the decisions of 195 sovereign foreign partners to develop and enhance their own national and regional detection programs. To that end, DNDO, in close cooperation with the interagency and multilateral partners such as the International Atomic Energy Agency (IAEA), the Global Initiative to Combat Nuclear Terrorism (GICNT), and INTERPOL, promotes the development of national nuclear security detection architectures.

Further, programs implemented by our interagency partners seek to secure and reduce the available material abroad as well as assist partner nations with interdicting and deterring the possession and use of illicit materials and weapons. DOE's Office of Radiological Security provides a first line of defense by securing radioactive materials used for legitimate medical, industrial, and research purposes; removing and storing disused radioactive sources; and, where feasible, encouraging the use of non-isotopic alternative technologies that cannot be used as weapons. DOE's Nuclear Smuggling Detection and Deterrence program also contributes significantly to the capacity of partner countries to deter, detect, and interdict illicit trafficking of nuclear and radiological material across international borders and through the maritime shipping network by providing partner country governments fixed and mobile detection equipment and support to indigenously advance and sustain a

nuclear detection architecture. DOE's efforts in these areas complement the DHS mission to protect the homeland by preventing terrorists and other criminal groups from accessing and using radioactive materials to carry out an attack.

To assist partner nations in their nuclear security endeavors, DNDO, working through the aforementioned international organizations, develops and shares guidance, best practices, and training courses. These efforts focus on foundational elements of detection architectures, such as planning, risk assessment, strategy development, legal and regulatory frameworks, and the integration of intelligence networks and law enforcement.

In acknowledgement of the serious nature of the threat, President Obama established a series of Nuclear Security Summits, beginning in 2010, as an international forum for improving nuclear security worldwide. Consistent with commitments made at these summits, nations are improving security at nuclear and radiological facilities, enhancing abilities to counter nuclear smuggling, and removing or disposing of nuclear materials. Although less nuclear and radiological material is available for use by terrorists due to these efforts, much work remains and the threat requires our constant attention.

The 2016 Nuclear Security Summit is anticipated to continue discussions to improve nuclear security efforts to deter, detect, and disrupt attempts at nuclear terrorism. As part of the Department's endeavor to address the congressional mandate to scan 100% of U.S.-bound maritime cargo containers overseas, DHS, DOE, and other USG representatives will participate in the Nuclear Security Summit Maritime Security Workshop in November 2015, which will specifically address radiation detection in the maritime environment. Any recommendations developed will be presented at the 2016 summit.

The summits, along with the aforementioned international efforts, contribute to building a multi-faceted, multi-layered approach for detection so nuclear and other radioactive material out of regulatory control can be interdicted before it is transported to the United States.

The layered approach to countering nuclear terrorism continues at our borders. To fulfill DNDO's responsibility to implement the domestic portion of the global nuclear detection architecture we work with DHS operational colleagues to develop and deploy detection technologies and state and local agencies to establish and enhance their detection capabilities. DNDO procures large-scale fixed radiation detection systems and small mobile devices for employment at our ports of entry, along our land and maritime borders, and in the interior of the United States. As such, we collaborate with the U.S. Coast Guard (USCG), U.S. Customs & Border Protection (CBP), and the Transportation Security Administration (TSA).

To bolster detection capabilities at our maritime borders, DNDO has procured portable radiation detectors for the USCG so that all boarding teams are equipped with mobile devices to scan for the presence of radiation. To increase the probability of detecting threats posed by small vessels, DNDO has also acquired capabilities for use by USCG and CBP vessels to scan such vessels before they reach our shores. To facilitate the scanning of inbound cargo containers, DNDO, in collaboration with CBP, has also procured and deployed radiation portal monitors and radioisotope identification devices for use at the ports of entry. As a result, today, almost100% of all incoming maritime containerized cargo is scanned for radiological and nuclear threats at our seaports.

At the same time, we continue to enhance our fielded capabilities. To improve the performance of radiation portal monitors and gain efficiency at land and maritime ports of entry, CBP and DNDO worked closely on implementing an approach to reduce the number of nuisance alarms. Radiation portal monitors routinely detect benign radioactive materials in the stream of commerce, resulting in a significant operational burden for CBP field officers who must resolve these alarms. CBP and DNDO worked closely to implement a new algorithm, reducing nuisance alarms (by 74% on average) without sacrificing detector performance against threat materials. The reduction in alarm rates and decrease in secondary security inspections has enabled officers in the field to redirect their attention to other high priority law enforcement duties.

To advance technology to detect threats, DNDO performs accelerated development, characterization, and demonstration of leading-edge technologies. One such effort is the Nuclear and Radiological Imaging Platform project, where DNDO is developing and evaluating emerging technologies to detect shielded materials while clearing benign conveyances at land and maritime ports. We are also collaborating with CBP's Laboratories and Scientific Services to use machine learning to further reduce the number of nuisance alarms in radiation portal monitors deployed to ports. In addition, we are working with the Massachusetts Port Authority, DHS Science and Technology's Border and Maritime Security Division, and the United Kingdom's Home Office to develop and evaluate the next generation non-intrusive inspection imaging equipment. The collaboration aims to produce the first wholly integrated system capable of detecting both nuclear material and contraband. The technology will be evaluated in the Port of Boston next year and, if successful, will demonstrate a next generation integrated system capable of detecting both nuclear material and contraband.

While technology is critical to detection, building operational capacity through training, exercises, and cross-jurisdictional protocols is integral to securing our maritime borders. DNDO works with federal, state, local, tribal, and territorial agencies to build flexible, multi-layered capabilities that can be integrated into a unified response when intelligence or information indicates a credible radiological or nuclear threat.

DNDO also provides program assistance to aid maritime partners in developing radiological and nuclear detection programs based on lessons learned in the West Coast Maritime Pilot, a collaborative effort with partners from Puget Sound, WA, and the Port of San Diego, CA. Under the leadership of the Area Maritime Security Committees, the pilot successfully established efficient, risk-informed regional detection programs focused on detecting and interdicting threats posed by small vessels in the maritime pathway. Lessons from this pilot have also shaped DOE's Maritime Vectors Program, which is an element of the DOE/NNSA Defense Nuclear Nonproliferation Office of Nuclear Smuggling Detection and Deterrence that seeks to deter, detect and interdict international smuggling of nuclear materials via unregulated maritime traffic. Today, DNDO's maritime assistance program works with Area Maritime Security Committees to develop regional Concepts of Operations and Standard Operating Procedures, provides information on detection equipment needed to support the same, and provides guidance on training and exercise plans.

To further our domestic capabilities to detect and interdict nuclear and other radioactive material out of regulatory control, DNDO is currently engaged with all 50 states and 33 of the USCG's Area Maritime Security Committees. Since intelligence and information sharing is integral for our collective success, DNDO efforts are focused on bringing together federal, state, local, tribal, and territorial partners at the outset. DNDO and DHS's Office of Intelligence & Analysis, along with our federal interagency partners at the Federal Bureau of Investigation (FBI) and the National Counterterrorism Center (NCTC), ensure that state and local partners have the information and tools necessary to address evolving threats. State and major urban area fusion centers, State Emergency Control Centers, and the FBI Joint Terrorism Task Forces (JTTFs) provide the necessary information exchange pathways. In the event of an emergency, this connected system provides federal, state, local, tribal, and territorial personnel with the ability to exchange sensitive information in a timely and secure manner.

To enhance situational awareness of radiological and nuclear threats and provide technical support to operational partners, DNDO's Joint Analysis Center provides information products and technical expertise. For example, the Joint Analysis Center provides geographic information on detectors, situational awareness reports, and other overlays in a geospatial viewer. DNDO's Joint Analysis Center Collaborative Information System (JACCIS) facilitates information sharing and provides nuclear alarm adjudication support to operational partners, including those in the maritime environment. This system is connected to the Triage system, maintained by the DOE's National Nuclear Security Administration, which enables seamless transition when national-level adjudication assistance is required.

DNDO's operational partners seek to ensure their readiness to counter the nuclear threat. To this end, DNDO brings to bear a unique "red team" that can challenge fielded capabilities using uncommon nuclear sources and scenarios. DNDO supports maritime partners by conducting overt and covert assessments of operations by intentionally introducing radiation sources and mock devices against deployed defenses to evaluate the performance of fielded technology, training, and protocols. Engagements are conducted through the Area Maritime Security Committees or directly with the federal, state, or local maritime agency. Recent engagements have included the USCG Maritime Security Response Team and the Florida Wildlife and Conservation Commission.

An act of nuclear terrorism or the interdiction of a nuclear or radiological threat at a U.S. port would necessitate rapid, accurate attribution based on sound scientific evidence. Nuclear forensics, when coupled with intelligence and law enforcement information, supports leadership decisions. DNDO's National Technical Nuclear Forensics Center focuses on developing and improving the readiness of the overarching USG nuclear forensic capabilities, advancing our technical capabilities to perform forensic analyses on pre-detonation nuclear and other radioactive materials, and building and sustaining an expertise pipeline for nuclear forensic scientists. As with its detection mission, DNDO must closely collaborate with interagency partners, particularly those in the FBI, DoD, DOE, and the intelligence community.

The operational readiness of U.S. nuclear forensics capabilities has improved markedly in recent years, as demonstrated by increasingly realistic and complex interagency exercises. Many of the exercises, which were traditionally conducted only by federal partners, now include state and local law enforcement and the intelligence community in order to plan and synchronize the fusion of intelligence, law enforcement, and technical forensics information.

DNDO also supports various efforts to advance technical forensics capabilities related to radiological materials. We have developed, and continue to provide input to, a radiological sealed-source database hosted at Argonne National Laboratory. It is the most comprehensive database of radiological sealed-sources in the world and is used to collect and understand sealed radioactive source design types, production and distribution processes and pathways, and country of origin profiles. The database has been used during operational events by FBI and DOE. DNDO also develops and produces radiological Certified Reference Materials to ensure measurement precision that is sufficient to determine the length of time since the material was last processed.

Our Nation's ports are central to international trade and commerce. An attack on a U.S. seaport with a dirty bomb would cause disruption to the global supply chain, whether directly or indirectly. The collective international efforts to reduce the amount of available material, develop national detection architectures, and deploy detection systems to interdict illicit material, are vitally important in minimizing the risk of a weapon entering the United States. These efforts, coupled with the USG's development and enhancement of domestic defenses present adversaries with multiple obstacles as they seek to attack us using nuclear or other radioactive material. Our national nuclear forensics capabilities will ensure responsible parties are held accountable for their actions. We will continue to work with our partners to counter nuclear terrorism and we sincerely appreciate this Subcommittee's interest in and support for securing the homeland.

Thank you again for this opportunity, and I am happy to answer any questions from the Subcommittee.

***Review Date:** November 6, 2015*

Allard Affidavit: Attachment H

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Radiation Protection and
Bureau of Land Recycling and Waste Management

DOCUMENT NUMBER:	250-3100-001
TITLE:	Final Guidance Document on Radioactivity Monitoring at Solid Waste Processing and Disposal Facilities.
EFFECTIVE DATE:	January 2, 2004
AUTHORITY:	Solid Waste Management, Act of July 7, 1980, P.L., No. 97, as amended, 35 P.S. Sections 6018.101-6018.1003; Radiation Protection Act, Act of July 10, 1984, P.L. 688, No. 147, 35 P.S. Sections 7110.101-7131.1101; The Administrative Code of 1929, Section 1917-A, 71 P.S. Section 510-17; Solid Waste Regulations, 25 Pa. Code Chapters 273, 277, 279, 281, 283, 284, 288, 289, 293, 295 and 297; Radiological Health Regulations, 25 Pa. Code Chapters 215-240.
POLICY:	To protect the environment and the public health, safety and welfare from the possible dangers of radioactive material that is delivered to solid waste processing and disposal facilities.
APPLICABILITY:	This guidance document applies to all owners and operators of solid waste processing and disposal facilities that are required by regulation to monitor for radiation from incoming loads of waste, and to those facilities that choose to monitor even though not required. This guidance document also applies to all Department personnel and activities involved with waste facility permitting, operations and enforcement, radiation protection, grants, monitoring, administration and emergency response.
DISCLAIMER:	The policies and procedures outlined in this guidance are intended to supplement existing requirements. Nothing in the policies or procedures shall affect regulatory requirements. The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of DEP to give the rules in these policies that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.
PAGE LENGTH:	38 Pages
LOCATION:	Volume 5, Tab 7
DEFINITIONS:	See attached.

GUIDANCE DOCUMENT ON RADIOACTIVITY MONITORING AT SOLID WASTE PROCESSING AND DISPOSAL FACILITIES

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DEFINITIONS

Absorbed Dose: Measure of energy absorbed by material interacting with radiation. The unit in the older conventional system is the rad, which is equal to the energy of 100 ergs per gram of irradiated material. In the System International (SI), the unit for absorbed dose is the gray (Gy), which is equal to 100 rads.

Activity: Rate of decay for radioactive material. The older conventional unit is the curie (Ci). The System International (SI) unit is becquerel (Bq), where $1Ci = 3.7 \times 10_{10} Bq$.

Byproduct Material: (1) Radioactive material, except special nuclear material, yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium or thorium solution extraction processes. Underground ore bodies depleted by these solution extraction operations do not constitute "byproduct material" within this definition. (10 CFR §20.1003)

Decay: Transformation of atoms of a radioactive element to atoms of another by emission of alpha or beta particles (positive or negative), or gamma rays from its nucleus. The resulting decay product may be radioactive or stable.

Department or DEP: The Pennsylvania Department of Environmental Protection.

Dose Equivalent: The dose of an ionizing radiation that will cause the same biological effect as one rad of x rays or gamma-rays. In the older conventional system, the unit is the rem. In the SI system, the unit is the sievert (Sv), 1Sv = 100 rem. Dose equivalent is calculated by multiplying absorbed dose (rad, Gy) by a quality factor (QF) that accounts for the effectiveness of the radiation, relative to gamma or x rays, in causing a biological effect, i.e., rem = rad x QF; Sv = Gy x QF. *(Note: For this guidance, and x ray or gamma radiation, rem = rad = R.)*

DOT: The U.S. Department of Transportation.

DOE: The U.S. Department of Energy.

EPA: The U.S. Environmental Protection Agency. *(Note: According to the revised Federal Radiation Emergency Response Plan (FRERP), EPA is responsible for providing assistance to states in managing incidents involving radioactive material of unknown origin that is found outside of Nuclear Regulatory Commission (NRC) licensed facilities unless the radioactive material is clearly associated with a NRC licensee, in which*

case the NRC assumes responsibility for assistance. In general, federal agencies provide assistance at the request of the state.)

Exposure Rate: An older measurement quantity of intensity for x ray or gamma radiation causing ionization of air. It is still in practical use in the U.S.A.; measured in roentgen (R) or microroentgen (μR) per unit time, usually an hour, as in Rh^{-1} or μRh^{-1}. 1 R = 2.58 E-4 C/kg of air.

Half-life: The time required for half the atoms of a quantity of a radioactive material to decay or become transformed to another nuclide.

Isotope: A chemical element with the same atomic number (i.e., number of protons), but different atomic mass.

Multichanne Analyzer (MCA): An electronic instrument which, when coupled with an appropriate detector, can determine the energy associated with various radiations and thereby identify the radioactive material emitting the radiation.

NARM: Naturally occurring or accelerator-produced radioactive material. The term does not include byproduct, source or special nuclear material.

NORM: Naturally occurring radioactive material is a radioisotope that is radioactive in its natural physical state, not man-made, but does not include source or special nuclear material.

NRC: The U.S. Nuclear Regulatory Commission, which is the federal agency responsible for the regulation of power and research reactors, and radioactive materials produced in nuclear reactors, and certain quantities of uranium and thorium.

Radioactive Material(RAM): A material – solid, liquid or gas - which emits radiation spontaneously.

Radiation: The ionizing particles (alpha, beta, others) or photons (x or gamma ray) emitted by radioactive materials in the process of decay or nuclear transformation.

Radioisotope: A radioactive isotope of an element.

Source Material: (1) Uranium or thorium or any combination of uranium and thorium in any physical or chemical form; or (2) ores which contain, by weight, 0.05 percent or more, of uranium, thorium, or any combination of uranium and thorium. Source material does not include special nuclear material. (10 CFR § 20.1003)

Special Nuclear or Material: (1) Plutonium, uranium-233, uranium enriched in the isotope 233, in the isotope 235, and in any other material that the Nuclear Regulatory Commission, pursuant to the provisions of Section 51 of the Atomic

	Energy Act of 1954 determines to be special nuclear material, but does not include source material; or (2) any material artificially enriched by any of the foregoing but does not include source material. The term "Department" shall be substituted for the term "Commission" when the Department assumes Agreement State status from the Nuclear Regulatory Commission. (10 CFR §20.1003)
TEDE:	Total effective dose equivalent. Means the sum of the deep dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures). (10 CFR § 20.1003.)
TENORM:	Technologically enhanced naturally occurring radioactive materials. It is naturally occurring radioactive material not specifically subject to regulation under the laws of the Commonwealth or Atomic Energy Act (Public Law 83-703, 68 Stat. 921, 42 U.S.C. §2011 et seq.), but whose radionuclide concentrations or potential for human exposure have been increased above levels encountered in the undisturbed natural environment by human activities.
Transuranic (TRU) Radioactive Material:	The term "transuranic radioactive material" means material contaminated with elements that have an atomic number greater than 92, including neptunium, plutonium, americium and curium. TRU waste disposal is strictly regulated by the NRC and DOE.

TECHNICAL GUIDANCE

Background

The Department has the responsibility of protecting the health and safety of the citizens of the Commonwealth and the environment from toxic and hazardous materials in the environment. This includes most sources of radiation. With increasing frequency, radioactive materials have been detected in the municipal waste stream by monitors installed at waste processing and disposal facilities. Radioactive material (RAM) can also appear in the residual waste stream. Sometimes the radiation comes from naturally occurring radioactive material (NORM), but most often it comes from man-made radioactive materials. Man-made radioisotopes are regulated by the U.S. Nuclear Regulatory Commission (NRC) and/or the individual states. Accelerator-produced radioactive materials are regulated by the Commonwealth. Naturally occurring radioactive materials (NORM) are not regulated in Pennsylvania unless resulting radiation doses exceed the limits set forth in Title 25, Chapter 219 of the Pennsylvania Code. However, in the case of radium-226, the Commonwealth can regulate individual discrete sources above 0.1 microcurie (μCi), as set forth in Chapter 217. Thus, one can have RAM that is regulated (through specific or general license), unregulated, deregulated, or exempted from regulation by a variety of federal and state regulatory authorities, and yet the material may cause a solid waste facility radiation monitor to alarm.

Almost everything in the world contains small amounts of radioactive elements, which in turn emit radiation. Most radiation found in the natural environment comes from NORM and cosmic radiation from space, with minor amounts from past above ground testing of nuclear weapons, the nuclear fuel cycle, and perhaps effluents from medical and industrial uses of radioisotopes. Most of the alarm events with radiation monitoring of the municipal waste stream in Pennsylvania have been from short-lived isotopes often used in medical procedures. However, a number of very dangerous RAM sources have been recovered in recent years (e.g., 4.2 Ci Ir-192 and 20 mCi radium-beryllium neutron sources). It is possible that the medical isotopes are getting into the waste stream directly from the medical facilities via contaminated items getting into general trash by mistake. Alternately, the contaminated items are discarded in municipal waste from homes of patients who have had nuclear medicine procedures and been discharged from the treating facility. Other credible routes to the waste stream include contaminated items being discarded in regular trash containers by mistake from clinical or research laboratories, industrial facilities, misplaced encapsulated RAM sources, and construction, residual or industrial waste containing NORM, TENORM or other types of radioactive material.

State and federal regulations require that those who are licensed to handle radioactive materials will maintain strict controls relative to the use and disposal of the material, and will take appropriate actions to prevent unauthorized releases of radioactive materials in solid waste. Nonetheless, for some radioactive materials licensed by NRC or state regulations, once radioisotopes have been administered to patients, and are not likely to cause a dose to an individual above the proscribed public dose limit, the RAM is no longer regulated and patients can be discharged from the treating facilities. The potential amount of radioisotope in a patient's body that may be released from a medical facility is noted in NRC Regulatory Guide 8.39.[1] It should be noted, even small amounts of radioisotopes used for diagnostic tests or radioactivity retained on items touched by patients may emit enough radiation to set off a facility radiation monitoring alarm. Licensees are encouraged to investigate ways of effectively monitoring institutional waste streams coming from facilities using radioactive material before the waste leaves the

[1]Regulatory Guide 8.39, Release of Patients Administered Radioactive Materials. U.S. Nuclear Regulatory Commission, Washington, DC April 1997. A copy of the relevant table from Regulatory Guide 8.39 is attached to this document as Exhibit B.

facility. The NRC has recently issued guidance to RAM licensees for the "Management of Wastes Contaminated with Radioactive Materials" in Information Notice 99-33.

Additionally, there are a number of consumer and industrial items containing RAM in general use that are distributed under a regulatory "exemption" or "general license;" that is, the fabricator or distributor must be licensed but the individual owner/user does not have a "specific license." Examples of exempt RAM include some types of smoke detectors, self-luminous watches or clocks, and many others. Some of these consumer items, like smoke detectors are assumed by the NRC to be discarded in municipal waste during their normal life cycle, however return to the manufacturer is recommended. Other RAM is supposed to be returned to the manufacturer for proper recycle or low-level radioactive waste disposal (e.g., self-luminous tritium EXIT signs). For the more hazardous higher activity sources, the NRC and the Department are presently developing registration requirements to inventory generally licensed (GL) devices used in industry and other areas.

It is interesting to note the first time an alarm went off at one large landfill in Pennsylvania, the cause was a load of sludge containing TENORM (specifically radium- 226) from a facility that treated oil and gas well brine. Similarly, most rocks, bricks, gypsum wall board, slag from metal processing, waste from coal ash or coke processing, and similar residuals contain some natural radioactivity. Depending on their origin, these materials may emit enough radiation to set off the radiation alarms at solid waste facilities. These are all examples of NORM or TENORM.

Given the above examples of RAM that may set off waste facility radiation alarms, materials that are regulated, deregulated, exempt or unregulated, there are no current standards for radiation monitor alarm set points, and the potential for serious impact on human health and the environment - the DEP Bureaus of Radiation Protection and Land Recycling and Waste Management have recommended to the Department's Solid Waste Advisory Committee and the Environmental Quality Board, that the Department promulgate regulations requiring monitoring for radiation and radioactive materials at the following types of facilities:

- Municipal waste landfills. (25 Pa. Code Ch. 273)
- Construction/demolition waste landfills. (25 Pa. Code Ch. 277)
- Municipal Waste transfer facilities. (25 Pa. Code Ch. 279)
- Commercial municipal waste composting facilities that will receive sewage sludge or unseparated municipal waste, or both. (25 Pa. Code Ch. 28)
- Resource recovery and other municipal waste processing facilities. (25 Pa. Code Ch. 283)
- Commercial infectious or chemotherapeutic waste processing facilities. (25 Pa. Code Ch. 284)
  Noncaptive residual waste landfills. (25 Pa. Code Ch. 288)
- Noncaptive residual waste disposal impoundments. (25 Pa. Code Ch. 289)
- Noncaptive residual waste transfer facilities. (25 Pa. Code Ch. 293)
- Noncaptive residual waste composting facilities. (25 Pa. Code Ch. 295)
- Noncaptive residual waste incinerators and other noncaptive residual waste processing facilities. (25 Pa Code Ch. 297)

Operators of these facilities must comply with the new regulatory requirements as they are adopted and phased in. Requirements may be implemented by following the recommendations of this guidance document. Briefly, the facilities will have to be equipped with suitable gamma radiation detection devices to monitor incoming loads of waste for radioactive materials in the waste, and will be required to have an appropriate Action Plan that is approved by the Department. These, and the other applicable requirements and recommendations, are discussed herein. It is the Department's belief that these

regulations and guidance will be a model for all solid waste facility operators that monitor for radioactive material in incoming waste loads. For Pennsylvania solid waste facilities not required to monitor, but wish to do so as a best management practice, this guidance document should be followed.

General Considerations

Detecting radiation and dealing with radioactive materials in the waste stream is a multiple phase process, including:

- Monitoring and detection of gamma radiation,
- Personnel Training,
- Awareness of items that may contain RAM,
- Initial response to the detection of RAM,
- Notifications - within the company, to DEP, and to others as necessary,
- Characterization,
- Disposition, and
- Record keeping.

The details of these phases may vary somewhat with the type of facility; but in most respects they are similar, except for disposition of the radioactive material. In some cases the facility may have the option of onsite processing or disposal with Department concurrence or pre-approval. Alternately, the waste load may be rejected. However, once RAM has been identified in the waste, it may not be transported on public roads without an evaluation for compliance with DOT regulations. The Department has the authority to exempt carriers from DOT regulations with the scenario of RAM in waste if certain conditions are satisfied.

Action Plans

The Department's regulations require specified facilities to have an approved Action Plan to give direction to operating staff and facility users regarding procedures for detecting and dealing with radioactive material in the waste stream. Action Plans will be part of the solid waste facility permit by modification, and must be approved by the Department. Guidance for preparation of Action Plans and their content is described below, and is also provided in Appendix D. As part of the submission of a proposed Action Plan, the Department may approve the processing and/or disposal of short lived RAM (e.g., I-131, Tc-99m, Tl-201, etc.) from a patient having undergone a medical procedure, small quantities of TENORM, and consumer products containing RAM. This will require providing appropriate justification and/or pathway analysis for modeling potential public and facility staff doses.

Dose Limits for Public and Workers

The public and occupational annual dose limits that will be utilized by the Department in evaluating proposed Action Plans are as follows:

Facility staff -	5,000 mrem	(considered as "occupationally" exposed)
Facility staff -	100 mrem	(if considered member of the "public")
Vehicle driver -	100 mrem	(considered member of the public)
General Public -	4 mrem	(for the drinking water pathway)
General Public -	10 mrem	(for the air pathway)
General Public -	25 mrem	(all pathways combined).

The above public radiation dose limits are all TEDE, where an external deep dose and internal committed dose is summed. It is important to emphasize that all public and facility staff exposure to radiation should be maintained as-low-as-reasonably-achievable (ALARA). As stated above, some facility staff may be considered members of the public, if it is unlikely they will exceed the 100 mrem per year dose limit. However, certain personnel may be considered occupationally exposed workers if higher exposures are anticipated (e.g., the individual that may be performing vehicle surveys). The Action Plan should include consideration of relevant requirements outlined in the Department's Standards for Protection Against Radiation (25 Pa Code Ch. 219) and Notices, Instructions and Reports to Workers (25 Pa Code Ch. 220) if personnel are to be considered occupationally exposed.

In all reviews of proposed Action Plans, the Department will perform evaluations to ensure solid waste processing or disposal does not endanger the environment, facility staff and public health and safety. Therefore proposed Action Plans should describe the potential exposure pathways for members of the general public, and how these expected doses were modeled. For certain solid waste facilities where processing solid waste may release RAM to the environment, the Department recommends the use of basic and conservative regulatory computer codes for such pathway analysis and dose modeling, e.g., the EPA's CAP88 or DOE/NRC's RESRAD codes. These codes and support documentation can be downloaded from various internet web sites. However, valid manual calculations using dispersion equations and published dose conversions factors are equally acceptable to the Department.

Detection of Radiation

The Department's revised solid waste regulations require radiation monitoring and response at the solid waste facilities specified above. Additionally, the regulations state that the radiation detector elements shall be as close as practical to the waste load, and in an appropriate geometry to monitor the waste. The Action Plan should require notification to the Department for conditions specified in the regulations (i.e., radiological conditions noted below in Action Level Two), the detection of prohibited RAM, or the case when a waste load is rejected and a DOT Exemption Form must be issued. Action Plans should address the two basic scenarios, or Action Levels, when radiation is detected from a truck or waste container:

1. Action Level One: A radiation monitor alarm at the facility indicating the potential presence of radioactive material in a waste load.

(Note: The regulations require a gamma exposure rate from a cesium –137 source, at a level no higher that 10 μR h^{-1} above the average local background, at any detector element, shall cause an alarm at the facility. Instrument background shall be kept below 10 μR h^{-1} using shielding if needed, and the system shall be set to detect gamma ray energies of 50 kiloelectron volts and higher.)

2. Action Level Two: Radiation dose rates of 20 μSv h^{-1} (2 mrem h^{-1}) or greater in the cab of the waste transport vehicle, 500 μSv h^{-1} (50 mrem h^{-1}) or greater from any other surface, or the detection of contamination on the outside of the vehicle shall require immediate notification of the Department, and isolation of the vehicle.

Measurements should be made in accordance with guidance provided in Appendix D

IDENTIFICATION AND DISPOSITION OF RADIOACTIVE MATERIAL FOUND IN THE WASTE STREAM

1. Landfill or Disposal Impoundment

A. RAM from Patients Having Undergone a Nuclear Medicine Procedure

If the gamma spectroscopy or other measurement indicates the radiation is from a radioisotope with a half-life of 65 days or less, the DEP Area Health Physicist may authorize the contents of the waste load to be processed and/or disposed of immediately. (See Appendix A for telephone numbers during normal and non-business hours.) This is provided there is a high likelihood, through radioisotope identification, the RAM is from a patient having undergone a medical procedure, and the disposal does not endanger the health or safety of the facility staff, the public or the environment. Alternately, as noted above, the facility may provide justification (e.g., considering the facility's engineered barriers, all the RAM will decay in place) in the proposed Action Plan, and apply for a blanket approval to dispose of short lived RAM from patients treated with radioisotopes.

For reference, the total estimated radioactivity that may be released in a patient is detailed in NRC Regulatory Guide 8.39, which is duplicated in Appendix B as Table 1. The solid waste facility operator will always have the option to reject any waste load causing an alarm; however, no vehicle containing RAM shall leave the facility without written approval and an authorized DOT Exemption Form issued by the Department.

Upon formal request and appropriate environmental analysis, the Department's Director of the Bureau of Radiation Protection may authorize disposal of RAM with a half-life greater than 65 days, if the material is not under state or federal regulatory controls and/or disposal restrictions. (See Appendix D for additional guidance.)

B. Naturally Occurring Radioactive Material

If the gamma spectroscopy or other measurement indicates the radiation is from NORM or TENORM, the Action Plan should outline an approach to determine the nature of the waste, or perhaps cover material, entering the facility. If the radiation source is determined to be from the undisturbed natural environment of the Commonwealth (e.g., cover material soil or rock with elevated NORM levels), then there are no disposal restrictions and the material can be accepted at the facility. Similarly, if the source is determined to be potassium or any related compound (e.g., potassium permanganate used for odor control), with a natural abundance K-40, there are no processing or disposal restrictions.

In the case where process knowledge would indicate the presence of TENORM, the DEP Area Health Physicist may authorize immediate disposal. However, the following conditions must be satisfied: a) the volume of waste does not exceed one cubic meter, b) the gamma radiation level at a distance of 5 cm from any source surface does not exceed 0.5 $\mu Sv\ h^{-1}$ (50 $\mu rem\ h^{-1}$), and c) the concentration of combined radium isotopes does not exceed 5.0 $pCi\ g^{-1}$. A facility may submit, in their proposed Action Plan, to obtain a blanket approval for disposal of such small quantities of waste with TENORM. For a blanket approval, the applicant shall provide appropriate justification (e.g., presence

of engineered barriers) in the proposed Action Plan. Disposal of waste with TENORM of higher volumes, emitting higher radiation levels, or at higher radium concentrations, may be approved by the Department's Director of the Bureau of Radiation Protection. Such evaluations shall require the appropriate environmental assessment and pathway analysis to demonstrate that the annual dose to any member of the public is unlikely to exceed those values noted above. (See Appendix D for additional guidance.)

Again, the facility operator may reject any waste load causing an alarm, however, no vehicle containing RAM shall leave the facility without written Department approval and an authorized DOT exemption form.

C. Consumer Products Containing Radioactive Material

If certain consumer products containing radioactive material are observed in waste or cause an alarm - and are subsequently identified through a visual means to be an individual commodity smoke detector, radium dial watch/clock, exempt thorium metal alloy (e.g., welding rod), or uranium glaze/glass product – a facility may propose in their Action Plan that such an individual waste product be disposed of immediately. A recent life cycle analysis of these exempt RAM sources by the NRC notes that the above public dose limits will not be exceeded in such a disposal scenario (see NRC NUREG-1717). The facility Action Plan could have such an allowed disposal scenario for the specific individual items noted above, but should prohibit the disposal of aggregate quantities of these exempt devices or other products without written approval by the Department. It is recommended that smoke detectors, when found, be returned to the manufacturer for appropriated disposal. If a "generally licensed" tritium EXIT sign is found in any waste stream, it shall be returned to a licensed manufacturer for recycle or shipped for proper low-level radioactive waste disposal.

Consumer products containing exempt radioactive materials may be recovered by the facility, and stored for ultimate disposal as low level radioactive waste by the operator. Alternately, the facility operator may reject any waste load causing an alarm; however, no vehicle containing RAM shall leave the facility without written Department approval and an authorized DOT exemption form.

2. Other Facilities

A. RAM from Patients Having Undergone a Nuclear Medicine Procedure

If the gamma spectroscopy or other measurement indicates the radiation is from a radioisotope with a half-life of 65 days or less, the DEP Area Health Physicist may authorize the contents of the waste load to be processed and/or disposed of immediately. (See Appendix A for telephone numbers during normal and non-business hours.) This is provided there is a high likelihood, through radioisotope identification, the RAM is from a patient having undergone a medical procedure, and the disposal does not endanger the health or safety of the facility staff, the public or the environment. Alternately, the facility may provide in the proposed Action Plan, the justification through modeling that the above general public dose limits are met, and apply for a blanket approval to dispose of short lived RAM from patients treated with radioisotopes.

For reference, the total estimated radioactivity that may be released in a patient is detailed in NRC Regulatory Guide 8.39, which is duplicated in Appendix B as Table 1. The solid waste facility operator will always have the option to reject any waste load causing an alarm, or forward the waste load to a solid waste facility that will process or dispose of the material. However, no vehicle containing RAM shall leave the facility without written approval and an authorized DOT Exemption Form issued by the Department.

Upon formal request and appropriate environmental analysis, the Department's Director of the Bureau of Radiation Protection may authorize processing or disposal of RAM with a half-life greater than 65 days, if the material is not under state or federal regulatory controls and/or disposal restrictions. (See Appendix D for additional guidance.)

B. Naturally Occurring Radioactive Material

If the gamma spectroscopy or other measurement indicates the radiation is from NORM or TENORM, the Action Plan should outline an approach to determine the nature of the waste entering the facility. If the radiation source is determined to be from the undisturbed natural environment of the Commonwealth (e.g., soil or rock with elevated NORM levels), then there are no processing or disposal restrictions and the material can be accepted at the facility. Similarly, if the source is determined to be potassium or any related compound (e.g., potassium permanganate used for odor control), with a natural abundance K-40, there are no processing or disposal restrictions.

In the case where process knowledge would indicate the presence of TENORM, the DEP Area Health Physicist may authorize immediate disposal. However, the following conditions must be satisfied: a) the volume of waste does not exceed one cubic meter, b) the gamma radiation level at a distance of 5 cm from any source surface does not exceed 0.5 $\mu Sv\ h^{-1}$ (50 $\mu rem\ h^{-1}$), c) the concentration of combined radium isotopes does not exceed 5.0 $pCi\ g^{-1}$, and d) the processing or disposal of such material will not cause any above stated general pubic dose limit to be exceeded. A facility may submit, in their proposed Action Plan, to obtain a blanket approval for disposal of such small quantities of waste with TENORM. For a blanket approval, the applicant shall provide appropriate justification and modeling in the proposed Action Plan.

Processing or disposal of waste with TENORM of higher volumes, emitting higher radiation levels, or at higher radium concentrations, may be approved by the Department's Director of the Bureau of Radiation Protection. Such evaluations shall require the appropriate environmental assessment and pathway analysis to demonstrate that the annual dose to any member of the general public is unlikely to exceed those values noted above. (See Appendix D for additional guidance.)

Again, the facility operator may reject, or forward to a landfill that will accept it, any waste load causing an alarm. However, no vehicle containing RAM shall leave the facility without written Department approval and an authorized DOT Exemption Form.

C. **Consumer Products Containing Radioactive Material**

If certain consumer products containing radioactive material are observed in waste or cause an alarm - and are subsequently identified through a visual means to be an individual commodity smoke detector, radium dial watch/clock, exempt thorium metal alloy (e.g., welding rod), or uranium glaze/glass product – a facility may propose in their Action Plan that such an individual waste product be processed or disposed of immediately. A recent life cycle analysis of these exempt RAM sources by the NRC notes that the above public dose limits should not be exceeded in such processing or disposal scenario (see NRC NUREG-1717). The facility Action Plan could have such an allowed processing or disposal scenario for the specific individual items noted above, but should prohibit the processing or disposal of aggregate quantities of these exempt devices or other products without written approval by the Department. It is recommended that smoke detectors, when found, be returned to the manufacturer for appropriated disposal. If a "generally licensed" tritium EXIT sign is found in any waste stream, it shall be returned to a licensed manufacturer for recycle or shipped for proper low-level radioactive waste disposal.

Consumer products containing exempt radioactive materials may be recovered by the facility, and stored for ultimate disposal as low level radioactive waste by the operator. Alternately, the facility operator may reject, or forward to a landfill that will accept it, any waste load causing an alarm. However, no vehicle containing RAM shall leave the facility without written Department approval and an authorized DOT exemption form.

3. **Records and Reports**

A. Each person or municipality who operates a waste processing or disposal facility which has detected radioactive materials in any manner or radiation levels in excess of Action Level One to cause an alarm shall maintain records of each incident, containing the information set forth in section b, below, in the facility's daily operational record.

B. The daily operational record should include information required by regulation, such as the following:

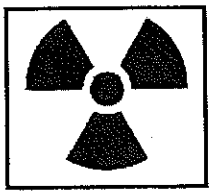
1) Date, time and location of the occurrence,
2) A brief narrative description of the occurrence,
3) Specific information on the origin of the material, if known,
4) A description of the RAM involved, if known,
5) The name, address and telephone number(s) of the supplier, handler or transporter of the RAM contaminated waste, the name of the driver, and
6) The final disposition of the material (processed, disposed, or rejected).

C. The facility's annual report should include a record of detected RAM summarizing the above information.

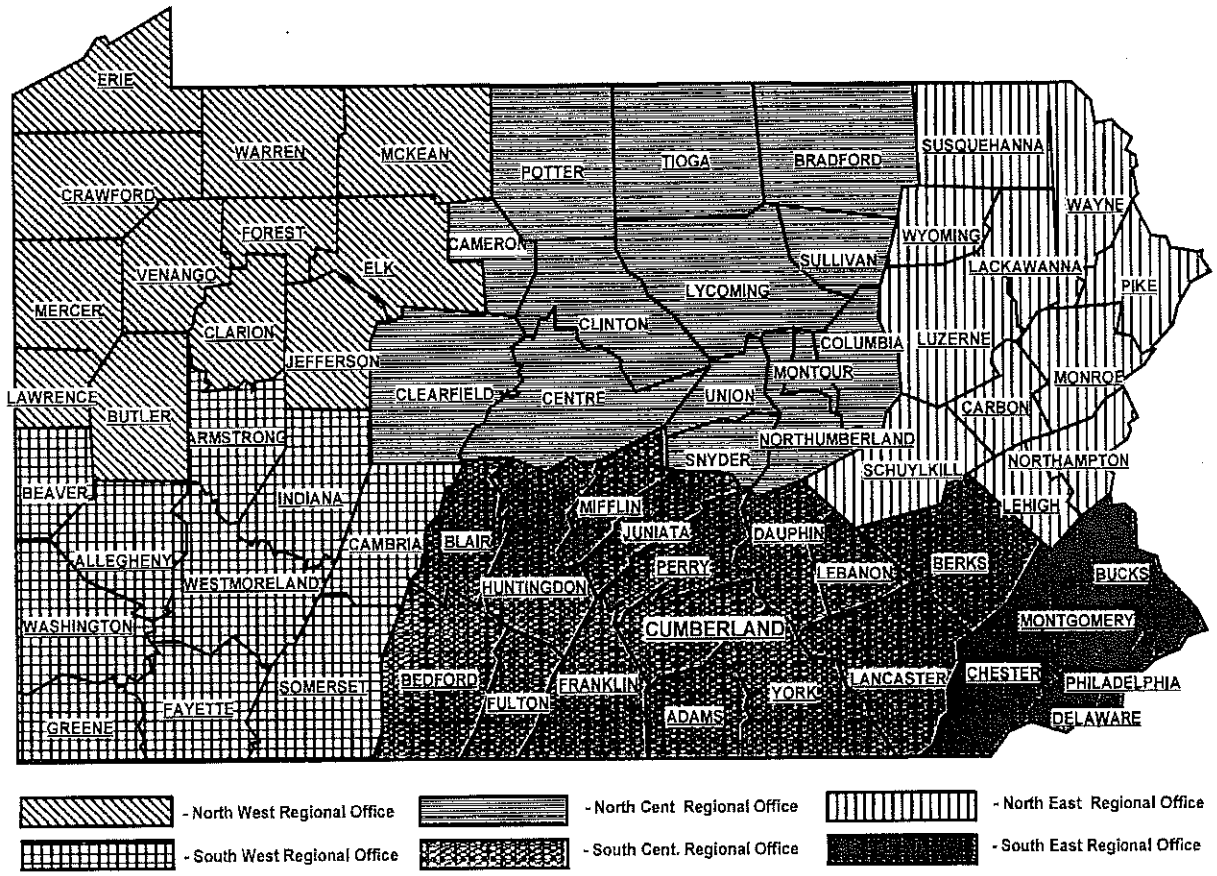
4. **Monitoring and Equipment** Facilities monitoring for radiation emitted from radioactive material must have appropriate monitoring equipment onsite. (See Appendix C for more information). Employees should be trained on proper use of all fixed and portable

equipment. Additionally, facility operational staff should be trained to visually monitor waste during transfer or unloading for the potential presence of RAM. Specifically, they should be able to identify the caution "radiation symbol" on containers, and items that may not be detected by gamma monitors (e.g., tritium "EXIT" signs).

RADIATION SYMBOL



APPENDIX A. NOTIFICATION OF INCIDENTS OF RAM IN SOLID WASTE AND/OR REQUEST FOR DOT EXEMPTION FORM (Rev. 2-1-01)



Department of Environmental Protection

Area Health Physicist Business hours: (412) 442-4227	Area Health Physicist Business hours: (717) 705-4712	Area Health Physicist Business hours: (484) 250-5900
Northwest Region: Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango and Warren Counties. Emergency Coordinator Non-business hours: (800) 373-3398	**Northcentral Region:** Bradford, Cameron, Clearfield, Centre, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga and Union Counties. Emergency Coordinator Non-business hours: (570) 327-3696	**Northeast Region:** Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne and Wyoming Counties. Emergency Coordinator Non-business hours: (570) 826-2511
Southwest Region: Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington and Westmoreland Counties. Emergency Coordinator Non-business hours: (412) 442-4000	**Southcentral Region:** Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry and York Counties. Emergency Coordinator Non-business hours: (877) 333-1904	**Southeast Region:** Bucks, Chester, Delaware, Montgomery and Philadelphia Counties. Emergency Coordinator Non-business hours: (484) 250-5950

APPENDIX B. ACTIVITIES AND DOSE RATES FOR AUTHORIZING PATIENT

RELEASE FROM MEDICAL FACILITIES[2]

Table 1. Activities and Dose Rates for Authorizing Patient Release†				
Radioactive Material	COLUMN 1 Activity at or Below Which Patients May Be Released		COLUMN 2 Dose Rate at 1 Meter, at or Below Which Patients May Be Released*	
	(GBq)	(mCi)	(mSv/hr)	(mrem/hr)
Ag-111	19	520	0.08	8
Au-198	3.5	93	0.21	21
Cr-51	4.8	130	0.02	2
Cu-64	8.4	230	0.27	27
Cu-67	14	390	0.22	22
Ga-67	8.7	240	0.18	18
I-123	6.0	160	0.26	26
I-125	0.25	7	0.01	1
I-125 implant	0.33	9	0.01	1
I-131	1.2	33	0.07	7
In-111	2.4	64	0.2	20
implant	0.074	2	0.008	0.8
Pd-103 implant	**	**	**	**
Re-186	1.5	40	0.03	3
Re-188	28	770	0.15	15
Sc-47	29	790	0.20	20
Se-75	11	310	0.17	17
Sm-153	0.089	2	0.005	0.5
Sn-117m	26	700	0.3	30
Sr-89	1.1	29	0.04	4
Tc-99m	**	**	**	**
Tl-201	28	760	0.58	58
Y-90	16	430	0.19	19
Yb-169	**	**	**	**
	0.37	10	0.02	2

† The activity values were computed based on 5 millisieverts (0.5 rem) total effective dose equivalent.

* If the release is based on the dose rate at 1 meter in Column 2, the licensee must maintain a record as required by 10 CFR 35.75(c) because the measurement includes shielding by tissue. See Regulatory Position 3.1, "Records of Release," for information on records.

** Activity and dose rate limits are not applicable in this case because of the minimal exposures to members of the public resulting from activities normally administered for diagnostic or therapeutic purposes.

[2] **Source:** Regulatory Guide 8.39, Release of Patients Administered Radioactive Materials. U.S. Nuclear Regulatory Commission, Washington, D.C. April 1997.

APPENDIX C. GUIDELINES FOR RADIOLOGICAL MONITORING EQUIPMENT

1. General Information About Radiation Detectors

In general, radiation detection equipment consists of a detector and electronics to convert the signal received by the detector into meaningful values. The passage of radiation through the detector (or probe) causes an impulse to be generated within the detector, which is converted into a preset unit, usually counts per minute (cpm). There are two general types of detectors likely to be used in municipal and residual waste monitoring. The first, called a Geiger-Muller (G-M) counter with thin window probe, converts electrical discharge pulses into counts, which are displayed on a meter. This is the best type of detector for detecting beta particles, because most of the beta particles that pass into the detector will register. However, certain low-energy beta particles will not penetrate through the outer wall of the detector and, therefore, will not be detected. Examples of radioactive materials emitting such low-energy beta particles include carbon-14 and tritium (hydrogen-3), which are commonly used in medical research programs and may inadvertently be disposed of in waste. This type of detector is gas-filled and is less efficient at detecting gamma radiation because most pass through the detector without causing a pulse to be generated. Nevertheless, G-M counters are normally used in hand-held instruments, and a "pancake" type thin window G-M probe can be used for alpha, beta, and gamma measurements when properly calibrated.

The second type of radiation detector also uses a probe that converts the impulses caused by the radiation striking the detector surface into counts, which are recorded on the meter. However, this type of detector differs from the G-M counter in that the signal transferred to the meter is dependent on the radiation type and energy striking the detector. Typically, this type of radiation detector is called a scintillation detector. Scintillation detectors convert the radiation energy into a light impulse within the probe. The amount of light generated is based on the amount of radiation that strikes the probe. This light impulse is then converted to a measurement that may be used to determine the energy of the radiation and the total amount of radiation. Because of this capability, scintillation detectors are useful in determining the type of radioactive material present in the waste as well as the relative radiation hazard associated with the material. Scintillation detectors are also more efficient at detecting gamma radiation than a G-M counter because they are solid material (i.e., a greater number of interactions occur between the detector and the radiation yielding a greater number of counts). Zinc sulfide scintillation detectors may be used to quantify the amount of alpha particle radiation from contamination materials, although this is often conducted in laboratories rather than field settings. In addition, the scintillation medium may be liquid, thus allowing greater contact of the medium with the radioactive material and further increasing the efficiency of the measurement. Liquid scintillation is often used to quantify the amount of radioactive materials that emit low-energy beta particles, such as carbon-14 and tritium. However, this technique is employed exclusively in laboratories, rather than in the field.

Sodium iodide (NaI) crystals, germanium crystals, zinc sulfide coatings, and specially formulated plastic materials are the most common media used in solid scintillation detectors. Plastic scintillation detectors may be more sensitive to beta/gamma radiation than NaI detectors due to size and window thickness, however neither detect alpha radiation. In addition, plastic

detectors are usually more resistant to environmental stresses than NaI detectors and can be purchased in larger sizes, allowing better geometry for detection of radioactive material in waste. However, though plastic detectors may be less expensive than NaI detectors, they may not offer the same degree of discrimination in terms of identifying the energies of the gamma radiation. Solid state germanium detectors are often used in laboratories for precise determination of the type and amount of radioactive materials present. Although some germanium detectors are sufficiently rugged to be used in the field, most are designed for use in laboratories.

2. Facility Monitoring Equipment

Many solid waste facilities have installed radiation detection equipment at the entrance portal to the facility or in conjunction with other onsite facilities, such as scales. In such installations, the radiation detector elements (e.g., NaI crystals) are typically installed to screen incoming waste and should be installed, operated, and maintained in a manner that ensures that the measurements are meaningful and fulfill the objectives for detecting radiologically contaminated waste. The detectors should be positioned as close as practical to the waste load, and calibrated so that they measure radiation [in $\mu R\ h^{-1}$, or equivalent counts per unit time] emitted from vehicles that are used to haul the solid waste into or out of the facility. The waste load portal detectors are normally scintillation type detectors. In the scenario where time permits (i.e., waste loads are infrequent) or fixed portal monitors become inoperable, hand-held microR meters may be used to scan incoming waste loads.

Both fixed and portable scintillation and G-M detectors can be calibrated to display radiation in units of exposure rate ($\mu R\ h^{-1}$), or dose equivalent rate ($\mu rem\ h^{-1}$). Equipment that display in counts per unit time should have calibration factors that can be related to these qualities. The radiation unit displayed by the detector is less important than the selection of the appropriate type of radiation detector element or probe, and the proper subtraction of background radiation is made. Factors that should be considered when developing radiation detection and monitoring programs are:

- Area background radiation level,
- Detector efficiency and ruggedness,
- Detector calibration and response checks,
- Detector positioning and shielding,
- Detector element physical protection,
- Counting time,
- Alarm set point,
- Overall system sensitivity, and
- Alarm response procedures and training.

Because of the complex nature of radiation detection instrumentation and the multiple objectives for which such instruments may be deployed, facility staff should be trained to determine the appropriate type of instrument and/or detector probe to be used at a facility based on the established operational objectives. In addition, it is recommended that only individuals with proper experience and training (e.g., manufacturer's representative or knowledgeable health physicist) should be permitted to initially install, calibrate fixed radiation detection equipment.

3. Monitoring Equipment – General Recommendations

Facilities shall comply with specific regulatory requirements, but the following general recommendations for monitoring equipment may be used for initial detection of radioactive material at solid waste facilities:

A. Monitoring equipment should consist of both portable (hand-held) and fixed radiation monitoring equipment. Portable instrumentation should have multiple probes for contamination and a range of gamma dose rate measurements (i.e., 10 $\mu R\ h^{-1}$ to over 50 $mrem\ h^{-1}$).

B. Fixed monitoring equipment should be capable of detecting and displaying ambient background radiation levels. For both portable and fixed instrumentation, the equipment should provide a visual readout of the $\mu Sv\ h^{-1}$, $\mu rem\ h^{-1}$, $\mu R\ h^{-1}$ or count rate (e.g., cpm) level. Should the background radiation level be above 10 $\mu R\ h^{-1}$, the detector elements will require shielding to maintain the rate below this level.

C. The readout on the instrumentation should allow either scale multiplying factors or logarithmic scales to display higher radiation levels.

D. Portable instrumentation should be powered either by replaceable batteries or power cells with charging units and provide indication if battery/power cell capacity is not at levels for proper unit function. Fixed instrumentation should be line operated (e.g., 110 volt AC).

E. Waste monitors should be installed according to the manufacturers recommendations, with the radiation detectors as close as practicable to the waste load (i.e., close as possible and preventing physical damage). The alarm set-point for fixed monitoring equipment shall be no higher than 10 $\mu R\ h^{-1}$ above background, with a cesium-137 gamma radiation field at the radiation detector element(s). The ambient gamma background in Pennsylvania ranges from about 5 $\mu R\ h^{-1}$ to 25 $\mu R\ h^{-1}$. Instrument readings in microroentgen per hour ($\mu R\ h^{-1}$), or equivalent counts per unit time (e.g., cpm), will need to be averaged during calibration to determine the appropriate alarm set point. If capable of energy discrimination, the radiation monitor shall be set to detect gamma rays of a 50 kiloelectron volt (keV) energy or higher. The alarm should provide an audible signal to the operator and may provide a visible signal that the alarm set point has been exceeded. The operator should be able to reset the audible signal from the readout position. Written indication of radiation levels, such as by a data log print out or chart recording, may be available as an option for the readout.

F. The detector element assemblies for fixed monitoring may be located at or near the weigh scale for vehicles. Provision should be made to stop or slow the vehicle during the monitoring for radioactive material, with a geometry and collimation of the radiation detectors to maximize system sensitivity. It is recommended an appropriate housing and other barriers be installed to protect the detector assembly from physical damage due to vehicles and from environmental conditions, such as precipitation, high humidity, and thermal variation.

G. If the detector assembly for fixed monitoring equipment is supplied with electrical power other than the monitoring unit, provision should be made to display power condition or availability to the detector assembly.

H. The range of readout for portable (hand-held) monitoring equipment and various probes should be 0.01 to approximately 100 mrem h^{-1}, and have a known gamma energy response. A "pancake" type G-M probe will be adequate for gross counting of wipes taken for gross contamination evaluations of vehicles. Again, hand-held micoR meters would be suitable for temporary vehicle monitoring if fixed systems become inoperable.

I. The monitoring equipment used at solid waste facilities should be calibrated no less frequently than annually, and (if utilized) its function should be tested on a daily basis using a check source for which the instrument's expected response has been previously determined.

4. Evaluation Equipment

If a radiation alarm is determined to be valid, evaluation of waste may require supplies, calibrated survey meters with capabilities similar to those specified above, and may require any of the following to determine the specific radioisotope, and if contamination is present:

A. Portable multichannel analyzer (MCA) coupled to a sodium iodide (NaI) detector or solid state detector. Appropriate calibration source(s) will also be needed to check the library of spectra.

B. Probes for survey meter capable of detecting beta and gamma radiation. Depending on the survey meter and probe(s) used for beta/gamma monitoring, a different probe could be obtained for alpha monitoring, if desired.

C. Supplies for taking samples for laboratory analysis, such as wipes (or smears), containers for water and soil/waste samples, plastic bags, indelible markers, trowels, tongs, etc. would be useful to have on hand.

D. Plastic tarps, disposable protective clothing and gloves for personnel handling potentially contaminated waste. *(Note: the use of some types of protective mask requires that the employing firm have an approved respirator qualification program.)*

E. A supply of radiation warning signs, rope, tape, etc.

F. Supplies and information for data analysis, e.g., scientific calculator, survey forms, tables of radioisotopes with half-life, etc.

APPENDIX D. GUIDELINES FOR ACTION PLANS FOR DETECTION AND HANDLING OF RADIOACTIVITY AT SOLID WASTE FACILITIES

1. Procedures for Development and Review of Action Plans

A. Qualifications of Persons Preparing the Action Plan

Plans should be prepared by individuals having, at a minimum, the following qualifications:

1) Two years of on-the-job training in health physics; or one year of on-the-job training in health physics plus one year of formal college level study in health physics, physics, chemistry, biology, engineering, or radiation science.

2) Experience with radiation detection and measurement, and in developing radiation safety procedures and plans.

Comprehensive certification by the American Board of Health Physics satisfies numbers 1 and 2, above. It is recommended that facilities employ a certified health physicist (CHP) as a consultant for developing and implementing their Action Plan.

B. Implementation of the Action Plan

The provisions of the Action Plan should be activated whenever situations arise in which the pre-established action levels are exceeded.

C. Persons Responsible for Implementation of the Action Plan

Each facility should designate an individual responsible for implementation of the Action Plan. This individual should have adequate authority to implement the plan. In the event that the individual(s) implementing the Action Plan is/are different from the individual who prepared the Action Plan, the Action Plan should specify a minimum one day training session in the fundamentals of radiation safety and detection.

(Note: Provided onsite operational facility personnel are able to appropriately respond to the radiological scenarios at Action Levels One and Two, the Action Plan may reference the use of corporate or consultant health physics support staff for further RAM characterization.)

D. Revision of the Plan

The plan should be reviewed and updated periodically by the permittee. At a minimum, this should occur when any of the following occurs:

1) Applicable Department regulations or policies are revised.

2) The Action Plan fails during an incident.

3) The facility operation changes in a manner that would interfere with implementation of the Action Plan.

4) The individual responsible for implementing the plan changes.

5) The monitoring equipment used is changed.

6) The designated area for vehicles in which RAM has been detected changes.

7) As otherwise required by the Department.

2. Content and Format of Action Plans

A. General Instructions

The main elements of the Action Plan should cover all the appropriate regulatory requirements, and are described in this basic guidance document. Details are outlined below. Certain Action Plan elements may not be entirely applicable or appropriate for a specific facility or type of incident. In these cases, the person preparing the Action Plan should act accordingly and provide a brief explanation as to why the Action Plan element(s) in question are not applicable or appropriate.

The most important thing to remember in developing an Action Plan is that the actual effectiveness of the plan will depend upon its simplicity, readability and summary instructions for facility operational staff.

B. Action Levels

The Action Plan must be designed to address two radiological scenarios or action levels, namely:

Action Level One: A radiation monitor alarm at the facility indicating the potential presence of radioactive material in a waste load.

(Note: The regulations require a gamma exposure rate from a cesium –137 source, at a level no higher that 10 μR h-1 above the average local background, at any detector element, shall cause an alarm at the facility. Instrument background shall be kept below 10 μR h-1 using shielding if needed, and the system shall be set to detect gamma ray energies of 50 kiloelectron volts and higher.)

Action Level Two: Radiation dose rates of 20 μSv h^{-1} (2 mrem h^{-1}) or greater in the cab of the waste transport vehicle, 500 μSv h^{-1} (50 mrem h^{-1}) or greater from any other surface, or the detection of contamination on the outside of the vehicle shall require immediate notification of the Department, and isolation of the vehicle.

The Action Plan should provide for notification of the Department.

1) For Action Level One, notification and request for DOT Exemption Form prior to rejection of a waste load, or request for disposal or processing approval of RAM in solid waste if blanket approval was not requested.

2) For Action Level Two, notification must be made immediately.

C. Detection and Initial Response

Fixed and portable radiation monitoring systems shall be calibrated annually to a traceable cesium-137 source. This radiation standard shall be traceable to the U.S. National Institute of Standards and Technology. Radiation monitors may be response checked daily on a relative basis. If the alarm level of 10 $\mu R\ h^{-1}$ over background is exceeded when a vehicle is at the monitoring location, the following procedures are recommended:

1) Reset the monitor alarm and evaluate the vehicle or container a second time.

2) If the alarm level is still exceeded, promptly survey the vehicle surfaces at a distance of 5 cm with a portable radiation survey meter to determine if Action Level Two levels are exceeded, and if an area of highest radiation level can be determined. Mark this location with chalk if other gamma spectroscopy measurements are to be performed.

3) If surveying the vehicle with a portable survey meter at 5 cm fails to reveal the presence of radioactive material, scan the driver with a portable survey meter (or have him/her stand between the monitor detectors) to determine if the driver has triggered the alarm. Alarms have been triggered by drivers who have undergone nuclear medicine procedures involving radioactive material. If this is the case, and the driver alone has triggered the alarm, no further action under this guidance document is necessary.

4) **Action Level One:** If the radiation monitor alarmed on a second count, the following procedures are recommended:

   a) Remove the vehicle to the Designated Area for vehicles found to contain RAM. (See D below.) Contact the individual responsible for supervising response to alarms at the facility. If the waste load is to be rejected, contact the appropriate DEP Area Health Physicist for approvals. If disposal or processing is considered, keep the load onsite until the nature of the RAM and proper actions are determined. Do not allow the vehicle or container to leave the facility without the permission of the Department, and the driver being issued a DOT Exemption Form signed by the Department's Area Health Physicist or their authorized representative. If a driver leaves the facility with a contaminated waste load, they must carry a copy of the signed DOT Exemption Form. *(Note: once a solid waste*

facility has an approved Action Plan, it is anticipated that facility survey data and DOT Exemption Form can be exchanged via fax to allow for immediate action on the part of the Department.)

b) If the driver leaves with the vehicle without a DOT Exemption Form and before the RAM can be evaluated, contact the Pennsylvania State Police and provide them with any information you may have on the vehicle such as make, model, color, company name, license plate number, time left and the direction in which the vehicle was traveling and, if possible, the intended destination. This is to ensure that the driver does not dispose of the contaminated waste improperly. Notify the appropriate DEP Area Health Physicist listed in Appendix A and apprise that individual of the situation.

5) **Action Level Two:** If the dose rates indicated by a radiation survey at a distance of 5 cm equal or exceed either limit in this Action Level on the exterior or in the cab of the vehicle, remove the driver and all other personnel from the immediate area. Similarly, if contamination is detected by wiping vehicle areas that may have contacted the waste during loading, or seams that may leak liquid, isolated the vehicle and call the Department's Area Health Physicist for your location as listed in Appendix A. Proceed as directed by the Area Health Physicist.

D. Designated Area

The Action Plan should include the location of a Designated Area for vehicles found to contain RAM. This area is to be used for surveys, and if needed, to isolate a vehicle or container to maintain personnel radiation exposure ALARA. If surveys show that either exterior dose rate limit in Action Level Two is exceeded, but there is no removable contamination on the exterior of the vehicle and the dose rate in the cab is below 50 mrem/hr, the vehicle should be promptly moved to the Designated Area for an addition characterization or evaluation by facility or Department staff. The area should be appropriate for the various types of RAM potentially found in waste, size of facility, size of truck, employees in the proximity of the truck, and any other suitable steps warranted by the potential situation at hand and site-specific facility layout. Protection of the health and safety of facility operators, and the environment, may be achieved through consideration of time, distance, shielding, and contamination containment.

E. Characterization

If blanket approval is requested for immediate disposal or processing of short lived RAM from patients, NORM, TENORM, or individual consumer products containing RAM (as described above), the Action Plan must have procedures for characterizing the radioactive material present in the waste. Characterization is best executed under the direct supervision of the person who prepared the Action Plan, or another similarly trained and qualified individual. The Action Plan should address steps to confirm the radiation level detected by the monitoring device and identify the radioisotope(s).

At Action Level One, the procedure to identify the radioisotope must include means to determine the gamma ray spectrum. Procedures used in the characterization phase should be situation specific and will be determined by many factors including the type of truck and how it is loaded, the nature of the waste, radiation levels indicated by the survey, highest dose rate, location of RAM in the load, instrumentation, personnel available, weather, and other factors.

At Action Level Two, radiation protection personnel from DEP, and perhaps federal agencies, may come onsite to provide additional guidance and assistance.

In general, appropriate characterization procedures should include the following:

1) If the cab radiation level is over 2 mrem/hr, vehicle surface is over 50 mrem/hr, or contamination is detected - immediately notify the Department's Area Health Physicist. If there is no contamination and the cab radiation level is less than 50 mrem/hr, promptly relocate the vehicle or container to the Designated Area. Using appropriate instrumentation and measurement set-up, identify the radioisotope (i.e., via gamma spectroscopy).

   If the gamma spectroscopy indicates the radiation is from RAM with a half-life of 65 days or less and is most likely from a patient having undergone a medical procedure, the DEP Area Health Physicist may authorize the contents to be processed or disposed of immediately in the facility, provided there is minimal risk to workers. Alternately, the waste load may be rejected. As noted above, a solid waste facility may apply for a blanket approval to process or dispose of certain RAM in waste (i.e., short lived radioisotopes form patients, NORM, TENORM and individual consumer products).

2) Survey the exterior of the vehicle with a portable survey meter set at the most sensitive setting and holding the survey meter no more than two inches (5 cm) from all vehicle surfaces. Mark areas where radiation levels appear to be the highest. If containerized, monitor the waste during unloading from the vehicle. If the radiation levels from the vehicle or any container exceeds 50 mrem/hr at any time during unloading, stop removing the waste, remove personnel from the area and call the DEP Health Physicist at the numbers provided in Appendix A.

3) If contamination is found or the dose rate on the vehicle or cab exceed Action Level Two, Department staff will oversee the surveying the waste vehicle or containers (if waste is containerized in the vehicle). Personnel who are handling the waste to isolate the source should have appropriate training, wear radiation monitoring devices, protective clothing, including coveralls, boots, gloves and dust masks to avoid skin contamination, inhalation, or ingestion with the radioactive material or other potentially hazardous material. The Action Plan and facility should provide for personal protective equipment for facility or consultant personnel if waste off-loading is anticipated.

4) If the waste is containerized, remove the individual waste containers (if not contaminated) from the vehicle and survey each with a survey meter. Look for signs and container labels that might identify the radioactive material or other hazards and the point of origin. Caution should be exercised to ensure that injuries do not occur during removal of the waste containers. Do not attempt to open containers and sort through the waste. The waste may contain sharps, biological waste, and other pathological or hazardous waste that could cause immediate, and more significant risks to the workers.

5) If the waste load is in bulk form and can not be processed or disposed of in the facility or rejected, remove the bulk waste until the estimated location of the radioactive source is approached. Survey bulk waste removed with the portable meter to isolate the RAM. When the source is located, attempt to separate the RAM from the waste, provided it can be done without jeopardizing the health and safety of workers due to other hazards present in the waste. The Action Plan should specify precautions to be taken to monitor external exposure and prevent workers from becoming contaminated by the radioactive material in this process. The contaminated material should be placed in containers and taken to the Designated Area where it can be stored safely and in a manner that protects facility staff, and prevents environmental contamination (e.g., due to runoff, infiltration, pests, etc.) until the means of disposition is determined.

6) If radiation is detected at more than 0.5 mSv h^{-1} (50 mrem h^{-1}) above background levels on the surface of any container, isolate this area within the facility property and contact the DEP Area Health Physicist.

7) The area(s) where radioactive material is identified per (5) and (6) above, should be roped off or otherwise secured to prevent persons from entering areas where radiation levels exceed 0.02 mSv h^{-1} (2 mrem h^{-1}), and labeled with appropriate signs. Radiation levels in areas occupied by operational staff should be kept ALARA. The contaminated waste should be physically secured against removal or inadvertent disposal or else be under observation by facility staff at all times.

8) If radioactive material is not detected in any of the waste containers or in the bulk waste, resurvey the exterior of the vehicle. Mark any areas where radiation levels exceed background levels. The source of the radiation may be the transport vehicle itself (i.e., contamination or a small sealed source).

F. Determination of Origin.

The plan should include procedures to determine the place where the waste originated that contained RAM. These procedures should be thorough (e.g., interview driver) and capable of providing the best attempt to determine the origin of the waste. This effort is most likely to be successful with monitoring at the transfer station.

G. Disposition and/or Storage.

The plan should have procedures for rejection, disposition, or perhaps storage for decay of the waste containing RAM in accordance with the requirements and recommendations set forth in this guidance document. The procedures must take into account the radiation level, the type and amount of waste involved, the radioactive material present in the waste, the form in which the radioactive material is present, availability of the storage option at the waste processing site, and the health and safety of personnel handling such waste or present in the immediate area.

Experience to date indicates that many, if not most, alarms at solid waste facilities involve radioactive materials used in medical procedures which have half-lives sufficiently short (i.e., less than 65 days) that it is practical to either process or dispose of the waste immediately, or to store the waste in a secure area until it has decayed to a non-radioactive form. If the waste is contaminated with short-lived radioisotopes from medical procedures, and the facility operator requests blanket approval to disposed or processed at a solid waste facility immediately, the proposed Action Plan should contain a justification and/or pathway analysis indicating that the RAM will decay in place or not cause a radiation dose to the general public above respective limits noted above. Similarly, for NORM, TENORM or individual consumer products containing RAM, the disposal or processing shall not cause a radiation dose to the general public above applicable limits.

H. Training

The Action Plan should provide for training of individuals responsible for implementing the plan in the areas of:

1) Fundamentals of radiation safety.

2) Operation of the monitoring instrumentation used by the facility, including daily operation and other response checks.

3) All aspects of the Action Plan.

I. Other Items to be Included

1) Provision for written alarm procedures to be posted where they can be seen by the personnel performing the waste monitoring. The alarm procedures should be coordinated in advance with facility personnel, including appropriate notification of DEP or other applicable state or local agencies and authorities.

2) Posting of notices so that waste haulers will be aware of the procedures that will be followed if radiation and radioactive material is detected in their vehicle, including notification of out-of-state radiation protection authorities and declaration of where the waste will be returned. Again, any rejected waste load must have an approved DOT Exemption Form from the Department.

3) Procedures to ensure that at least one individual per shift is trained in and responsible for the implementation of response procedures in the event an alarm is activated.

4) Informing customers in advance of the procedures in the event that an alarm point is exceeded, especially if the procedures include "waste load rejection" provisions under which the suspect waste may be promptly returned to the shipper.

5) Instructing facility personnel on the appropriate procedures to be followed in the event the alarm is activated. The instructions should include graduated contingency plans in the event that RAM in waste is detected, or criteria of Action Level Two is exceeded.

APPENDIX E. BACKGROUND INFORMATION ON RADIOACTIVE MATERIAL IN SOLID WASTE

1. Introduction

Radioactive material is used for a variety of beneficial purposes in the United States, including medical diagnosis and treatment and materials testing. The use and disposal of most types of radioactive material are regulated by the Nuclear Regulatory Commission (NRC) and individual states. Other types of radioactive material are regulated by the Environmental Protection Agency (EPA) and the States. Although low-level radioactive waste must be disposed of in a licensed radioactive waste disposal facility, occasionally unregulated RAM (e.g., from patients having undergone a medical procedure) is found at solid waste processing sites that are not licensed by the NRC or states for the control radiation hazards. Additionally, with increasing frequency, NORM, TENORM or consumer products are detected, as well as less frequent lost or improperly discarded higher hazard radioactive sources.

Radioactive materials in municipal waste have been detected with increasing frequency at landfills, incinerators, transfer stations, and associated facilities. This increase can be partially attributed to increased use of radiation detection instruments at the solid waste facilities. The operators of facilities have been installing such instruments in response to concerns by regulatory agencies and the public or in an attempt to limit liability for potentially costly remedial actions for radioactive contamination. When radioactive contamination is detected, it often prompts an emergency response until the potential hazards posed by the waste are determined and the material is properly controlled.

2. Sources of the Contamination

It should be noted just about everything contains some trace amount of radioactivity, and the earth is continually bathed in cosmic radiation from space. Radioactive materials exist naturally in soil, rocks, and water. There are a great many of these radioactive materials in construction materials, food, and waste. These materials may also be concentrated artificially above naturally occurring levels in their use or production (i.e., TENORM). In addition to these naturally occurring radioactive materials, municipal waste may also contain radioactive materials that have been introduced in consumer products (e.g., most domestic smoke detectors contain the radioactive material americium-241). These detectors enter the waste stream when consumers dispose of them in municipal waste.

Although the NRC and the Agreement States (States that have assumed regulatory control over certain nuclear materials through an agreement with NRC) strictly control the possession, use, storage, transportation and disposal of certain radioactive materials through their licensing and inspection activities, on occasion, radioactive material can find its way into municipal solid waste streams. Over the last several years, the Department and NRC have monitored event reports involving detection of radioactive materials in municipal wastes. Based on reported incidents, the principal man-made sources of radioactively contaminated waste in municipal waste landfills are medical facilities, private and university laboratories and radiopharmaceutical manufacturers.

The radioactive materials reported in contaminated waste have consisted primarily of the following radioisotopes: iodine-131, technetium-99, thallium- 201, gallium-67,iodine-123, indium-111, etc. In most cases, such RAM has been legitimately released within patients in accordance with the NRC and state requirements. However, in other cases the event has been caused in violation of applicable requirements, such as lost sealed sources of cobalt-57 and iridium- 192.[3]

In the practice of nuclear medicine, radioactive materials are administered to patients for the diagnosis or treatment of illnesses such as thyroid cancer or dysfunction. NRC and Agreement State regulations allow patients receiving radiopharmaceuticals to leave the hospital or clinic when the amount of radioactive material present in their bodies has dropped to certain levels or they present a low exposure potential to members for their family and the public. (See Appendix B). After these patients leave the hospital, they may inadvertently contaminate ordinary trash that is then disposed of in municipal solid waste disposal facilities. Contaminated materials that have been generated by nuclear medicine practices and detected at municipal solid waste facilities include diapers, bed linen, disposable medical supplies and general trash (for example, food, plastic and paper dishes and utensils, newspapers and magazines). Again, these items often become contaminated with radioactive materials when they are contacted by patients that have received the nuclear medicine administration, either while the patient is in the hospital or after the patient has returned home. Although the amount of radioactivity in the municipal waste is often small, detection systems used by solid waste facilities are often sensitive enough to detect the radioactive contamination.

Hospital, clinics, laboratories and universities use radioactive materials in research, including the marking and detection of molecules in genetic research, the study of human and animal organ systems, and in the development of new drugs. There is a potential that municipal wastes may become contaminated with radioactive materials when contaminated laboratory trash is inadvertently mixed with municipal waste. Contaminated materials may include contaminated glass or plastic, gloves, animal bedding, or paper lab countertop protectors. Waste from radiopharmaceutical manufacturers is similar to the waste produced by laboratories and universities. On rare occasions, sealed sources are mistakenly discarded from such facilities, and shall be retrieved when detected.

In addition to radioactive material that may inadvertently be included in municipal solid waste, solid waste facilities may detect NORM, which is found in a variety of common household or construction materials. NORM, such as radium, thorium or uranium is often found in bricks, wall board or building rubble containing these construction materials. It should be noted, this NORM was present in the base material that was used to produce these construction materials. Natural potassium also contains trace amounts of the radioisotope potassium-40 (K-40). In sufficient quantities, NORM potassium salts may trigger radiation alarms. In no case, because of radiological concerns, shall the presence of potassium or any related compound (with K-40 at natural abundance levels) prevent the immediate disposal or processing of solid waste.

[3] Of particular note and concern is an incident that occurred in Pennsylvania when an high activity iridium-192 source used in cancer treatment was inadvertently disposed of as medical or "red bag" waste - see NRC document number NUREG-1480 for more information.

The NRC and most Agreement States allow licensees with waste contaminated with radioactive material having a short half-life (e.g., less than 65 days), to be held for at least ten half-lives onsite at licensed facilities. After this period, the licensees are allowed to dispose of the decayed waste, if it is indistinguishable from background radiation levels based on an appropriate survey. There have been occasions when municipal waste becomes contaminated when a licensee fails to properly monitor radioactively contaminated waste before releasing it for disposal as ordinary trash. In other reported detection incidents, licensees may have properly managed the waste, but the disposal facility's detection equipment was more sensitive than the licensee's equipment.

The NRC and some Agreement State regulations also allow small quantities of specific radioactive materials used in clinical or laboratory tests to be disposed of as if they were not radioactive. Although no incidents involving the disposal of these types of radioactive material have been reported, incidents involving medical waste have shown that detection systems are capable of detecting the low levels of radioactivity associated with these exempted materials.

Some radioactive materials that could contaminate solid waste include:

Radioisotope	Half-Life	Radiation Type
Iodine-131	8 days	beta, gamma
Iodine-125	60 days	Gamma
Iodine-123	13 hours	Gamma
Technetium-99m	6 hours	Gamma
Indium-111	2.8 days	Gamma
Thallium-201	73 hours	Gamma
Gallium-67	3.3 days	Gamma
Cobalt-57	270 days	Gamma
Hydrogen-3	12 years	Beta
Iridium-192	74 days	beta, gamma
Potassium-40	1.3×10^9 years	beta, gamma
Radium-226	1600 years	alpha, gamma
Uranium-238	4.5×10^9 years	alpha, gamma
Thorium-232	1.4×10^{10} years	alpha, gamma
Americium-241	432 years	alpha, gamma

Lastly, under NRC and Agreement State regulations, some sources and devices may be possessed under a General License. These items include industrial gauging equipment, tritium "EXIT" signs, etc. There is a real potential for such items to be present in solid waste streams. When they are identified through radiation alarms, or visual observation of a GL device or radiation warning symbol, the waste processing facility shall investigate, isolate the item, and contact the Department if needed. Action Plans should contain procedures for the appropriate response if a tritium (hydrogen-3) EXIT sign, or other package with a caution radiation symbol, is observed during processing or disposal of solid waste.

3. What is Radioactivity and Radiation?

The term "radiation" as it relates to "radioactive materials" means the energetic emissions given off by the material as it decays. Ionizing radiation produces charged particles, or ions, in the material that it encounters. Potential adverse effects from radiation on humans are caused by these charged particles, and the energy they deposit in tissues and organs.

Detailed information on radioactivity and radiation is provided in Appendix F.

If you have questions about radiation or require more information, please contact the Bureau of Radiation Protection at the Department of Environmental Protection in Harrisburg (717) 787-2480 or the Area Health Physicist listed in Appendix A for your location.

APPENDIX F. RADIATION PROTECTION FUNDAMENTALS

1. What is Radiation?

Radiation is energy that comes from a source and travels through any kind of material and through space. Light, radio, and microwaves are types of radiation. The kind of radiation discussed in this appendix is called *ionizing radiation* because it can produce charged particles (ions) in matter.

Ionizing radiation is produced by unstable atoms. Unstable atoms differ from stable atoms because unstable atoms have an excess of energy or mass or both. Radiation can also be produced by high voltage devices (e.g., x-ray machines).

Unstable atoms are said to be *radioactive*. In order to reach stability, these atoms give off, or emit, the excess energy or mass. These emissions are called *radiation*. The kinds of radiation are electromagnetic (like light) and particulate (i.e. mass given off with the energy of motion). Gamma radiation and x rays are examples of electromagnetic radiation. Beta and alpha radiation are examples of particulate radiation.

Interestingly, there is a "background" of natural radiation everywhere in our environment. It comes from space (i.e., cosmic rays) and from naturally occurring radioactive materials contained in the earth and in living things. Background radiation levels are typically 5 to 10 $\mu R\ h^{-1}$ depending on location, but may be as high as 25 $\mu R\ h^{-1}$.

Radiation from Various Sources

External Background Radiation	60 mrem/yr, U.S. Average
Natural K-40 Radioactivity in Body	40 mrem/yr
Air Travel Round Trip (NY- LA)	5 mrem
Chest X-ray Internal Dose	10 mrem per film
Radon in the Home	200 mrem/yr (variable)
Man-made (medical x rays, etc.)	60 mrem/yr (average)

2. Types of Radiation

The radiation one typically encounters is one of four types: alpha radiation, beta radiation, and gamma (or X) radiation.

A. Alpha Radiation

Alpha radiation is a heavy, very short range particle, and actually an ejected helium nucleus. Some characteristics of alpha radiation are:

1) Alpha radiation is not able to penetrate human skin.

2) Alpha emitting materials can be harmful to humans if the materials are inhaled, swallowed, or absorbed through open wounds.

3) A variety of instruments have been designed to measure alpha radiation.

Special training in the use of these instruments is essential for making accurate measurements.

4) A thin window Geiger-Mueller (GM) probe can detect the presence of alpha radiation.

5) Instruments cannot detect alpha radiation through even a thin layer of water, dust, paper, or other material, because alpha radiation is not penetrating.

6) Alpha radiation travels only a short distance (a few inches) in air, but is not an external hazard.

7) Alpha radiation is not able to penetrate clothing.

Examples of some alpha emitters: radium, radon, uranium, thorium.

B. Beta Radiation

Beta radiation is a light, short range particle, and actually an ejected electron. Some characteristics of beta radiation are:

1) Beta radiation may travel several feet in air and is moderately penetrating.

2) Beta radiation can penetrate human skin to the "germinal layer," where new skin cells are produced. If high levels of beta emitting contaminants are allowed to remain on the skin for a prolonged period of time, they may cause skin injury.

3) Beta emitting contaminants may be harmful if deposited internally.

4) Most beta emitters can be detected with a survey instrument and a thin window G-M probe (e.g., "pancake" type). Some beta emitters, however, produce very low energy, poorly penetrating, radiation, that may be difficult or impossible to detect. Examples of these difficult to detect beta emitters are hydrogen-3 (tritium), carbon-14, and sulfur-35.

5) Clothing provides some protection against beta radiation.

Examples of some pure beta emitters: strontium-90, carbon-14, tritium, and sulfur-35.

C. Gamma (or X) Radiation

Gamma radiation or x rays are very long range, penetrating electromagnetic radiation. Some characteristics of gamma radiation are:

1) Gamma radiation or x rays are able to travel many feet in air, and many inches in human tissue. It readily penetrates most materials, and is sometimes called "penetrating" radiation.

2) X rays are like gamma rays. X rays, too, are penetrating radiation. Sealed radioactive sources and machines that emit gamma radiation and x rays respectively constitute mainly an external hazard to humans.

3) Gamma radiation and x rays are electromagnetic radiation like visible light, radiowaves, and ultraviolet light. These electromagnetic radiations differ only in the amount of energy they have. Gamma rays and x rays are the most energetic of these.

4) Dense materials are needed for shielding from gamma radiation. Clothing provides little shielding from penetrating radiation, but will prevent contamination of the skin by these materials.

5) Gamma radiation is easily detected by survey meters with a sodium iodide detector probe.

6) Gamma radiation and/or characteristic x rays frequently accompany the emission of alpha and beta radiation during radioactive decay.

Examples of some gamma emitters are: iodine-131, cesium-137, cobalt- 60, radium-226, technicium-99m.

3 How is Radiation Measured?

In the United States, radiation dose or exposure is often measured in the older units called rad, rem, or roentgen (R). For practical purposes with gamma and x rays, these units of measure for exposure or dose are considered equal.

Smaller fractions of these measured quantities often have a prefix, such as, milli (m) means 1/1000. For example, 1 rad = 1,000 mrad. Micro (μ) means 1/1,000,000. So, 1,000,000 μrad = 1 rad, or 10 μR = 0.000010 R.

The "System International" of units (SI system) for radiation measurement is now the official system of measurement, and uses the "gray" (Gy) and "sievert" (Sv) for absorbed dose and equivalent dose respectively.

1 Gy = 100 rad
1 mGy = 100 mrad
1 Sv = 100 rem
1 mSv = 100 mrem

With radiation counting systems, radioactive transformation events can be measured in units of "disintegrations per minute" (dpm) and because instruments are not 100% efficient, "counts per minute" (cpm). Background radiation levels are typically less than 10 μR h^{-1}, but due to differences in detector size and efficiency, the cpm reading on a fixed portal monitor and various hand-held survey meters will vary considerably.

4. How Much Radioactive Material is Present?

The size or weight of a quantity of material does not indicate how much radioactivity is present. A large quantity of material can contain a very small amount of radioactivity, or a very small amount of material can have a lot of radioactivity.

For example, uranium-238, with a 4.5 billion year half life, has only 0.00015 curies of activity per pound, while cobalt-60, with a 5.3 year half life, has nearly 513,000 curies of activity per pound. This "specific activity," or curies per unit mass, of a radioisotope depends on the unique radioactive half-life, and dictates the time it takes for half the radioactive atoms to decay.

In the U.S., the amount of radioactivity present is traditionally determined by estimating the number of *curies* present. The more curies present, the greater amount of radioactivity and emitted radiation.

Common fractions of the curie are the millicurie (1 mCi = 1/1000 Ci) and the microcurie (1 μCi = 1/1,000,000 Ci). In terms of transformations per unit time, 1 μCi = 2,220,000 dpm.

The System International of units (SI system) uses the unit of becquerel (Bq) as its unit of radioactivity. One curie is 37 billion Bq. Since the Bq represents such a small amount, one is likely to see a prefix noting a large multiplier used with the Bq as follows:

37 GBq = 37 billion Bq = 1 Curie
1 MBq = 1 million Bq = ~ 27 microcurie
1 GBq = 1 billion Bq = ~ 27 millicuries
1TBq = 1 trillion Bq = ~ 27 Curies

5. How Can You Detect Radiation?

Radiation cannot be detected by human senses. A variety of instruments are available for detecting and measuring radiation

The most common of these are:

Geiger-Mueller (G-M) Tube or Probe -- A gas-filled device that creates an electrical pulse when radiation interacts with the gas in the tube. These pulses are converted to a reading on the instrument meter. If the instrument has a speaker, the pulses also give an audible click. Common readout units are: roentgens per hour (R/hr), milliroentgens per hour (mR/hr), rem per hour (rem/hr), millirem per hour (mrem/hr) and counts per minute (cpm). G-M probes (e.g., "pancake" type) are most often used with hand-held radiation survey instruments.

Sodium Iodide Detector -- A solid crystal of sodium iodide creates a pulse of light when radiation interacts with it. This pulse of light is converted to an electrical signal, which gives a reading on the instrument meter. If the instrument has a speaker, the pulses also give an audible click. Common readout units are: microroentgens per hour (μR/hr), and

counts per minute (cpm). Sodium iodide detectors are often used with hand-held instruments and large stationary radiation monitors. Special plastic "scintillator" materials are also used in place of sodium iodide.

(Note: For practical purposes, consider the rad, roentgen, and the rem to be equal with gamma or x rays. So, 1 mR/hr is equivalent to 1 mrem/hr.)

6. How Can You Keep Radiation Exposure Low?

Although some radiation exposure is natural in our environment, it is desirable to keep radiation exposure as low as reasonably achievable (ALARA) in an occupational setting. This is accomplished by the techniques of time, distance, and shielding.

Time: The shorter the time in a radiation field, the less the radiation exposure you will receive. Work quickly and efficiently. Plan your work before entering the radiation field.

Distance: The farther a person is from a source of radiation, the lower the radiation dose. Levels decrease by a factor of the square of the distance. Do not touch radioactive materials. Use shovels, or remote handling devices, etc., to move materials to avoid physical contact.

Shielding: Shielding behind a massive object (such as a truck, dumpster, or pile of dirt) provides a barrier that can reduce radiation exposure.

7. What is Radioactive Contamination?

If radioactive material is not in a sealed source container, it might be spread onto other objects. Contamination occurs when material that contains radioactive atoms is deposited on materials, skin, clothing, or any place where it is not desired. It is important to remember that radiation does not spread or get "on" or "in" people; rather, it is radioactive *contamination* that can be spread. A person contaminated with radioactive material will receive radiation exposure until the source of radiation (the radioactive material) is removed.

-- A person is *externally* contaminated if radioactive material is on the skin or clothing.

-- A person is *internally* contaminated if radioactive material is breathed in, swallowed, or absorbed through wounds.

-- The *environment* is contaminated if radioactive material is spread about or is unconfined.

8. How Can You Work Safely Around Radiation or Contamination?

You can work safely around radiation and/or contamination by following a few simple precautions:

A. Use time, distance and shielding to reduce exposure. B. Avoid contact with the contamination.

C. Wear protective clothing that if contaminated, can be removed.

D. Wash with non-abrasive soap and water any part of the body that may have come in contact with the contamination.

E. Assume that all materials, equipment, and personnel that came in contact with the contamination are contaminated. Radiological monitoring is recommended before leaving the scene.

9. Is it Safe to be Around Sources of Radiation?

A single high-level radiation exposure (i.e., greater than 10,000 mrem) delivered over a very short period of time may have potential health risks. From follow-up of the atomic bomb survivors, we know acutely delivered very high radiation doses can increase the occurrence of certain kinds of disease (e.g., cancer) and possibly negative genetic effects. To protect the public, radiation workers (and environment) from the potential effects of chronic low-level exposure (i.e., less than 10,000 mrem), the current radiation safety practice is to prudently assume similar adverse effects are possible with low-level protracted exposure to radiation. Thus, the risks associated with low-level medical, occupational and environmental radiation exposure are conservatively calculated to be proportional to those observed with high-level exposure. These calculated risks are compared to other known occupational and environmental hazards, and appropriate safety standards have been established by international and national radiation protection organizations (e.g., ICRP and NCRP) to control and limit potential harmful radiation effects.

	Annual Radiation Dose Limits- TEDE	
Facility staff -	5,000 mrem	(considered as "occupationally" exposed)
Facility staff -	100 mrem	(if considered member of the "public")
Vehicle driver -	100 mrem	(considered member of the public)
General Public -	4 mrem	(for the drinking water pathway)
General Public -	10 mrem	(for the air pathway)
General Public -	25 mrem	(all pathways combined)

Both public and occupational dose limits are set by federal (i.e., EPA and NRC) and state agencies (i.e., DEP) to limit cancer risk.

(Note: It is important to remember when dealing with radiation sources in other materials or waste that there may be chemical or biological hazards separate and distinct from the radiation hazard. These chemical or biological hazards are often more dangerous to humans than the radiation hazard.)

Wolfe, Jill

From: EP, Right-to-Know
Sent: Friday, April 22, 2016 5:55 PM
To: Wolfe, Jill; klsmith@smithbutzlaw.com; Arnold, Roy W.
Cc: Barnett, Jacqueline Conforti (DEP)
Subject: Smith v. DEP OOR Dkt 2016-0587, (consolidated) - part 3
Attachments: Affidavit - CO part 1 of 2.pdf; Affidavit - CO part 2 of 2.pdf

Please find attached part 3 of 3 of the Department's above appeal.

Dawn Schaef | Agency Open Records Officer | Chief, Records Mgmt & Library Support
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DEP PRIVILEGE LOGS

DEP Central Office

Smith v. DEP; OOR DKT 2016-0587; 0602; 0603; 0604; 0605; 0606; and 0607

PRIVILEGE LOG
DEP CENTRAL OFFICE

Exemption	Dates of Record	# of Pages	Subject Matters/Description
Attorney-Client Privilege/Attorney Work Product: Attorney-Client Work Product A public record protected by the attorney-work product privilege as defined in 65 P.S. § 67.102./ Attorney Client Communication A public record protected by the attorney-client privilege as defined in 65 P.S. § 67.102.	December 2009-December 2015	581	Legal advice sought by/provided to DEP personnel including David Allard, Joseph Melnic, John Chippo, John Krueger, Lisa Forney, Francis Costello, Terry Derstine, Stephen Acker, Robert Yowell, George Jugovic, Kelly Burch, Jennifer Means, Alan Eichler, Joseph Deman, and Neil Shader regarding the following: • DEP's noncriminal investigations of ProTechnics • Preparation for meetings with ProTechnics • Enforcement actions against ProTechnics • ProTechnics' license application • ProTechnics' reporting obligations • Draft tracer well site agreements • Draft consent order and agreements • Media inquiries regarding ProTechnics and the issued NOVs. The DEP attorneys involved included: Alexandra Chiaruttini, Chief Counsel; Scott Perry, Assistant Counsel, Bureau of Regulatory Counsel; Mary Lou Barton, Assistant Counsel, Bureau of Regulatory Counsel; Curtis Sullivan, Assistant Counsel, Bureau of Regulatory Counsel; Keith Salador, Assistant Counsel, Bureau of Regulatory Counsel; Jacqueline Conforti Barnett, Director, General Law Division
Radiation Protection Act, Regulations and Regulatory Preclusions 35 P.S. §7110.102, 35 P.S. § 7110.301, 35 P.S. § 7110.305, 25 Pa. Code § 215.12, 25 Pa Code 215.1, 25 Pa Code §215.14; and RTKL noncriminal investigation 65 P.S. § 708(b) (17)	January 2010	62	Records pertaining to the noncriminal investigations DEP conducted regarding ProTechnics and consist of the following: • Inspection reports prepared by the Radiation Protection Program • Internal pre-enforcement documents • DEP internal email correspondence • Staff reviews of ProTechnics radioactive materials license registration.

RTKL Internal, Predecisional, Deliberative Records 65 P.S. § 708(b)(10)(i)(A)	December 2009-December 2015	1,244	Records of internal, predecisional deliberations amongst DEP personnel including Kenneth Reisinger, Joseph Melnic, David Allard, Terry Derstine, Jennifer Kelly, Joseph Deman, John Chippo, Robert Maiers, Bryan Werner, James Barnhart, George Vargo, John Krueger, William Wagner, Joseph Pryber, Francis Costello, James Yusko, Barbara Bookser, Stephen Socash, Neil Shader, Lisa Forney, Robert Zaccano, Benjamin Seiber, Curtis Sullivan, Scott Perry, Keith Salador, Mary Lou Barton, Rusty Diamond, Frank Peffer, Stephen Acker, Brooke Reynolds, Robert Yowell, George Jugovic, Kelly Burch, Jennifer Means, Alan Eichler, Craig Logins, Martin Seigel, Tonda Lewis, Stevan Kip Portman, Patrick Brennan, William Tomayko, Anita Stainbrook, Richard Croll, Jennifer Niki, Anthony Rathfon, Michael Sherman, Mark Carmon, Susan Seighman, Michael Bedrin, Barbara Sexton, Nels Taber, Stefanie Muzic, Jonathan Spang, Scott Walters, Julie Lalo, and Rich Janati regarding the following topics: • DEP steps to take regarding the first ProTechnics investigation • Preparations of DEP staff for meeting with ProTechnics representatives • DEP actions to take following in-person meeting with ProTechnics • The monitoring of cleanup and removal by DEP of ProTechnics radioactive material • DEP's options for enforcement actions after the first ProTechnics investigation • DEP's Review of ProTechnics' license application • Proposed steps for DEP regarding the second ProTechnics investigation • DEP's options for enforcement actions after the second ProTechnics investigation • Coordination with other programs within the DEP regarding ProTechnics • DEP's review of reports submitted by ProTechnics • DEP's plans to brief its upper level management regarding ProTechnics • Draft responses to an informal request for records to DEP's Communications Office beginning in October 2015
RTKL Personal and Public Safety Security Exceptions 65 P.S. § 708(b)(2),and 65 P.S. § 708(b)(3)	December 2009-December 2015	2,027	Records containing sensitive security-related information such as radioactive material isotope, the form of a radioactive materials license, internal DEP tracking information, and location and quantity of radioactive material that are reasonably likely to result in a substantial and demonstrable risk of physical harm to or the personal security of an individual; are records that are maintained by DEP that if disclosed would be reasonably likely to jeopardize or threaten public safety or preparedness or public protection activity; and are records the disclosure of which would create a reasonable likelihood of endangering the safety or physical security of a building, public utility, resource, infrastructure, facility, or information storage system. These records include the following: • Internal DEP correspondence regarding ProTechnics' use of radioactive

			materials • Steps for DEP take regarding the first ProTechnics investigation • Preparations of DEP staff to meet with ProTechnics representatives • DEP actions to take following in-person meeting with ProTechnics • The monitoring of cleanup and removal by DEP of ProTechnics radioactive material • DEP's options for enforcement actions after the first ProTechnics investigation • DEP correspondence with ProTechnics regarding their use radioactive materials • DEP correspondence with ProTechnics regarding their radioactive materials license application • DEP's review of ProTechnics' license application • DEP's Steps to take regarding the second ProTechnics investigation • DEP's options for enforcement actions after the second ProTechnics investigation • Coordination with other programs within DEP regarding ProTechnics • DEP's review of reports submitted by ProTechnics • DEP's plans to brief its upper level management regarding ProTechnics • ProTechnics' radioactive materials license application • ProTechnics' radioactive materials license • ProTechnics' radioactive materials license amendment applications • ProTechnics' radioactive materials license amendments • DEP's noncriminal investigations of ProTechnics violations resulting in NOVs and COAs • DEP's enforcement actions against ProTechnics • ProTechnics' reporting obligations to DEP • Draft tracer well site agreements by DEP staff • Draft consent order and agreements by DEP staff • Notifications made by ProTechnics to DEP regarding temporary work site locations • Protechnics *in-situ* decay surveys • Presentation materials made by ProTechnics
Confidential Proprietary Information 65 P.S. § 67.708(b)(11)	December 2008-June 2009	714	• Information pertaining to ProTechnics' patented tracer technology included in NOVs, COAs, emails, temporary job site notification forms, material safety data sheets, patents, radioactive materials license applications, and radioactive materials licenses. • ProTechnics' Trace and Logging Services Field Receipt Agreements • ProTechnics' correspondence with the State of California concerning

			ProTechnics' tracer materials located at a California facility. This correspondence contains confidential customer information including the location of ProTechnics' customer's facility, the materials stored there, and the radiation levels at that location.
Total		2,588*	

*The total for all exceptions is less than the sum of the items withheld for each individual exception because some items are covered by more than one exception.

DEP Southeast Regional Office

Smith v. Pa. Dep't of Env'tl. Prot., AP 2016-0607

PRIVILEGED RECORDS LOG

DEP Southeast Regional Office Records

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
1	Patent	7/27/1999	7	ProTechnic's patent regarding well tracers	Confidential Business Information
2	cover letter and license	4/7/2004 - 2/9/2010	171	letter from ProTechnics employee to John Chippo with application and license	Regulatory Preclusion; Public Safety and Security
3	Email with attachment	7/14/2008	5	Email from Richard Croll to Terry Derstine, Joseph Pryber, Francis Costello and Joseph Koshy regarding reciprosity licenses and inspection dates, including license numbers	Regulatory Preclusion; Public Safety and Security
4	E-mails with attachment	11/12/2008-11/13/2008	2	E-mails from Terry Derstine to Richard Croll; Honalee Dobnak to Terry Derstine and Joseph Pryber re: reciprocity licensees with spreadsheet attachment containing company names, license nos., site locations and inspections.	Regulatory Preclusion; Public Safety and Security
5	E-mail with attachment	7/1/2009	3	E-mail from Dwight Shearer to James Yusko, Stephen Acker, John Chippo, Francis Costello, Terry Derstine, Ronald Hamm, Joseph Melnic, and Benjamin Sieber re: reciprocity licenses with license information.	Regulatory Preclusion; Public Safety and Security
6	E-mail with attachments	8/3/2009	77	E-mail from Dwight Shearer to James Yusko, Stephen Acker, Barbara Bookser, John Chippo, Francis Costello, Terry Derstine, Ronald Hamm, Joseph Melnic, and Benjamin Sieber re: materials licenses and inspections. Attachments include 4 excel spreadsheets containing license information, locations and companies.	Regulatory Preclusion; Public Safety and Security

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
7	E-mail	12/9/2009-1/4/2010	4	E-mail chain with communications between David Allard, Francis Costello; Marylou Barton; cc'ing Terry Derstine, Joseph Pryber, Scott Perry, Joseph Melnic, Stephen Acker, John Krueger, James Yusko, Barbara Bookser re: licensing, classification, and storage information	Internal predecisional deliberation
8	Email	12/22/2009 - 12/23/2009	4	Seven emails in a chain between Stephen Acker, Dave Allard, Joseph Melnic, etc., regarding a radiation detection alarm at a Pennsylvania landfill, including generator information, home and personal cell phone numbers, the type of isotope, the identification of ProTechnic employee with knowledge of location of radioactive material.	Regulatory Preclusion; Public Safety and Security; personal identification information; Noncriminal Investigation
9	E-mail	12/23/2009	1	E-mail chain between David Allard to Francis Costello cc'ing Melnic, Joseph; Deman, Joseph; Chippo, John; Maiers, Robert; Werner, Bryan;Barnhart, James; Vargo, George; Krueger, John; Wagner, William; Pryber, Joseph; Yusko, James; Bookser, Barbara; Socash, Stephen; Acker, Stephen; Bill Belanger; Derstine, Terry; Kelly, Jennifer; Reisinger, Kenneth; re: disposal of radioactive materials.	Internal predecisional deliberation
10	E-mail with attachment	12/28/2009-12/29/2009	27	E-mail chain with communications from David Allard, ProTechnics employees, Susan Seighman, Francis Costello and George Vargo, also forwarded from Terry Derstine to Francis Costello re: testing data and information from ProTechnics on radioactive materials and locations. Includes 7 attachments with radioactive material information, ProTechnics employees names, addresses, and contact information.	Internal predecisional deliberation; Regulatory Preclusion; Public Safety and Security.
11	E-mail	12/28/2009-12/29/2009	2	E-mail from Terry Derstine to Francis Costello, Richard Croll, Brooke Reynolds re: testing data and information from ProTechnics on radioactive materials and locations.	Internal predecisional deliberation; Regulatory Preclusion; Public Safety and Security.

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
12	E-mail with attachment	12/28/2009-12/29/2009	13	E-mail chain with communications from David Allard, ProTechnics employees, John chippo, John Krueger, Stephen Acker, Terry Derstine, Joseph Pryber, James Yusko, Barbara Bookser, Marylou Barton and Scott Perry, Francis Costello, Richard Croll and Brooke Reynolds re: testing data and information from ProTechnics on radioactive materials and locations. Includes e-mail attachment with an e-mail chain between ProTechnics employees, Jeff Searfoss and Joseph Melnic that in turn contains three attachments that contain radioactive material information.	Internal predecisional deliberation; Regulatory Preclusion; Public Safety and Security.
13	Email with attachment	12/28/2009-12/29/2009	10	Email chain between David Allard, Corelab employee, Joseph Melnic, John Chippo, John Krueger, Stephen Acker, Terry Derstine, Scott Perry, etc. regarding a ProTechnics meeting, including the locations of radioactive material, license information, isotope types and volumes	Regulatory Preclusion; Public Safety and Security
14	E-mail with attachments	12/29/2009-12/31/2009	34	E-mail chain including communications between David Allard, Terry Derstine, Stephen Acker, John Krueger, Francis Costello, Marylou Barton,Joseph Melnic, Scott Perry, Brooke Reynolds, Barbara Bookser; Rusty Diamond, James Yusko, Joseph Pryber, Robert Maiers, Rich Janati re: licensing, classification and storage. 4 Attachments that include ProTechnics employees' names, addresses and contact information, license information, radioactive materials information and site locations.	Internal predecisional deliberation; Regulatory Preclusion; Public Safety and Security
15	E-mail with attachment	12/29/2009	4	E-mail from David Allard to Joseph Melnic, John Chipp, John Krueger, Stephen Acker and Marylou Barton with cc's re: Reciprocity license notifications. Attachment contains information about ProTechnics employees, contact information, radioactive material information and location.	Regulatory Preclusion; Public Safety and Security

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
16	Email	12/29/2009-1/4/2010	4	E-mail chain between David Allard, Francis Costello, Marylou Barton, CC Terry Derstine, Joseph Pryber, Scott Perry, Joseph Melnic, Stephen Acker, John Krueger, James Yusko, etc. regarding ProTechnic tracer information	Regulatory Preclusion; Public Safety and Security; Internal Predecisional Deliberations
17	Email with attachment	12/30/2009	2	Email between Dwight Shearer, Barbara Bookser and Francis Costello regarding ProTechnics, including license number information and locations of radioative material	Regulatory Preclusion; Public Safety and Security
18	Email	1/4/2010	5	Email from Corelab employee to David Allard regarding a ProTechnics presentation, including a personal cell phone number and other contact information.	Regulatory Preclusion; Public Safety and Security; Personal Identification Information
19	Email	1/4/2010-1/8/2010	5	Email chain between John Spang, Stephen Socash, John Krueger, Stephen Acker, James Yusko, Barbara Bookser, Terry Derstine, Joseph Pryber, Francis Costello, etc. regarding ProTechnics, including isotope and license information and personal cell phone number	Regulatory Preclusion; Public Safety and Security; personal identification information; internal, predecisional deliberations
20	Email with two attachments	1/5/2010-1/6/2010	26	Email chain between Joseph Melnic, John Krueger, David Allard, John Chippo, Marylou Barton, Scott Perry, Francis Costello, etc., regarding ProTechnic's license information	Regulatory Preclusion; Public Safety and Security; internal predecisional deliberations

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
21	Email with attachment	1/4/2010-1/6/2010	31	Email chain between David Allard, Stephen Socash, John Krueger, etc. regarding ProTechnics well logging tracers, including license information and a deliberation on leachate test	Regulatory Preclusion; Public Safety and Security; Personal Identification Information; internal, predecisional deliberations
22	Email	1/4/2010-1/16/2010	8	Email chain between David Allard, Stephen Socash, Scott Walters, Joseph Melnic, John Chippo, John Krueger, etc., deliberating test procedures for ProTechnics, license information	Regulatory Preclusion; Public Safety and Security; personal identification information; internal, predecisional deliberations
23	license application	1/6/2010	132	letter from ProTechnics employee to John Chippo with application and license	Regulatory Preclusion; Public Safety and Security
24	letter and license application	1/26/2010	54	letter from ProTechnics employee to John Chippo with support for an application	Regulatory Preclusion; Public Safety and Security
25	Notice of Violation	1/28/2010	3	Notice of Violation to Citrus Energy Corporation. Produced but redacted delivery confirmation number, site location information; ProTechnics employees names, Protechnics address, License No., proprietary technology.	Regulatory Preclusion; Public Safety and Security; Confidential Business Information
26	Notice of Violation	1/28/2010	3	Notice of Violation to Protechnics. Produced but redacted delivery confirmation number, site location information; ProTechnics employees names, Protechnics address, License No., proprietary technology.	Regulatory Preclusion; Public Safety and Security

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
27	notice of violation	1/28/2010	2	redacted notice of violation from Lisa Forney to ProTechnics employee	Regulatory Preclusion; Public Safety and Security
28		2/1/2010	2	letter from John Chippo to ProTechnics employee	Regulatory Preclusion; Public Safety and Security
29	letter	2/25/2010	2	letter from ProTechnics employee to John Chippo with revised tracer well site agreement	Regulatory Preclusion; Public Safety and Security
30	E-mail with attachment	2/26/2010	5	E-mail chain between John Chippo, Barbara Bookser, Joseph Pryber, Stephen Acker, Terry Derstine and Francis Costello re: ProTechnics license with license attached containing license no., ProTechnics employee names, address and contact information.	Regulatory Preclusion; Public Safety and Security
31	letter and license	2/26/2010	7	cover letter from John Chippo to ProTechnics employee and new license	Regulatory Preclusion; Public Safety and Security
32	Email with attachment	3/9/2010	8	Email from Dennis Angelo to Benjamin Seiber, Joseph Melnic, Kenneth Gelburd, Esq., etc. on Monthly radiation protection call with attorney advice included	Attorney-client privilege
33	E-mail	3/24/2010	2	E-mail from Terry Derstine to Brooke Reynolds, Stephan Brown, Francis Costello, Elaine Crescenzi, Richard Croll, Terry Derstine, Joseph Koshy, Joseph Pryber re: Texas theft. Contains information relating to location and type of radioactive materials.	Regulatory Preclusion; Public Safety and Security
34	Email	3/30/2010	2	E-mail from Joseph Pryber to Stephan Brown, Francis Costello, Elaine M Crescenzi, Richard Croll, Joseph Koshy and Brooke Reynolds; cc'ing Terry Derstine re: Texas theft follow-up. Conatins information relating to location and type of radioactive materials.	Regulatory Preclusion; Public Safety and Security

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
35	records management request for changes to a file	4/9/2010	2	change of file request and facility query screen	Regulatory Preclusion; Public Safety and Security
36	Email with attachment	6/14/2010	3	Email from Stephen Acker to David Allard, Curtis Sullivan, Esq. and Kenneth Gelburd, Esq., etc. regarding action items, including attorney advice	Attorney-client privilege
37	Email with attachment	7/9/2010, 7/15/2010	4	Email from Joseph Melnic to David Allard, Curtis Sullivan, Esq., etc. regarding the July 12 monthly radiation protection call, which attorney advice included.	Attorney-client privilege
38	Email	8/25/2010-8/26/2010	5	Email chain between Terry Derstine, Richard Croll, Brooke Reynolds, Stephan Brown, Joseph Koshy, Joseph Pryber, Elaine Crescenzi regarding the location of ProTechnics tailings roll offs	Regulatory Preclusion; Public Safety and Security; Internal Predecisional Deliberations
39	E-mail with attachment	8/6/2010-8/9/2010	3	E-mail from Joseph Pryber to Francis Costello forwarding e-mail sent from Joseph Melnic to Radiation Protection staff re: Regional Office/Central Office meeting agenda with agenda attached. Attachment contains license no. information.	Regulatory Preclusion; Public Safety and Security
40	Email with attachment	8/6/2010-8/13/2010	5	Email chain between Joseph Melnic, David Allard, Dennis Angelo, Curtis Sullivan, Esq. regarding a monthly meeting agenda discussing ongoing cases with legal advice given	Attorney-client privilege
41	E-mail with attachment	8/9/2013-1/13/2014	3	E-mail chain between Jennifer Noll, Terry Derstine, Bejanmin Seiber and others re: IMPEP questionnaire with 1 excel attachment containing companies, site locations, inspectors, inspection dates and priority list.	Regulatory Preclusion; Public Safety and Security.

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
42	Email with attachment	9/10/2010-9/14/2010	4	Email chain between Joseph Melnic, David Allard, Dennis Angelo, Curtis Sullivan, Esq. regarding a monthly meeting agenda discussing ongoing cases with legal advice given	Attorney-client privilege
43	letter	11/1/2010	1	letter from ProTechnics employee to John Chippo discussing license	Regulatory Preclusion; Public Safety and Security
44	Consent order and agreement	11/2/2010	24	letter from Lisa Forney to ProTechnics employee with CO&A	Regulatory Preclusion; Public Safety and Security
45	Email with attachment	11/8/2010	22	Email from Terry Derstine to Francis Costello regarding radiation protection licenses, including license numbers for all facilities in the Southeastern Region	Regulatory Preclusion; Public Safety and Security
46	letter and license amendment	12/1/2010	8	cover letter from John Chippo to ProTechnics employee and license amendment	Regulatory Preclusion; Public Safety and Security
47	letter and license amendment	12/2/2010	7	cover letter from John Chippo to ProTechnics employee and license amendment	Regulatory Preclusion; Public Safety and Security
48	letter and license	1/25/2011	8	cover letter from John Chippo to ProTechnics employee and license	Regulatory Preclusion; Public Safety and Security
49	E-mail with attachment	11/20/2012	47	E-mail from Francis Costello to Elaine Crescenzi re: Licensing log. 1 Attachment contains spreadsheet of Radiation License Reviews and Reciprocity Applications containing license nos., company names and radioactive material information.	Regulatory Preclusion; Public Safety and Security.

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
50	E-mail with attachments	4/22/2013-9/16/2013	13	E-mail chain between David Allard, Robert Zaccano, Joseph Deman, Richard Croll and John Chippo regarding radioactive materials location and disposal. 2 Attachments include radioactive material information and location.	Regulatory Preclusion; Public Safety and Security; Confidential Business Information; Noncriminal Investigation; Internal Predecisional Deliberations
51	Email	8/9/2013-1/13/2014	3	Email chain between Benjamin Seiber, Barbara Bookser, John Chippo, Terry Derstine, Joseph Deman, Robert Maiers, Joseph Melnic, Jennifer Noll, Dwight Shearer, Curtis Sullivan, Esq. etc. regarding IMPEP implementation	Internal, predecisional deliberations
52	E-mail with attachment	9/10/2013-9/11/2013	5	E-mail chain between Waste Management employee, Richard Croll, Jennifer Noll and Terry Derstine re: detected radioactive material in landfill. E-mail discusses incident, radioactive material information and license no.; 1 attachment references radioactive material information and contains commercial drivers' license information (home address, but not Driver's License No.) of individual.	Regulatory Preclusion; Public Safety and Security; Noncriminal Investigation; Personal Identification Information.
53	Email	9/10/2013 - 9/11/2013	4	Five emails in a chain between Jennifer Noll, Terry Derstine, and Rick Croll, discussing a TENORM hit at a landfill, including personal cell phone number, radiation protection license number, and isotope information	Regulatory Preclusion; Public Safety and Security; Noncriminal Investigation
54	E-mail	9/11/2013	1	E-mail from Richard Croll to Joseph Deman cc'ing Jennifer Noll re: detected radioactive material in landfill. Contains license no., radioactive material information.	Regulatory Preclusion; Public Safety and Security; Noncriminal Investigation.

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
55	Email	9/11/2013	1	Three emails between Richard Croll and Dennis Gallagher, CC Jennifer Noll regarding ProTechnic's license information	Regulatory Preclusion; Public Safety and Security
56	E-mail	9/12/2013	6	E-mail from Francis Costello to Jennifer Noll, Barbara Bookser, Joseph Deman re: inspections. Contains license no. information.	Regulatory Preclusion; Public Safety and Security; Noncriminal Investigation.
57	Email	9/12/2013-9/17/2013	5	Five emails in a chain between Francis Costello, Jennifer Noll, Joseph Deman, and Barbara Bookser regarding ProTechnics inspections, including the license number	Regulatory Preclusion; Public Safety and Security
58	Email	9/13/2013	1	Email from Richard Croll to Jospeh Deman, John Chippo, and Jennifer Noll regarding ProTechnics violations, including locations of certain well sites	Regulatory Preclusion; Public Safety and Security; Noncriminal Investigation
59	E-mail	9/16/2013	17	E-mail from Joseph DeMan to Richard Croll cc'ing John Chippo re: enforcement action and Consent Order and Agreement. Attachment contains otherwise produced Consent Order and Agreement.	Internal predecisional deliberation
60	E-mail	9/16/2013	1	E-mail from Joseph DeMan to Richard Croll cc'ing John Chippo, Lisa Forney, Jennifer Noll; Robert Zaccano re: enforcement action	Internal predecisional deliberation
61	Email	9/16/2013	4	Email chain between Richard Croll and Perma-Fix employee regarding frack beads	Regulatory Preclusion; Public Safety and Security
62	E-mail	9/17/2013	1	E-mail from Joseph DeMan to Richard Croll re: draft inspection report	Internal predecisional deliberation
63	E-mail with attachment	9/17/2013	5	E-mail from Richard Croll to Jennifer Noll and Joseph Deman re: draft ProTechnics Inspection Report. Attachment includes a draft Inspection Report with license information, location and type of radioactive materials.	Regulatory Preclusion; Public Safety and Security; Noncriminal Investigation.

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
64	E-mail with attachment	9/17/2013	23	E-mail from ProTechnics employee to Richard Croll with 1 attachment regarding detected radioactive material in landfill. Attachment contains licens no., radioactive material information, site location information.	Regulatory Preclusion; Public Safety and Security; Noncriminal Investigation.
65	Email	9/17/2013	1	Email chain between ProTechnics employee and Richard Croll regarding ProTechnic's tracers, including the identity of individuals with knowledge of location of radiological source	Regulatory Preclusion; Public Safety and Security
66	Email	9/17/2013	1	Email from Richard Adams to Richard Croll regarding contracts with ProTechnics and license, including well site information	Regulatory Preclusion; Public Safety and Security
67	Email with attachment	9/17/2013	23	Email between Corelab employee and Richard Croll regarding ProTechnics license, including license number, ProTechnic's employee with knowledge of location of radioactive material, isotope information, well location information.	Regulatory Preclusion; Public Safety and Security
68	Email with attachment	9/17/2013	13	Email from Richard Adams to Richard Croll regarding contracts with ProTechnics and license, including license information, well site locations, employees with information on radiological sources	Regulatory Preclusion; Public Safety and Security
69	Email with attachment	9/19/2013	2	Email from a Corelab employee to Waste Management, Richard Croll, etc., regarding a radiation detection alarm at a Pennsylvania landfill, including a personal cell phone number. The attachment includes the location of radioactive material.	Regulatory Preclusion; Public Safety and Security; Personal Identification Information
70	Email with three attachments	9/19/2013	4	Email from Corelab employee to Richard Croll regarding training records for a ProTechnics employee, including employee with knowledge of location of radioactive material and well location information	Regulatory Preclusion; Public Safety and Security
71	E-mail	9/23/2013	1	E-mail from Joseph DeMan to Richard Croll cc'ing John Chippo re: enforcement action and Consent Order and Agreement	Internal predecisional deliberation

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
72	E-mail	9/24/2013	1	E-mail from Joseph DeMan to Richard Croll re: enforcement action	Internal predecisional deliberation
73	Email	9/24/2013-9/27/2013	1	Email chain between Richard Croll and a Perma-Fix employee regarding ProTechnic's samples, including isotope information	Regulatory Preclusion; Public Safety and Security
74	E-mail	9/24/2013	1	E-mail from Joseph Deman to Richard Croll re: enforcement action	Internal predecisional deliberation
75	E-mail with attachment	9/24/2013	2	E-mail from Joseph Deman to Richard Croll re: license and Consent Order and Agreement with letter re: license attached. Contains license information, ProTechnics employees' names, address and contact information.	Regulatory Preclusion; Public Safety and Security.
76	E-mail with attachment	9/24/2013	19	E-mail from scanner to Richard Croll attaching Radioactive Material License No. and information, site location, ProTechnics employee name, location and contact information.	Regulatory Preclusion; Public Safety and Security.
77	E-mail with attachment	9/24/2013	19	E-mail from scanner to Richard Croll attaching Radioactive Material License No. and information, site location, ProTechnics employee name, location and contact information.	Regulatory Preclusion; Public Safety and Security.
78	E-mail with attachment	9/24/2013	5	E-mail from scanner to Richard Croll attaching Radioactive Material License No. and information, site location, ProTechnics employee name, location and contact information.	Regulatory Preclusion; Public Safety and Security.
79	E-mail with attachment	9/24/2013	5	E-mail from scanner to Richard Croll attaching Radioactive Material License No. and information, site location, ProTechnics employee name, location and contact information.	Regulatory Preclusion; Public Safety and Security.
80	E-mail with attachment	9/24/2013	3	E-mail from scanner to Richard Croll attaching Radioactive Material License No. and information, site location, ProTechnics employee name, location and contact information.	Regulatory Preclusion; Public Safety and Security.

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
81	E-mail with attachment	9/24/2013	3	E-mail from scanner to Richard Croll attaching Radioactive Material License No. and information, site location, ProTechnics employee name, location and contact information.	Regulatory Preclusion; Public Safety and Security.
82	inspection report	9/24/2013	5	inspection of ProTechnics facility	Regulatory Preclusion; Public Safety and Security
83	E-mail with attachment	10/2/2013	3	E-mail from Francis Costello to John Chippo with cc's re: Pre-Impep File Review with attachment containing license information.	Regulatory Preclusion; Public Safety and Security.
84	Draft Inspection Report	10/3/2013	4	Draft Inspection Report containing ProTechnics employees names, address, contact informtaion, radioactive materials and locations.	Regulatory Preclusion; Public Safety and Security; Noncriminal investigation.
85	E-mail	10/10/2013	1	E-mail from Richard Croll to John Chippo, Joseph Deman, cc'ing Jennifer Noll forwarding e-mail from ProTechnics Employee with employee information, radioactive material location.	Regulatory Preclusion; Public Safety and Security
86	Email	10/10/2013	1	Email between Corelab employee and Steve Acker, CC Richard Croll regarding locations of oil and gas wells	Regulatory Preclusion; Public Safety and Security
87	Notice of Violation	11/26/2013	4	Notice of Violation . Produced but redacted for delivery confirmation number, site location information; ProTechnics employees names, Protechnics address, License No.	Regulatory Preclusion; Public Safety and Security
88	Email	11/26/2013	1	Email from Lisa Forney to Joseph Deman, Robert Zaccano, etc. regarding ProTechnics NOV, including license number	Regulatory Preclusion; Public Safety and Security
89	notice of violation	11/26/2013	3	redacted notice of violation from Lisa Forney to ProTechnics employee	Regulatory Preclusion; Public Safety and Security

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
90	E-mail with attachment	12/6/2013-12/9/2013	4	E-mail from Lisa Forney to Robert Zaccano, Joseph Deman, Jennifer Noll, Richard Croll; forwarding e-mail from ProTechnics employee to Lisa Forney and other re: response to Notice of Violation. Attachment contains ProTechnics employee names, address and contact information and radioactive material information.	Regulatory Preclusion; Public Safety and Security.
91	E-mail	12/6/2013-12/9/2013	2	E-mail from Lisa Forney to Richard Croll re: enforcement action	Internal predecisional deliberation
92	Letter	12/23/2013	3	Letter regarding November 26, 2013 Notice of Violation. Producted but redacted delivery confirmation number, ProTechnics employees names, ProTechnics Address, License No., ProTechnics employees' e-mail addresses	Regulatory Preclusion; Public Safety and Security
93	letter	12/23/2013	3	letter from Lisa Forney to ProTechnics employee re: enforcement of a CO&A	Regulatory Preclusion; Public Safety and Security
94	Email	12/23/13 - 1/4/14	2	Three emails between Lisa Forney of DEP and employees of Corelab including a personal cell phone number	Personal Identification Information; Regulatory Preclusion; Public Safety and Security
95	E-mails with attachment	12/23/2013 - 1/9/2014	9	E-mails between ProTechnics employee and Lisa Forney, Jennifer Noll, John Chippo, re: stipulated penalties	Regulatory Preclusion; Public Safety and Security
96	Email with attachment	4/2/2014	10	Email from Bridget Craig to Jennifer Noll regarding active radiation monitoring licenses, including license numbers for all facilities in the Southeastern Region	Regulatory Preclusion; Public Safety and Security
97	Addendum to Consent Order and Agreement	5/7/2014	7	Addendum to Consent Order and Agreement dated Nov. 2, 2010. Produced but redacted for delivery confirmation number, ProTechnics employees names, Protechnics address, License No., proprietary technology, ProTechnics telephone number.	Regulatory Preclusion; Public Safety and Security; Confidential Business Information

	Record Type	Record Date	Page No.	Subject Matter of Record	Legal Basis for Exclusion
98	E-mail with attachment	5/7/2014	8	E-mail from Stephanie Muzic to Lisa forney, Robert Zaccano, Joseph Deman, David Allard, John Chippo, Joseph Melnic, Jennifer Noll, and Richard Croll containing license information with an addendum to a Consent Order and Agreement attached that has already been produced for the requester.	Regulatory Preclusion; Public Safety and Security.
99	letter	5/7/2014	6	redacted letter from Lisa Forney to ProTechnics employee with addendum to CO&A	Regulatory Preclusion; Public Safety and Security
100	Email	2/18/2015-2/19/2015	2	Email between David Allard and Randolph Ragland regarding ProTechnics tracer flowback, including specific isotopes and license information	Regulatory Preclusion; Public Safety and Security
101	E-mail with attachment	4/20/2015	1	E-mail from Bridget Craig to Jennifer Noll re: Active RAM licenses with ICS codes 2900 & 2910 with spreadsheet attached containing companies, license numbers, and addresses.	Regulatory Preclusion; Public Safety and Security
102	Email with attachment	4/13/15-4/14/15	19	Email chain between Joseph Melnic, Francis Costello regarding nonmedical reports, including ProTechnics, which includes license information, locations, and isotope types and amounts.	Regulatory Preclusion; Public Safety and Security
103	E-mail with attachments	4/13/2015-4/17/2015	19	E-mail chain between Francis Costello, Joseph Melnic, and Jennifer Noll re: NMED Events with spreadsheet attached listing license nos., location, type and amount of radioactive materials.	Regulatory Preclusion; Public Safety and Security.
104	memorandum on application	undated	37	internal memorandum on application deficiencies	Internal, Predecisional Deliberations and Regulatory Preclusion; Public Safety and Security

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Number of pages	Document Date	Document Type	Description	Exception Categories
8	07/12/2010	Meeting Notes and Agenda	Internal Meeting notes from 07/12/2010 Settlement Conference, 07/12/2010 Settlement Conference Agenda (Distributed to ProTechnics at the meeting) to discuss 06/15/2010 NOV about loss of control of radioactive material from a flowback incident.	IP, NCI, S&S, RPA
1	07/12/2010	Meeting Log Sheet	Meeting log sheet . Contains personal identifying information of DEP employees. It contains the names and information of ProTechnics employees.	PII, S&S, RPA
1	09/23/2010	Meeting Log Sheet	Meeting log sheet. Contains personal identifying information of DEP employees and ProTechnics employees.	PII, S&S, RPA
1	09/23/2010	Agenda/Meeting Minutes	Agenda from the 09/23/2010 Meeting to further discuss the 06/15/2010 NOV and to discuss the pending/draft COA. This document contains the License number and references license conditions., as well as identifies the well where the flowback occurred and control of radioactive material was lost. Discussion of civil penalty matrix and civil penalty offer.	NCI, S&S, RPA
2	07/09/2010	Efacts Report	EFACTS Compliance History Report. Notes license number. Printed out in preparation for the Settlement Conference on 07/12/2010.	S&S, NCI, RPA
2	UNK	Handwritten Notes	Handwritten notes. Documents internal discussions within DEP and what additional information needed to be obtained from ProTechnics. Identified contacts within ProTechnics, the hauling company, well owner/operator. Internal discussions on how to proceed in investigating cross-program issues.	IP, S&S, NCI, PN, RPA
2	UNK (Late 2009?)	Handwritten Notes	Handwritten notes. Documents discussions on Pyrotechnics operations. Identified contacts within ProTechnics, the hauling company, well owner/operator, activity.	IP, S&S, NCI, PN, RPA
9	09/23/2010	Penalty Matrix and Notes	Penalty Matrix & Internal Notes from 09/23/2010 Meeting to discuss 06/15/2010 NOV and to discuss the pending/draft COA. License Number, references to ProTechnics Operations, Well Owner/Operator, specifics of license authorization, discussion of flowback/loss on control. Internal justification of penalty per civil penalty matrix and guidance considerations. Discusses findings of investigation.	S&S, IP, NCI, RPA
8	08/23/2010	Legislator Information	Printout of Legislators Covering the Area. Preparation for internal discussion on next steps.	NCI, RPA
2	12/18/2013	Meeting Log Sheet	Meeting Log - DEP contact information, ProTechnics upper management names and contact information, meeting related to investigation of flowback/ loss of control incident.	PII, S&S, NCI, RPA
16	12/18/2013	Agenda/Meeting Minutes	Agenda from meeting with ProTechnics and meeting minutes regarding flowback/ loss of control incident. Some personal handwritten notes on the meeting minutes; well information, Information concerning flowback/loss of control incident gathered during DEP investigation.	PN, S&S, NCI, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
3	12/30/2009	Meeting Outline and log	Meeting discussion points regarding flowback / loss of control incident, overview of gas well tracing material, timeline at well site, review of other state licenses, history of ProTechnics activity in Pennsylvania; discussion of possible revisions to Pennsylvania license; Internal DEP notes discussing ProTechnics history and possible action items; Discussion points concern flowback/ loss of control incident, ProTechnics' operating procedure ProTechnics disposal activity of radioactive material, ProTechnics plans for radionuclide tracing work in Pennsylvania; well site operator information, isotope information	IP, NCI, S&S, PII, RPA
1	07/12/2010	Meeting Agenda	Meeting Agenda for enforcement conference to discuss license history, NOV, and Cameron County Incident. DEP staff handwritten notes on copy of agenda about meeting discussion on timeline of events and isotopes used; The conference and what was discussed is directly related to the NOVs regarding the flow back Incident, Contact information for DEP and ProTechnics	NCI, PN, RPA
1	05/19/2015	Meeting Log Sheet	Meeting log sheet with DEP and ProTechnics direct contact information. Log was for phone conference regarding COA and Operations. License number also on document.	S&S, NCI, PII, RPA
4	2008 - 2010	License	Copies of the expired license. Contains License number, references a license in another state, identifies contact information for ProTechnics and its employee.	S&S, RPA
17	2010	Efact	Numerous EFACTS Screen Printouts - Contains License information, activities, isotopes, license authorizations, ProTechnics contact information, identifies Pyrotechnics personnel, includes payment record. Printed in preparation for settlement conference.	S&S, NCI, RPA
328	02/26/2010	License	New License. This license contains the license number, conditions, isotopes, quantities authorized, as well as the authorized use of the radioactive materials. It also contains operating and emergency procedures from ProTechnics. It discloses contact information for ProTechnics, as well as its employees. Training records and resumes are also provided. Discusses a product that is patented by ProTechnics. Information tied to the license is specific to the patented material.	S&S, CPI, RPA
8	12/01/2010	License	License Amendment 1 (Same justification)	S&S, RPA
7	12/02/2010	License	License Amendment 2 (Same justification)	S&S, RPA
8	01/25/2011	License	License Amendment 3 (Same justification)	S&S, RPA
4	03/08/2011	License	License Amendment 4 (same Justification)	S&S, RPA
7	39923	License	Reciprocity License for ProTechnics. Document contains copy of out of state license and references license number. Contains License information, activities, isotopes, license authorizations, ProTechnics contact information, identifies Pyrotechnics personnel.	S&S, RPA
2	06/25/2010	Email	Email chain between the DEP and Pyrotechnics, which discusses proper contact information for ProTechnics. Contact information for ProTechnics; Contains DEP contact information.	S&S, PII, RPA
1	11/01/2010	Letter	License Amendment Request (Corrective Action under COA) Contains license number, references license conditions, contains ProTechnics contact information, as well as identifies ProTechnics personnel.	S&S, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
2	11/01/2010	Email Chain	Email chain discussing terms of the COA between DEP representatives and Pyrotechnics. Discusses the terms of the Draft COA and the language contained within. Provides DEP contact information. Contains the names of ProTechnics upper management and personnel.	NCI, PII, S&S, RPA
1	04/17/2013	Letter	Letter between ProTechnics employees submitted to DEP concerning analysis of samples. Contains information regarding isotopes, well sites, and license information, the names of ProTechnics upper management and contact information; flowback material sample information related to terms of COA	S&S, NCI, RPA
1	09/26/2013	Letter	Letter from ProTechnics to DEP regarding status of activity in Pennsylvania using radioactive tracers and status of samples analyzed. Names and contact information for ProTechnics upper management, well and owner/operator location; flowback material sample information related to terms of COA	S&S, NCI, RPA
1	10/22/2013	Email	Email from Well Owner/Operator to DEP regarding allegations of failure to notify DEP of well returns. Contains information regarding location of well site, contains contact information of operator; Email is in response to DEP's request for information for its investigation regarding allegations of failure to notify.	S&S, NCI, RPA
1	10/08/2013	Email	Email from Well Owner/Operator to DEP regarding contact information for Owner/Operator. Contact information for owner operator; Information requested by DEP as part of its investigation into allegations of failure to notify	S&S, NCI, RPA
15	11/21/2013	Pyrotechnics Business Pamphlet	Contains description of the company; its services and its history; S&S - Contains information of ProTechnics upper management; contact information for company locations; NCI: Information was provided to DEP during its investigation for the flow back material/ loss of control related to the COA	S&S, NCI, RPA
3	05/13/2011	Email Chain	Email chain between the DEP and well operator regarding disposal of waste from a well site and a DEP inspection; Contains well owner/operator information; Contains DEP contact information; Information gathered as follow up from inspection regarding radioactive material	S&S, PII, NCI, RPA
2	05/11/2011	Email Chain	Email Chain between DEP staff regarding the transport of containers of residual waste from a well site; Contains DEP contact information; Information related to NOV regarding flow back; DEP discussing status of removal of waste and possible follow up inspections	PII, NCI, IP
1	05/12/2015	Email Chain	Email between DEP and Pyrotechnics discussing conference call for annual meeting required under COA for company's general operations. S&S: name and contact information for ProTechnics upper management; NCI: Information gathered related to COA and continuing investigation on company's activities	S&S, NCI, RPA
2	12/29/2009	Email Chain	Email chain between DEP employees discussing what type of license it should require ProTechnics to have in Pennsylvania	IP

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Number of pages	Document Date	Document Type	Description	Exception Categories
1	08/19/2003	Letter	Letter from EPA to ProTechnics regarding discharge of radioactive materials that contain isotope information; isotope information, name and contact information for ProTechnics upper management. Provided to DEP during its investigation into the company's operations.	S&S, NCI, RPA
13	05/15/2014	Email and Attachment	Email from ProTechnics to DEP with attachments showing that their shipper provided for the flowback sand on two well locations. Well location; shipper information is also included. Information sent to DEP for their continued investigation into ProTechnics' activities.	S&S, NCI, RPA
2	12/16/2013	Email	Email from ProTechnics to DEP regarding flowback/ loss of control incident and scheduling meeting. DEP contact information included. Information relates to DEP's investigation into incident	NCI, PII, RPA
22	Nov 2013 - Dec 2013	Emails/ Letters	Emails and Letters between DEP and ProTechnics regarding COA and NOV for violations of 2013 regarding failure to notify DEP about the flowback/loss of control incident. DEP contact information and Contact information for ProTechnics upper management is included. Also well location information is included. ProTechnics provided DEP information for DEP's investigation into the flowback/ loss of control incident.	PII, S&S, NCI, RPA
2	09/19/2010	Email	Email between DEP attorney and DEP staff regarding draft of Well Site Agreement; Email contains information from attorney to clients concerning draft well site agreement. DEP direct contact information also included.	PII, ACP/AWP
7	10/24/2010	Email Chain	Email chain between DEP and ProTechnics discussing COA and arranging meeting for discussing the COA for flowback/ loss of control. Contains DEP contact information. Contains contact information of ProTechnics upper management. Contains information regarding DEP's investigation into the flowback incident	PII, NCI, S&S, RPA
2	06/10/2010	Email Chain	Email chain between DEP staff regarding flowback/ loss of control incident and what next steps DEP should take. DEP direct contact information is included. Isotope information is included. DEP staff discussing initial incident and what next steps to take regarding enforcement and further inspection.	PII, IP, S&S, RPA
17	05/21/2010	Report	McKean County Landfill report on flowback May 2010 incident with ProTechnics. Report was submitted to DEP as part of its investigation into the incident. Email contains owner/operator well information	NCI and S&S, RPA
1	01/04/2010	Email	Email between DEP and ProTechnics regarding approval for decay in storage. ProTechnics upper management contact information included. Personal notes regarding type of approval needed on email printout; Information gathered during DEP's investigation into company operations.	PN, S&S, NCI, RPA
1	01/04/2010	Email	DEP internal staff email on weekly update of ProTechnics reciprocity licensee status and flowback investigation. Internal discussion on status of discussion with ProTechnics on reciprocity license and next steps DEP must take in resolving flowback incident. Information regarding Well Operator and isotope is included.	S&S, IP, NCI, RPA
1	06/21/2010	Email	DEP internal staff email regarding pre meeting before meeting with ProTechnics to discuss NOV. Discussion between staff on next steps and who should attend meeting	IP

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Number of pages	Document Date	Document Type	Description	Exception Categories
2	02/09/2010	Letter	Letter from ProTechnics to DEP regarding response to DEP letter regarding possible modifications to license and control over the well site. Contact number for ProTechnics is included.	S&S, RPA
2	06/21/2010	Letter	Letter from DEP to ProTechnics regarding meeting to discuss NOV regarding flowback incident. License number and ProTechnics upper management contact information is provided. It is part of DEP's investigation into the flowback incident.	S&S, NCI, RPA
1	06/15/2010	Email	Email from DEP to ProTechnics alerting company NOV was mailed; DEP direct contact information and ProTechnics upper management contact information is included.	S&S, PII, RPA
4	07/15/2010	Letter and Attachment	Letter from DEP to ProTechnics following up on meeting regarding NOV on flowback /loss of control incident, detailing corrective actions ProTechnics must take, documents provided by pyrotechnics and documents DEP still needs; also copy of email sending out letter;DEP direct contact information is included. Information on the well site and isotope is included. Information on next steps in investigation is included.	NCI, S&S, PII, RPA
3	08/12/2010	Nuclear Materials Event Database Report	Internal email with DEP direct contact information, Report attached that was given to NRC that documents the type radioactive material, the activity of it, volume of it and concentration, provides location information for where the material was taken, report also lists license number	NCI, S&S, PII, RPA
11	08/09/2010 - 08/16/2010	Email Chains	Internal email chains between DEP staff. DEP direct contact information on email. Attachments to emails include well site surveys that list activity, identify well location, drawings of site and description of where material is	NCI, S&S, PII, RPA
1	10/07/2010	Email	Email between DEP and ProTechnics stating revised COA is sent. Email has direct contact information for DEP and ProTechnics	S&S, PII, RPA
1	09/24/2013	Email	Email between DEP and ProTechnics. DEP asked ProTechnics for information on the well sites, reversals and surveys. DEP and ProTechnics direct contact information.	S&S, PII, NCI, RPA
3	12/06/2013	Letter	Letter from ProTechnics responding to 11/26/2013 NOV regarding flowback /loss of control and failure to notify prior to tracing incident. ProTechnics direct contact information included, identifies wells that were traced and describes ProTechnics operations	S&S, PII, NCI, RPA
1	09/24/2013	email	Email between DEP and ProTechnics. DEP asked ProTechnics for information on the well sites, reversals and surveys. DEP and ProTechnics direct contact information.	S&S, PII, NCI, RPA
1	10/10/2013	email	Email DEP staff forwarding email from ProTechnics regarding flow back incident. Email identifies wells, identifier information from ProTechnics, ProTechnics direct contact information	S&S, NCI, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
9	01/09/2014	Email	Email from ProTechnics to DEP. ProTechnics providing response to NOV and notifying that they will pay stipulated civil penalty. Contains direct contact information for ProTechnics and DEP. Attached to email is Jan 3, 2014 letter that ProTechnics was putting in the mail. The attached letter let DEP know there was a change in radiation safety officer. Has ProTechnics account number on copy of check that was attached to email	S&S, NCI, PII, RPA
3	01/09/2014	Email	Email from ProTechnics asking DEP to verify where to send letter to. Email has direct contact information for DEP and ProTechnics.	S&S, NCI, PII, RPA
2	01/15/2014	Email	Email with letter attached from DEP to ProTechnics stating DEP received penalty payment and discussing changes to well site agreement. Identifier information for ProTechnics and license number, DEP direct contact information is also on document	S&S, NCI, PII, RPA
1	01/09/2014	Email	Email with tracking information for letter ProTechnics sent. Has ProTechnics direct information	S&S, RPA
9	01/09/2014	Email Chain	Email chain between ProTechnics to DEP concerning draft acknowledgment form/ well site agreement and copy of Jan 3, 2014 letter regarding change in radiation safety officer. Has ProTechnics account numbers on copy of check. Contains direct contact information for ProTechnics and DEP.	S&S, NCI, PII, RPA
2	12/09/2013	Email Chain	Initial email from ProTechnics providing response to NOV flowback /loss of control. Rest of email chain between DEP staff only discussing ProTechnics responses regarding the incident. Direct contact information for ProTechnics and DEP.	S&S, NCI, PII, IP, RPA
6	02/04/2014	Email	Email from ProTechnics to DEP with attachments. It has ProTechnics direct contact information. Provides names of wells, radioactive activity at the well, isotopes used at the well, references other state license for radioactive material, provides radioactive sample results	S&S, NCI, RPA
2	02/06/2014	Email	Email from ProTechnics to DEP with attachment. Courtesy copy of latest license amendment request. Copy of letter dated 02/06/2014 that contains license number, contact information for ProTechnics and discusses change in radiation safety officer.	S&S, NCI, RPA
4	05/15/2014	Email	Email with attachment from ProTechnics to DEP. License amendment request amending language in license to include instruction of handling well returns containing ProTechnics tracer technology acknowledgment from. Pyrotechnics contact information included.	S&S, NCI, RPA
6	07/23/2010	Letter	Letter from DEP to ProTechnics with enclosure of ProTechnics 07/13/2010 letter. DEP Letter acknowledges DEP received ProTechnics letter and revised draft of well tracer agreement. Letter notes deficiencies, contains ProTechnics license number and contains specific license conditions, discusses ProTechnics operations and handling of material, references specific ProTechnics employees. The 07/13/2010 ProTechnics documents identifies radioactive material used and discusses company's operations.	S&S, NCI, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
5	07/08/2010	Letter	Letter from ProTechnics to DEP. Follow up to incident of 06/1/2010. Identifies isotopes and activity and volume. Identifies well owner operator, name of well included, contains ProTechnics' guidance for handling of tracers	S&S, NCI, RPA
4	08/02/2010	Email	Internal Email chain between DEP staff discussing well site agreement and what should be tied into company's license, contains ProTechnics' license number, Contains DEP direct contact information. DEP attorney included in chain providing advice to DEP staff.	S&S, NCI, ACP/ACW, IP, RPA
4	01/15/2014	Letter	Letter from DEP to ProTechnics stating DEP received penalty payment and discussing changes to well site agreement. Identifier information for ProTechnics and license number, DEP direct contact information is also on document. Also contains tracking information.	S&S, NCI, PII, RPA
7	04/23/2014	Letter	Letter from DEP to ProTechnics regarding addendum to COA for flow back issues and revised well owner/operator agreement, has ProTechnics license number and discusses tracer technology, has both DEP and ProTechnics direct contact information.	S&S, NCI, PII, RPA
2	02/08/2010	Letter	Letter from well owner/operator to DEP documenting cleanup following flowback /loss of material incident. It has well owner/operator information, well pad location, survey results.	S&S, NCI, RPA
3	01/26/2010	Email Chain	Internal email chain in DEP forwarding email from ProTechnics. Well is identified and contact information from ProTechnics provided. Attached to email is incident report from ProTechnics regarding flowback incident.	S&S, RPA
1	01/07/2010	Email Chain	Internal email chain between DEP staff discussing root cause of flowback incident and isotope information, discussion deciding next steps and reviewing regulations that were potentially violated, DEP direct contact information included.	IP, NCI, S&S, RPA
2	05/11/2011	email chain	Internal email chain between DEP staff. Transporter of radioactive material information is included. Email chain documents movement of material back to well pad. Provides isotope and well owner/operator name and general location of well. It identified residual waste processor. DEP direct contact information is provided.	IP, NCI, S&S, PII, RPA
1	04/01/2008	Letter	Copy of letter sent to ProTechnics regarding issuance of reciprocity license; references PA and out of state license number, contact information for DEP and ProTechnics is included	NCI, S&S, PII, RPA
4	01/12/2010	Email Chains	DEP internal email chain discussing flowback incident and cross program violations and enforcement strategy, it notes ProTechnics license conditions, it discusses well owner/operator, hauler and waste processor information. DEP attorney included in email chain.	IP, NCI, S&S, ACW/ACC, RPA
2	01/08/2010	Email	DEP internal email from DEP technical staff to their attorneys and senior management discussing root cause of flowback incident, isotope involved, processing of waste and reporting requirements. Includes DEP direct contact information	IP, NCI, S&S, ACW/ACC, PII, RPA
2	12/22/2009	Email Chain	DEP internal email chain discussing flowback / loss of control incident. It references isotope and activity, references other third-parties involved such as landfills and waste generator.	S&S, IP, NCI, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
5	12/23/2009	Email Chain	Email between DEP and third party consultant confirming that radioactive material came from ProTechnics and summarizing flowback/ loss of control incident. Information in email identifies patent information in well tracer, isotopes used, references NRC and other state license numbers, identifies well owner/operator. Contains DEP direct contact information.	S&S, NCI, PII, RPA
20	12/22/2009	Email Chain	Email between DEP and third party consultant discussing radio active tracers with attachment about research from 1996 for radioactive tracers and review of principle design and application. Also attached is copy of a license for a company with the NRC. Information was gathered as a result of flowback incident to gain more information about the tracer technology and how it is licensed. DEP direct contact information is included.	NCI, S&S, PII, RPA
7	11/12/2009	Letter	Letter from DEP to ProTechnics about an inspection identifying well site, contains license number. It also has ProTechnics contact information. Inspection report is attached to letter.	S&S, NCI, RPA
5	11/12/2009	Letter	Letter from DEP to ProTechnics with enclosure of inspection report. It has ProTechnics license number, references out of state license, activity, patent tracer information, isotopes. It also has ProTechnics contact information.	S&S, NCI, RPA
11	01/21/2010	Email Chain	Internal DEP email chain discussing waste management program's investigation into the well owner/operator where the flowback/ loss of control took place. It discusses compliance and enforcement strategy. It notes the location of the well, hauler, isotope, and well owner/operator. It documents actions following the incident. Attached to the email are waste inspector report and NOV dated 6/14/2010. It has DEP direct contact information.	NCI, S&S, PII, IP, RPA
1	09/22/2010	Email	Internal DEP email between regions discussing which region should do inspection of ProTechnics. It also has well location information, discussion of ProTechnics work in PA, and license number. DEP direct contact information included.	IP, S&S, PII, RPA
3	08/12/2010	Email	Internal DEP email to DEP attorney requesting legal advice about what should be contained in the COA regarding the flowback/ loss of control incident.	IP, ACC, NCI, RPA
4	08/25/2010	Email with Attachments	Internal DEP email regarding he disposal at the well site. It provides pictures of disposal at well site, identifies well site, and provides ProTechnics contact information.	IP, NCI, S&S, RPA
3	7/12/10 - 8/2/10	Email Chain	Internal DEP email with DEP counsel discussing well site agreement and ProTechnics' 30 day report, DEP direct contact information is included. Document discusses well owner/operator name.	ACC/ACW, IP, NCI, S&S, PII, RPA
2	08/09/2010	Email Chain	Internal email chain between DEP staff discussing the investigation into the flowback incident that identifies well site and discusses surveys that detect radiation level. DEP contact information is included.	PII, NCI, S&S, RPA
2	08/25/2010	Email Chain	Internal email chain directed to DEP counsel discussing revised owner/operator agreement. DEP signature block is included. It includes names of owner/operators.	S&S, NCI, ACC/ACW, IP, PII, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
1	08/26/2010	Email Chain	Email from DEP counsel to DEP staff regarding owner/operator agreement. DEP direct contact information included.	ACC/ACW, IP, NCI, PII
1	08/27/2010	Email	Email from DEP staff to DEP counsel regarding owner/operator agreement. DEP direct contact information included.	ACC/ACW, IP, NCI, PII
1	21/24/2009	Email Chain	First email is Internal email discussing next steps DEP must take for flow back/ loss of control incident. Email chain forwards email from ProTechnics which documents flowback / loss of control incident. Email provides activity and isotope information, identifies location of gas well.	IP, NCI, S&S, RPA
1	12/22/2009 - 12/24/2009	Email Chain	Photocopy of portions of email chain between DEP and ProTechnics regarding MSDS for the patented tracer. Information about the well owner operator and the isotopes used are also provided.	NCI, S&S, CPI, RPA
3	01/04/2010 - 01/05/2010	Email Chain	Email chain between DEP and ProTechnics follow up discussion on flowback / loss of control incident. Identifies isotopes and well owner/operators. It has DEP direct contact information and discusses tracer technology.	CPI, NCI, S&S, PII, RPA
2	02/02/2010	Email Chain	Email chain from ProTechnics to DEP committing to follow up with waste processor and well owner/operator regarding the flowback/ loss of control incident. The email chain contains information about the isotopes and ProTechnics contact information. It also has DEP contact information.	PII, S&S, NCI, RPA
4	01/29/2010	Email Chain	Email from DEP to ProTechnics discussing tracer operations, follow-up actions from flowback/ loss of control incident. Identifies isotopes and well owner/operator and waste processor. It contains direct contact information for ProTechnics and DEP.	PII, S&S, NCI, RPA
13	12/23/2009	Email Chain	Email chain between DEP and third party consultant concerning recap of events of flowback / loss of control event and providing guidance on NRC and other state licenses for using a radioactive tracer. It notes the isotope ProTechnics uses. It identifies the waste processor facility, well owner/operator. It provides radiation levels. It contains DEP direct contact information. It includes attachment of NRC technical assistance guidance document from 1995.	PII, S&S, NCI, RPA
2	01/08/2010	Email Chain	Internal email chain between DEP staff discussing flowback /loss of control event, regulations and possible violations for ProTechnics, the transporter and the waste processor.	S&S, NCI, IP, RPA
1	12/23/2009	Email Chain	Email chain between DEP staff and third party consultant discussing disposal options and guidance from NRC and another state where ProTechnics is licensed. Document mentions isotope ProTechnics uses. DEP direct contact information is provided.	S&S, PII, NCI, RPA
1	12/31/2009	Email Chain	Internal DEP email chain regarding lab test results of a tracer sample. It identifies isotope and the activity.	S&S, NCI, RPA
2	12/31/2009	Email Chain	Internal DEP email discussing what happened during meeting with ProTechnics, discussing options of handling flowback, and discussing license approaches from other states. DEP direct contact information is included	PII, S&S, IP, NCI, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
2	01/04/2010	Email Chain	Internal DEP email with general discussion of flowback /loss of control incident and proper handling of material. It recaps meeting with ProTechnics. It discusses isotopes used by ProTechnics. It notes ProTechnics PA and other state license numbers, it identifies waste processor and transporter. It has DEP direct contact information.	PII, S&S, NCI, IP, RPA
2	01/08/2010	Email Chain	Internal DEP email discussing Texas A&M wash test, procedures associated with the test and references ProTechnics patented tracer material. It has DEP direct contact information.	CPI, NCI, S&S, PII, IP, RPA
4	01/16/2010	Email Chain	Internal DEP email chain forwarding initial email from ProTechnics regarding ProTechnics presentation on its patented tracer technology. The Internal DEP email chain discusses leach tests and disposal options for flowback. Document has DEP direct contact information.	CPI, NCI, S&S, PII, IP, RPA
1	01/28/2010	Email Chain	Internal DEP email chain distributing ProTechnics and well owner/operator NOVs. DEP direct contact information. Discussion on DEP next steps.	PII, NCI, IP, RPA
4	03/16/2010	Email Chain	Internal DEP email chain regarding a lab test result on the tracer that was sampled.	IP, NCI, RPA
2	01/28/2010	Email Chain	Email chain from ProTechnics to DEP discussing waste sample from flowback incident and discusses activities. It has contact information for ProTechnics.	NCI, S&S, RPA
2	01/28/2010	Email Chain	Email from ProTechnics to DEP discussing disposal options with 1 page attachment. Direct contact information for ProTechnics included.	NCI, S&S, RPA
1	01/26/2010	Email Chain	Email from DEP to ProTechnics discussing disposal options. Contains contact information for ProTechnics.	NCI , S&S, RPA
4	01/21/2010	Email Chain	Email chain from ProTechnics to DEP with attachments discussing sample results and exposure calculation. Attachment is drawing of well site that was surveyed with radiation readings. The second attachment provides radiation levels and identifies the isotope. The third attachment is an exposure decay chart. ProTechnics direct contact information is provided.	S&S, NCI, RPA
1	01/20/2010	Email Chain	Email from ProTechnics to DEP. ProTechnics request for extension on 30 day report requirement. It has the name of the transporter, provides location of the well.	S&S, NCI, RPA
10	01/28/2010	Email Chain	Email from ProTechnics to DEP providing sample analysis results for frack waste identifying the isotope and information on activity. The attachments are the analysis printouts. ProTechnics contact information is provided.	S&S, NCI, RPA
1	12/23/2009	Email	Internal Email with DEP staff and includes one attachment which is a print out of PEAKEASY. Discusses well tracer waste at waste processor facility, identifies isotope and provides a spectrum.	IP, S&S, NCI, RPA
3	11/19/2015	Email	Internal Email between DEP staff discussing ProTechnics regulatory requirements and enforcement. It has direct DEP contact information.	NCI, IP, PII, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
18	01/05/2010	Email	Internal DEP email forwarding 1/4/2010 ProTechnics email and attachment. The ProTechnics email that was forwarded has two attachments and the company's contact information. One is a presentation with information regarding the tracer technology that is patented and how it is used. The other attachment is a 1991 Texas A&M University letter discussing testing and development. The Internal DEP email forwarding this information has DEP direct contact information and discusses disposal and flowback issues.	PII, S&S, CPI, NCI, IP, RPA
4	03/23/2010	Email	Internal email between DEP staff with photos attached documenting an inspection of a well site following a flowback/ loss of control event. It identifies the well owner/operator and also the transporter. It identifies the isotope and provides radiation readings. It contains ProTechnics direct contact information and information about the well site location. It has DEP direct contact information.	NCI, S&S, PII, RPA
3	01/26/2010	Email	Email sent from ProTechnics to DEP with an attachment of an incident report for the well pad. The attachment provides well location, documents waste processor and transporter, it provides radiation readings. It also discusses ProTechnics operations and follow up. It has ProTechnics direct contact information.	NCI, S&S, RPA
12	12/29/2009	Email Chain	Email chain with attachment between DEP and ProTechnics. The chain forwards an email from ProTechnics that has documents they sent to DEP in advance of a meeting with DEP. ProTechnics' email discuses the patented tracer technology, flowback procedure, surveying and sampling. The attachment includes a copy of their out of state license. The emails contain direct contact information for ProTechnics and DEP.	NCI, S&S, PII, RPA
24	12/30/2009	Email Chain	Internal Email between DEP staff giving everyone a copy of the Kansas well logging guidance document. DEP direct contact information is included.	NCI, PII, RPA
6	01/24/2010	Email Chain	Internal email between DEP staff discussing ProTechnics tracer technology and applicable regulations. It references ProTechnics' out of state license, it references waste processor, isotope, well owner/operator and material. It has DEP direct contact information	NCI, PII, S&S , IP, RPA
86	12/28/2009	Email Chain	Email chain between DEP staff and ProTechnics. ProTechnics provided patents of their tracer technology and associated literature. Direct contact information for both DEP and ProTechnics is included.	NCI, PII, S&S, RPA
8	12/24/2009	Email Chain	Email chain between DEP staff and New Jersey Department of Environmental Protection. It includes and attachment pictures of the hauler. The email discusses patented tracer technology, identifies isotope, identifies well owner/operator, and discusses activity at the site. DEP direct contact information is included.	NCI, S&S, PII, RPA
2	01/13/2010	Email	Email from DEP staff to the DEP Secretary providing a briefing of the flowback/ loss of control incident. It identifies the well owner/operator, location of the well, the hauler, waste processor, and isotope. It discusses violations and references out of state license. DEP direct contact information is included.	IP, NCI, S&S, PII, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
2	01/27/2010	Email	Internal email between DEP staff discussing strategy and plans for enforcement regarding the flowback/ loss of control incident. It contains information about the isotopes. DEP direct contact information is included.	IP, NCI, S&S, PII, RPA
6	01/22/2010	Email	Email from ProTechnics to DEP with attachments providing a list of wells and dates of work. It identifies all well locations and well owner/operators. It provides ProTechnics direct contact information.	S&S, NCI, RPA
2	01/05/2010	Email	Email is between New Jersey Department of Environmental Protection and DEP. It discusses activity, the isotope, and volume of material injected. It also provides information about the waste hauler.	S&S, NCI, RPA
3	09/01/2010	Email Chain	Internal Email between DEP staff discussing the major advisory action for enforcement for the flowback / loss of control incident. DEP direct contact information is included. It discusses well owner/operator, identifies well site, and discusses ProTechnics license.	IP, PII, NCI, S&S, RPA
13	01/19/2010	Email	Internal email between DEP staff with attachments of draft NOVs for ProTechnics, the well owner operator, the hauler and processor. The NOVs describe the flowback/ loss of control incident, identify the site of the well, identify the radio active material used and reference the technology. DEP direct contact information is included.	IP, PII, NCI, S&S, RPA
9	02/19/2015	Email Chain	Email from DEP to NRC and provides copy of ProTechnics' patent dated 5/20/1997. The email discusses ProTechnics operation. DEP direct contact information is included. The patent is for their tracer technology. It discusses the radioactive component and how it is prepared and used.	PII, NCI, S&S, RPA
59	2009 - 2013	Agreement	Well Tracer Notifications, Signed Well Site Agreements & Job Site Survey Forms. Contains locations of wells, name of well owner/operator, Pyrotechnics contacts/personnel, activity, isotope, map of well site, documentation of training for Pyrotechnics Authorized users., latitude/longitude of well, directions to well site. Documents were requested and submitted as part of our investigation. Reference to patented tracer material.	S&S, NCI, CPI, RPA
1	UNK	Picture	Photograph of well site- Name of well site and owner/operator - map of site; location of well site and owner/operator names. Part of investigation by DEP into ProTechnics	S&S, NCI, RPA
9	12/28/2009 - 1/15/10	Company Promotional Information	ProTechnics company information regarding their isotope tracer technology , patent Information. The information provided to DEP for its investigation into the company's business operations	CPI, NCI, RPA
3	10/4/2010	Check Invoice and receipt	Check Receipt -check and receipt of check related to COA	NCI, PII, RPA
6	7/26/2006	Material Safety Data Sheet	Material Safety Data Sheet - isotopes and their characteristics; ProTechnics patent material about isotopes it uses. Information gathered during DEP's investigation into company operations	CPI, S&S, NCI, RPA
1	12/22/2009	HOO Report to NRC	Report to NRC discussing incident where alarm went off from a truck hauling frack sand containing radioactive material; status of DEP's investigation into the incident and notification that site is secured; isotope information and ProTechnics license number	S&S, NCI, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
2	Feb-10	Well Site Information	List of Well Sites ProTechnics is at and directions to each site. Directions to the site that use radioactive material; Information gathered by DEP during its investigation into company operations	S&S, NCI, RPA
11	1/26/1993	Patent	A copy of ProTechnics' patent for their tracer technology. It discusses the radioactive component and how it is prepared and used.	CPI, S&S, NCI, RPA
14	2010	Agreement	Draft COA regarding flow back incident/ loss of material ; Handwritten notes on document; It has ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident	IP, PN, S&S, NCI, RPA
3	UNT	Copy of License	Partial copy of radioactive material license with handwritten notes; Notes regarding isotopes half life and decay; Review of license	IP, PN
3	1/13/2014	SAP Checks Transmittal	DEP internal routing numbers and codes for penalty checks	PII
3	11/2/2010	Spreadsheet	Penalty calculation related to NOV for failure to notify DEP; well site information, materials used, estimated penalty calculation. Information in chart from DEP's investigation into ProTechnics	S&S, IP, NCI, RPA
12	2010	Agreement	Draft COA regarding flow back incident/ loss of material; ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident	S&S, IP, NCI, RPA
6	UNT	Agreement	Draft Radioactive tracer well site agreement; DEP staff personal notes editing document; DEP internal review of edits to agreement; ProTechnics license information is included.	PN, IP, S&S, RPA
12	2010	Agreement	Draft COA regarding flow back incident/ loss of material ; It includes ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident	S&S, IP, NCI, RPA
4	9/24/2013	Inspection Report	DEP inspection report from Southeast Regional Office. Uses ProTechnics' license number, identifies isotope activity and information, provides well location information	S&S, NCI, RPA
4	8/25/2010	email	Internal DEP email regarding follow up investigation and included attached pictures of well pad, burial site and picture of sign with Contact information for ProTechnics	S&S, NCI, RPA
8	11/26/2013	NOV and Inspection Report	NOV that was provided with redaction. Attached to NOV is inspection report dated 9/24/2013 regarding flow back/ loss of control and failure to notify DEP prior to tracing a well. Both documents contain license number, isotopes, radioactive material, points of contact for well owner/operator, DEP and ProTechnics contact information	S&S, NCI, PII, RPA
17	12/15/2010	Draft COA and email	Email chain between DEP and ProTechnics regarding draft COA. Draft COA regarding flow back incident/ loss of material; - ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; - Information in draft document regarding DEP's investigation into flowback incident, DEP Contact information included	S&S, NCI, PII, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
15	9/30/2010	Letter	Letter from DEP to ProTechnics regarding draft COA. Draft COA regarding flow back incident/ loss of material; ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident, DEP contact information included	S&S, NCI, PII, RPA
15	9/23/2010	Letter	Letter from ProTechnics to DEP regarding draft COA. Draft COA regarding flow back incident/ loss of material; ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident, DEP contact information included	S&S, NCI, PII, RPA
16	9/30/2010	email	Courtesy email from DEP to ProTechnics regarding draft COA letter with attachment. Draft COA regarding flow back incident/ loss of material; ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident, DEP contact information included	S&S, NCI, PII, RPA
15	10/7/2010	Letter	Letter from DEP to ProTechnics regarding draft COA. Draft COA regarding flow back incident/ loss of material; ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident, DEP contact information included	S&S, NCI, PII, RPA
17	10/25/2010	Letter	Letter from DEP to ProTechnics regarding draft COA. Draft COA regarding flow back incident/ loss of material; ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident, DEP contact information included. Also attached email with courtesy copy.	S&S, NCI, PII, RPA
16	11/2/2010	email	Email from DEP to ProTechnics with attachment of executed COA. COA regarding flow back incident/ loss of material; ProTechnics' license information, owner/operator information, well location information, ProTechnics contact information; Information in draft document regarding DEP's investigation into flowback incident, DEP contact information included.	S&S, NCI, PII, RPA
2	1/28/2010	NOV	NOV to well owner/operator summarizing flowback incident / loss of control of material. NOV is for failure to characterize waste and properly disposing it. The document references ProTechnics license number in Pennsylvania and other states. DEP direct contact information included.	S&S, NCI, PII, RPA
1	1/15/2010	effects report	Compliance history of ProTechnics.	NCI, RPA
13	8/26/2008, 10/29/2009	Draft Inspection Report	Draft inspection reports and draft letter from 10/29/2009 inspection. Picture included of ProTechnics' apparatus for tracing the well. ProTechnics license number, isotope and its use, general operations of ProTechnics. References out of state license number. It also has direct contact information for ProTechnics.	S&S, NCI, RPA

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Number of pages	Document Date	Document Type	Description	Exception Categories
2	1/28/2010	NOV	The NOV was issued to ProTechnics for flowback / loss of control event. This document was provided in the 2/29/16 RTKL response with redactions. The following was redacted from the document: isotope that was used, license number, patented tracer technology, well owner/operator, personal contact information for DEP and ProTechnics.	PII, S&S, NCI, CPI, RPA
3	6/15/2010	NOV	The NOV was issued to ProTechnics for flowback/loss of control incident. This document was provided in the 2/29/16 RTKL response with redactions. The following was redacted from the document: a description of the use of the patented radioactive tracer, isotope, well owner/operator, the license number for ProTechnics, the location of the well, Efacts identifier information, license conditions, and ProTechnics contact information.	S&S, NCI, CPI, RPA
3	11/26/2013	NOV	The NOV was issued to ProTechnics for flowback / loss of control event. This document was provided in the 2/29/16 RTKL response with redactions. The following was redacted from the document: contact information for ProTechnics and DEP, Efacts identifiers, license number for ProTechnics, patented tracer technology, isotope, the well, the well owner/operator and well site name.	PII, S&S, NCI, CPI, RPA
15	11/2/2010	COA	The COA was issued to ProTechnics for the two incidents involving flowback/ loss of control events. This document was provided in the 2/29/16 RTKL response with redactions. The following was redacted from the document: contact information for ProTechnics and DEP, license numbers, the out-of- state license of ProTechnics, patented tracer technology, isotopes, the wells, license conditions and contact information the well owner/operator.	PII, S&S, NCI, CPI, RPA
6	5/7/2014	COA Addendum	The COA Addendum was issued to ProTechnics to have it alter its well owner/operator agreement. The agreement includes an acknowledgement between ProTechnics and well owner/operator, confirms that they had a discussion about flowback incidents and were given instructions on what to do in a well reversal event, and provides contact information for ProTechnics. This document was provided in the 2/29/16 RTKL response with redactions. The following was redacted from the document: license number, and contact information for ProTechnics and DEP.	PII, S&S, NCI, RPA

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Abbreviations	Meanings
CPI	Confidential Proprietary Information 65 P.S. § 67.708(b)(11)
IP	Internal Pre decisional Deliberative 65 P.S. § 67.708(b)(10)
NCI	Noncriminal Investigation 65 P.S. § 67.708(b)(17)
PII	Personal Identifier Information 65 P.S. § 67.708(b)(6)
S&S	Safety & Security 65 P.S. § 67.708(b)(3)
PN	Personal Notes 65 P.S. § 67.708(b)(12)
ACW/ACC	Attorney-Client Work Product A public record protected by the attorney-work product privilege as defined in 65 P.S. § 67.102./ Attorney Client Communication A public record protected by the attorney-client privilege as defined in 65 P.S. § 67.102
RPA	Radiation Protection Act, Regulations and Regulatory Preclusions 35 P.S. §7110.102, 35 P.S. § 7110.301, 35 P.S. § 7110.305 25 Pa. Code § 215.12, 25 Pa Code 215.1, 25 Pa. Code § 215.12, 25 Pa Code §215.14

DEP Northcentral Regional Office

NORTHCENTRAL REGIONAL OFFICE EXCEPTIONS/PRIVILEGE LOG

Smith v. Pa. Department of Environmental Protection

AP 2016-0607

Total Pages	Record Date	Type of Document	Author	Recipient	Description	Legal Basis for Exclusion
3	6/10/2010	General Inspection Report for J-W Operating Company	Dustan Karschner/Pa DEP-Waste Management Program	n/a	Type of radioactive material; location of radioactive material including the GPS coordinates; name, address, phone number of responsible official	Public Safety & Security,
2	6/21/2010	Email with copy of June 15, 2010 NOV	Lisa Forney	Thomas Hampton of ProTechnics,	Radioactive Materials License number; Type of radioactive material	Redactions under Public Safety & Security, Internal DEP tracking information
3	12/29/09 - 1/4/10	Email chain	Rusty Diamond, David Allard, Stephen Acker, John Krueger	Joseph Melnic, Jennifer Means, John Chippo, Stephen Acker, Marylou Barton, Scott	Preparations of DEP staff to meet with ProTechnics representatives and post meeting discussion regarding	Internal predecisional record, Public Safety & Security

				Perry John Krueger, Terry Derstine, Francis Costello, Brooke Reynolds, Barbara, Robert Yowell, Bookser, and other DEP Personnel copied	monitoring and disposal of radioactive materials.	
4	12/24/09-12/28/09	Email chain	David Allard, Kelly Burch	Randy Shamblin, (Corelab), Robert Yowell, David Allard, Kelly Burch, Craig Lobins, George Jugovic, Alan Eichler, Michael Sherman, (Other DEP personnel copied)	Meeting preparation regarding investigation into incident in Wyoming County and gas well tracing.	Public Safety & Security, Non-Criminal, Investigation
15	11/2/10	Cover letter and Copy of COA dated 11/2/10	ProTechnics	COA signed by Martin Siegel and John Krueger for DEP and	Redacted Radioactive Tracer Well Site Agreement and sensitive security	Public Safety & Security

				Thomas Hampton and Joe Williams for ProTechnics	related information	
4	6/9/10	Email and attached radioactive materials license	Anita Stainbrook	Patrick Brennan	Rad Protection follow-up regarding incident involving readioactive material at McKean County Landfill	Public Safety & Security,
5	6/10/10 - 6/11/10	Email chain	Joseph Melnic, David Allard, Rusty Diamond, Kelly Burch,	Rusty Diamond, David Allard, Kelly Burch, Nels Taber, Jennifer Means, Joseph Melnic	Discussion for meeting regarding incident involving radioactive material at McKean County Landfill	Internal predecisional record, Public Safety & Security

DEP Southwest Regional Office

DEP EXCEPTIONS LOG

Smith v. Pa. Dep't of Env'tl Prot.

OOR Dkt. # AP 2016-0607

No.	Date	Record Description	Authors	Recipients	RTKL Exception
1	04/04/2007 – 02/01/2010	638 pages that include ProTechnics' application for reciprocity license; ProTechnics' application for specific license; ProTechnics' reciprocity license; ProTechnics' specific license; and ProTechnics' license amendments	ProTechnics (principally Radiation Safety Officers Ricky Kent and Will Williams)	DEP, Bureau of Radiation Protection (principally Radioactive Materials Licensing Chief John Chippo)	PSS and RPRR
2	04/04/2007 – 04/29/2014	562 pages of correspondence between ProTechnics and DEP, Bureau of Radiation Protection, concerning ProTechnics' application for reciprocity license; ProTechnics' application for specific license; ProTechnics' reciprocity license; ProTechnics' specific license; and ProTechnics' license amendments	DEP, Bureau of Radiation Protection (principally Radioactive Materials Section Chief Ron Hamm and Radioactive Materials Licensing Chief John Chippo), and Protechnics (principally Radiation Safety Officers Ricky Kent, Will Williams and Randy Shamblin)	DEP, Bureau of Radiation Protection (principally Radioactive Materials Section Chief Ron Hamm and Radioactive Materials Licensing Chief John Chippo), and Protechnics (principally Radiation Safety Officers Ricky Kent, Will Williams and Randy Shamblin)	PSS and RPRR

List of Abbreviations:

- PSS refers to the Right-to-Know Law Public Safety and Security exceptions at 65 P.S. §§ 67.708(b)(2) and 67.708(b)(3).
- IPD refers to the Right-to-Know Law Internal, Predecisional Deliberation exception at 65 P.S. § 67.708(b)(10).
- RPRR refers to the Regulatory Preclusion to the Release of Records at 25 Pa. Code § 215.14(2), pursuant to Sec. 305(a)(3) of the Right-to-Know Law, 65 P.S. § 67.305(a)(3).
- NCI refers to the Right-to-Know Law Noncriminal Investigation exception found at 65 P.S. § 67.708(b)(17).

No.	Date	Record Description	Authors	Recipients	RTKL Exception
3	12/22/2009 – 01/09/2014	366 pages of emails discussing DEP monitoring of ProTechnics' operations and DEP's review of ProTechnics' license-required reports and submissions to assure ProTechnics' compliance with its reciprocity license, specific license and license amendments	Various DEP staff, including Bureau of Radiation Protection Director Dave Allard and Program Managers James Yusko and Dwight Shearer	Various DEP staff, including Bureau of Radiation Protection Director Dave Allard; Program Managers James Yusko and Dwight Shearer; and Program Supervisor Barbara Bookser	PSS
4	12/22/2009 – 01/09/2014	35 pages of DEP-internal emails discussing DEP plans and strategy for inspection, monitoring and enforcement to assure ProTechnics' compliance with its reciprocity license, specific license and license amendments	Various DEP staff, including Bureau of Radiation Protection Director Dave Allard and Program Managers James Yusko and Dwight Shearer	Various DEP staff, including Bureau of Radiation Protection Director Dave Allard; Program Managers James Yusko and Dwight Shearer; and Program Supervisor Barbara Bookser	PSS and IPD
5	12/22/2009 – 01/09/2014	26 pages of emails discussing various DEP investigative and examination activities to assure ProTechnics' compliance with its reciprocity license, specific license and license amendments	Various DEP staff, including Bureau of Radiation Protection Director Dave Allard and Program Managers James Yusko and Dwight Shearer	Various DEP staff, including Bureau of Radiation Protection Director Dave Allard; Program Managers James Yusko and Dwight Shearer; and Program Supervisor Barbara Bookser)	PSS, RPRR and NCI

List of Abbreviations:

- PSS refers to the Right-to-Know Law Public Safety and Security exceptions at 65 P.S. §§ 67.708(b)(2) and 67.708(b)(3).
- IPD refers to the Right-to-Know Law Internal, Predecisional Deliberation exception at 65 P.S. § 67.708(b)(10).
- RPRR refers to the Regulatory Preclusion to the Release of Records at 25 Pa. Code § 215.14(2), pursuant to Sec. 305(a)(3) of the Right-to-Know Law, 65 P.S. § 67.305(a)(3).
- NCI refers to the Right-to-Know Law Noncriminal Investigation exception found at 65 P.S. § 67.708(b)(17).

No.	Date	Record Description	Authors	Recipients	RTKL Exception
6	01/06/2009 – 06/05/2010	14 pages of reports from DEP inspections conducted to assure ProTechnics' compliance with its reciprocity license, specific license and license amendments	DEP, Bureau of Radiation Protection (principally Inspectors C. Rittinger, James Hughes and Dwight Shearer)	DEP Inspection File	PSS, RPRR and NCI

List of Abbreviations:

- PSS refers to the Right-to-Know Law Public Safety and Security exceptions at 65 P.S. §§ 67.708(b)(2) and 67.708(b)(3).
- IPD refers to the Right-to-Know Law Internal, Predecisional Deliberation exception at 65 P.S. § 67.708(b)(10).
- RPRR refers to the Regulatory Preclusion to the Release of Records at 25 Pa. Code § 215.14(2), pursuant to Sec. 305(a)(3) of the Right-to-Know Law, 65 P.S. § 67.305(a)(3).
- NCI refers to the Right-to-Know Law Noncriminal Investigation exception found at 65 P.S. § 67.708(b)(17).

DEP Northwest Regional Office

NORTHWEST REGIONAL OFFICE EXCEPTIONS/PRIVILEGE LOG

Smith v. Pennsylvania Department of Environmental Protection, OOR Dkt. No. AP 2016-0587 (consolidated with 2016-0602; 2016-0603; 2016-0604; 2016-0605; 2016-0606; 2016-0607)

Total Pages	Date of Doc	Type of Doc	Author	Recipient	Description	Privilege Claimed
14	6/2/2010	General Inspection Report and Attachments/ McKean Cty Landfill	Ruth Taylor/Pa DEP-Waste Management Program	n/a	Type of radioactive material; driver's license number; location of radioactive material; references to amount of radioactive material; company name, address, contact names, phone numbers; DEP employee phone number	Personal Identification Information/Public Safety & Security
3	6/10/2010	General Inspection Report for J-W Operating Company	Dustan Karschner/Pa DEP-Waste Management Program	n/a	Type of radioactive material; location of radioactive material including the GPS coordinates; name, address, phone number of responsible official; well permit number	Public Safety & Security
2	6/11/2010	Weekly Report/North west Regional Office Pa DEP	Todd Carlson/Pa DEP- Waste Management Program	Pa DEP	Radioactive Materials License number; type of radioactive material	Public Safety & Security