2020

Annual Low-Level Radioactive Waste Program Report

to the
Pennsylvania General Assembly and the
Appalachian Compact Commission

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Commonwealth of Pennsylvania
Bureau of Radiation Protection

MESSAGE FROM THE SECRETARY

In 1980, the U.S. Congress enacted the Low-Level Radioactive Waste Policy Act. It made each state responsible for the disposal of such waste generated within its borders and encouraged states to enter into compacts with each other.

The Pennsylvania General Assembly responded to the federal act by enacting the Appalachian States Low-Level Waste Compact Act of 1985 (the Act). The Act permits Pennsylvania to establish a regional disposal site for the Appalachian Compact states of Delaware, Maryland, West Virginia, and Pennsylvania. Pennsylvania was selected as the initial host state because it generates the largest amount of low-level radioactive waste (LLRW) within the Appalachian Compact.

Since the Act was passed, the factors that drove the need for such a facility have changed dramatically. In December 1998, the Pennsylvania Department of Environmental Protection (DEP) announced the suspension of efforts to site a LLRW facility in Pennsylvania. There is currently disposal capacity for LLRW at two out-of-state facilities.

While Pennsylvania suspended the siting process, it maintains the ability to restart it should circumstances again change. The work done under the state's voluntary siting and technical screening process would provide a solid foundation for future work if necessary.

To help assure the public that LLRW is disposed of properly, the Pennsylvania DEP's Bureau of Radiation Protection collects disposal data from the LLRW generators as well as from the U.S. Department of Energy's (DOE) national LLRW database and the Energy*Solutions* disposal facility in Clive, Utah, and the Waste Control Specialists disposal facility in Andrews, Texas.

The data is compiled and reported in the *Annual Low-Level Radioactive Waste Program Report to the Pennsylvania General Assembly and the Appalachian Compact Commission*. This report contains the LLRW generation data for calendar year 2020.

Sincerely,

Patrick McDonnell
Secretary

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SECTION 1

INTRODUCTION

This report is prepared for submission to the Pennsylvania General Assembly and the Appalachian Compact Commission (Commission). Its purpose is to fulfill the statutory requirements contained in Section 901 of the Pennsylvania Low-Level Radioactive Waste (LLRW) Disposal Act (35 P.S. § 7130.901) and Article 2 of the Act (35 P.S. §§ 7125.1).

Similar to the 2019 report, this report contains disposal information for Class A, Class B, and Class C wastes from the Appalachian Compact (Compact). As in past years, the majority of LLRW generated by volume in 2020 is Class A waste. Table C-1 and Chart C-1 illustrate the trend in volume of LLRW disposed by state and year. Most of this Class A LLRW was disposed of at the Waste Control Specialists (WCS) facility in Andrews, Texas. In addition, there is a small amount of Class C LLRW disposed by the Appalachian Compact generators. The 2013 opening of the WCS disposal facility in Andrews, Texas, to LLRW generators outside of the Texas LLRW Disposal Compact (member states are Texas and Vermont) allows for Class B and Class C LLRW disposal from the Appalachian Compact generators.

Section 2 of this report contains activities of the Commission as well as the host state of Pennsylvania.

Section 3 contains a discussion of LLRW quantities generated in Pennsylvania and the Compact, waste minimization, and toxicity of LLRW.

Section 4 contains the financial statistics and expenditures for Pennsylvania (calendar year 2020) and the Commission (fiscal year 2019-2020), and a list of LLRW generators in the Compact for 2020.

Appendix A includes information on volume, curie content, waste class, radionuclides, and waste toxicity of LLRW generated. The information was obtained from the Energy*Solutions* facility in Clive, Utah; the Waste Control Specialist's site in Andrews, Texas; and the Department of Energy's (DOE) national database contained in the Manifest Information Management System (MIMS).

Appendix B contains pertinent LLRW disposal tables and charts for Pennsylvania and the other member states of the Compact - Delaware, Maryland, and West Virginia.

Appendix C provides statistics related to volume and activity trends of LLRW during 2000 through 2020.

Appendix D includes the independent auditor's report of the Commission's financial accounts for fiscal year 2019-20.

SECTION 2

APPALACHIAN STATES COMPACT ACTIVITIES

The Commission was established under a compact entered into by Delaware, Maryland, West Virginia, and Pennsylvania. The U.S. Congress consented to the Compact in May 1988. The primary purpose of the Compact is to provide for the regional management and disposal of LLRW as required by the federal Low-Level Radioactive Waste Policy Act of 1980, as amended. Pennsylvania was designated as the initial host state to provide a site for a regional facility because it generates more LLRW than the other Compact members. Other important duties of the host state are to:

- Ensure, consistent with applicable state and federal law, the protection and preservation of public health, safety, and environmental quality in the siting, design, development, licensing, operation, closure, decommissioning, and long-term care for the institutional control period of the facility within the state.
- Prohibit the use of any shallow land burial and develop alternative means for treatment, storage, and disposal of LLRW.
- Establish requirements in law for financial responsibility. These requirements include purchase and maintenance of adequate insurance by generators, brokers, carriers, and regional facility operators and establish a long-term care fund to pay for preventative or corrective measures at the regional facility.
- Ensure that charges for disposal of LLRW at the regional facility are sufficient to fully fund the safe disposal and perpetual care of the regional facility, and that charges are assessed without discrimination based on the state of origin.
- Ensure and maintain a manifest system that documents all waste-related activities of generators, brokers, and carriers, and establish the chain of custody of waste from its initial generation to the end of its hazardous life.

Summary of the Host State Activities for Calendar Year 2020

The Pennsylvania Department of Environmental Protection (Department) continued to perform the administrative responsibilities and duties of the Appalachian States Low-Level Radioactive Waste Commission (Commission). The Commission's powers and duties are specified in the Appalachian States LLRW Compact Act of 1985 (Act 1985-120).

In March, a representative from the Department's Low-Level Radioactive (LLRW) Program attended the virtual meeting of the Low-Level Waste Forum (LLW Forum) as one of the Forum directors and a member of the Executive Committee. The LLW Forum was established to facilitate state and compact implementation of the Low-Level Radioactive Waste Policy Act and to promote the objectives of LLRW regional compacts.

In October, a representative from the Department's LLRW Program attended the virtual meeting of the LLW Forum.

In October, the Department held the annual meeting of the Low-Level Radioactive Waste Advisory Committee (LLWAC). The primary purpose of the meeting was to discuss regional and national issues involving management and disposal of low-level radioactive waste.

In November, the Department's LLRW Program staff coordinated and attended the 2020 annual meeting of the Appalachian States Low-Level Radioactive Waste Compact Commission.

A representative from the Department continued to serve on the LLW Forum's Disused Sealed Sources Working Group (DSWG). At the request of the National Nuclear Security Administration (NNSA), the LLW Forum formed the DSWG to solicit input from a broad range of stakeholders and to prepare a report. The DSWG is currently working on the implementation of the recommendations contained in the report.

A representative from the Department continued to serve on the LLW Forum's Working Group on 10 CFR Part 61 (Licensing Requirements for Land Disposal of Radioactive Waste) and Greater-Than-Class C (GTCC) waste.

The Department continued to monitor the generation of LLRW in Pennsylvania. The Department has significantly reduced the regulated community's administrative LLRW reporting requirements by now obtaining the appropriate disposal information directly from the national Manifest Information Management System (MIMS) database.

Summary of Commission's Activities for Fiscal Year 2019-20

In July 2019, the Commission's Independent Auditor, Trout CPA, conducted its annual audit of the Commission's financial statements for fiscal year (FY) 2018-19. The audit did not identify any instances of non-compliance that are required to be reported under the Government Auditing Standards.

In October 2019, a representative from the Commission attended the LLW Forum meeting in Chicago, Illinois.

In November 2019, the Commission held its annual meeting in Harrisburg. At this meeting, the Commission elected its chairman and vice-chairman, reviewed the audit report of the Commission's financial statements for FY 2018-19, reviewed and discussed the recent national developments involving LLRW management and disposal, reviewed the LLRW generation report for the Appalachian Compact, and approved a proposed budget for FY 2020-2021.

In April 2020, a representative from the Commission attended the virtual meeting of the LLW Forum. The Commission's representative chairs the Missions and Operations Subcommittee of the LLW Forum.

The Commission continued to monitor the generation of LLRW in the Appalachian Compact. The Commission also continued to monitor and assess the national developments, including the activities of the NRC, for any potential impact on management and disposal of LLRW in the compact.

SECTION 3

WASTE QUANTITIES GENERATED

Radioactive waste is radioactive material judged by the licensee as being no longer useful for its intended purpose. Radioactive waste can also be legacy waste resulting from past contamination of a facility. This legacy waste enters the waste stream after a facility is decontaminated. Radioactive waste can be generally categorized as high-level, low-level, byproduct material, special nuclear material and transuranics, or a combination of these. Radioactive waste can also be mixed with hazardous non-radioactive waste, which is generally referred to as a mixed waste.

LLRW is waste that satisfies the definition in the LLRW Policy Amendments Act (LLRWPAA) of 1985. The LLRWPAA defines LLRW as, "radioactive material that (A) is not high-level radioactive waste, spent nuclear fuel or byproduct material as defined in Section 11e.2 of the Atomic Energy Act of 1954; and (B) which the NRC, consistent with existing law and in accordance with paragraph (A), classifies as low-level radioactive waste."

Any LLRW that requires disposal at a licensed facility is considered generated waste, and the institution or person that produces the waste is considered a generator. Since 1998, commercial LLRW is tabulated by date, in the MIMS system, for the date it was disposed of at the Barnwell or the Energy*Solutions* (formerly called Envirocare) LLRW disposal facilities. The LLRW disposed of at a DOE site is not included in this report.

Generators of LLRW can be categorized according to the type of operation or service they conduct. In the Compact, waste generator types are categorized as nuclear power plant (utility), medical, academic, government, or industrial.

Utilities include all the nuclear reactors that are used for generation of electricity in the Compact. Medical facilities include hospitals, clinics, and medical colleges where radioactive materials are used for medical applications. Academic facilities include universities and other institutions of higher learning that generate LLRW. Government facilities include federal, state, county and municipal operated institutions that generate LLRW. Industrial facilities may generate LLRW as part of the manufacturing process, research, waste-volume reduction, sample analysis, and facility or equipment decontamination.

Pennsylvania and Appalachian Compact LLRW Quantities

As of July 1, 2008, the Barnwell LLRW disposal site in South Carolina stopped accepting LLRW from outside of the Atlantic Compact (Connecticut, New Jersey, and South Carolina). Therefore, the LLRW generators within the Compact no longer had a disposal option for Class B and C wastes and certain types of Class A waste. Both Pennsylvania and the Commission were monitoring and tracking the generation of these types of wastes, which were stored by the LLRW generators in the Compact. As of 2013, WCS disposal facility in Andrews, Texas, has been accepting Class B and Class C LLRW from several utilities in the Compact.

Pennsylvania generators disposed of the largest volume and activity (radioactivity) of LLRW among the Compact states. Quantities and activity totals of LLRW by facility type and state for 2020 are listed in Tables and Charts B-1 and B-2.

The total volume of waste disposed of by the Compact LLRW generators in 2020 was about 145,545 cubic feet (ft^3). This amount was mainly due to waste from the industrial and utility category (see Table and Chart B-1). The largest volume of LLRW disposed of was from the industry in the Compact.

The 2020 LLRW activity from the Compact is about 1,213 curies (Ci). The greatest contribution is from the nuclear utility sector (see Table and Chart B-2). The highest reported activity is due to the shipments of higher concentration of LLRW (Class B and C) for disposal at the WCS facility in Texas. The disposal activity and volume tabulated in the aforementioned tables and charts include Class A, Class B, and Class C LLRW.

LLRW must be classified according to 10 CFR 61.55 before it can be shipped for disposal. In 2020, the majority of LLRW disposed of at WCS from the Compact was Class A with some being Class B and C LLRW. It was the same for the Energy*Solutions* site with the majority being Class A waste with small quantities of Class B and C.

Table B-3 contains information on the radioactive isotopes in the LLRW disposed of from the Compact's generators in 2020. The characterization and quantification of these isotopes are generally performed several months prior to disposal. Therefore, due to the short half-life of some listed isotopes and the in-growth of some others, the actual isotopic characterization and activity will be different at the time of disposal.

Table B-4 contains information on 2020 Compact LLRW disposal volume and activity by percentage of disposal at WCS and Energy*Solutions* LLRW sites.

Technically Enhanced Naturally Occurring Radioactive Material (TENORM)

Technically Enhanced Naturally Occurring Radioactive Material is naturally occurring radioactive material (NORM) whose radionuclide concentrations or potential for human exposure have been increased above levels encountered in the undisturbed natural environment by human activities. It is not specifically subjected to regulation under the laws of the Commonwealth or the Atomic Energy Act of 1954. Additionally, the definition of LLRW in the Appalachian Compact does not include TENORM. However, it has recently been discovered that the DOE's MIMS database includes this TENORM waste in its totals for both volume and activity. Therefore, for this report, the Department went back to 2016 and subtracted out TENORM values from the tables and charts in Appendix B and C. There are no plans to correct previous LLRW reports that included TENORM data in the charts and tables.

As can be noted, there has been significant increase in the generation of TENORM in the Appalachian Compact during 2016 to 2020. In 2020, the Appalachian Compact generated approximately 250,344 ft^3 or 3.50 Ci of TENORM. The large contribution of TENORM waste volume over the years is due to the development and production from the conventional and unconventional oil and gas industry. TENORM waste is generally very high in volume (ft^3) but it is very low in activity (Ci).

Lastly, because of its low concentration and not being defined as LLRW, TENORM waste would not have been accepted for disposal at the Appalachian Compact's regional facility in Pennsylvania. However, the Department will continue to monitor and track the generation of TENORM in the Appalachian Compact.

Waste Minimization

Waste minimization can be accomplished by two different methods: source reduction and volume reduction. Source reduction is achieved by process modification, materials replacement, and segregation. Volume reduction is generally achieved by compaction or incineration. Appendix C discusses volume and activity trends from 2000 to 2020.

Toxicity of Low-Level Radioactive Waste

The toxicity of LLRW is a function of its constituent radionuclides. Toxicity is based on drinking water standards and expressed in two ways, as shown in Table A-2 of Appendix A.

Toxicity is first expressed as the annual concentration in picocuries per liter (pCi/L) of beta particle and photon radioactivity in drinking water that produces an annual dose equivalent to the total body or any internal organ of no more than 4 millirems (mrem) per year.[1] For gross alpha-emitting radionuclides, excluding radon and uranium, the maximum contaminant level (MCL) in drinking water is 15 pCi/L.[2] For combined radium-226 and radium-228, the MCL in drinking water is 5 pCi/L.[3] The second column of Table A-2 shows radionuclide concentrations in pCi/L in drinking water that would yield a risk equal to that from a dose rate of 4 mrem per year. Lower concentration quantity indicates higher toxicity.

The second mode of indicating toxicity is by comparing toxicity of each radionuclide to that of tritium (H-3) and expressing it as relative toxicity. Tritium is one of the least toxic of radionuclides and is assigned a value of 1. Relative toxicity of other radionuclides is calculated in column three of Table A-2, where higher numbers indicate higher toxicity. Radionuclides are listed without their half-lives in Table A-2; however, arrangement of radionuclides by their half-life ranges is provided in Table B-3, which is also arranged by nuclide and activity.

[1] Based on 40 CFR 141.16(a), and proposed revision to 40 CFR 141, published as Appendix C on Sept. 30, 1986, 51 FR 34859.
[2] 40 CFR 141.15(b)
[3] 40 CFR 141.15(a)

SECTION 4

FINANCIAL STATISTICS

The Pennsylvania LLRW Disposal Act (1988-12) requires the annual report to include financial statistics relating to all aspects of the Compact and the regional disposal facility. This chapter includes financial information on the host state of Pennsylvania and the Commission.

Pennsylvania law, in the form of the LLRW Disposal Act and the LLRW Disposal Regional Facility Act (Act 1990-107), established funds to pay the costs of developing an LLRW disposal facility in Pennsylvania. Funds were generated from mandatory contributions by utilities in Pennsylvania and voluntary contributions from a utility in Maryland. The maximum amount of money mandated for the Regional Facility Siting Fund was about $33 million.

Pennsylvania General Fund money was also appropriated for the LLRW program. The Acts state that funds used from the General Fund must be repaid to that fund within five years after the LLRW facility begins disposal operations. Repayments to the General Fund will be taken from surcharges on the waste during facility operation.

Expenditures of the Host State and the Appalachian Compact Commission

Table 4-1 contains the financial information of the host state, Pennsylvania, and the Commission for calendar year 2020 and fiscal year 2019-20, respectively.

TABLE 4-1

Pennsylvania and Appalachian Compact Commission Expenditures

EXPENDITURES	PENNSYLVANIA (HOST STATE) CY 2020	FY 2019-20 APPALACHIAN COMPACT COMMISSION
GRANTS	**$0.00**	**$0.00**
PERSONNEL	**$28,589.92**	**$0.00**
GENERAL EXPENSE	**$0.00**	**$31,080.00**
CONTRACTOR SERVICES	**$0.00**	**$0.00**
TOTAL	**$28,589.92**	**$31,080.00**

APPENDIX A

TABLE A-1

APPALACHIAN COMPACT LLRW DISPOSERS BY STATE AND COUNTY FOR 2020

Pennsylvania

County	Facility	Generator Type
Allegheny	Applied Health Physics	Industry
	Cabot Oil & Gas	Industry
Beaver	Energy Harbor - Beaver Valley Power Station	Utility
Berks	Global Advanced Metals	Industry
Blair	Altoona Area School District	Academic
Butler	II-VI, Incorporated	Industry
Centre	Pennsylvania State University	Academic
Chester	Cephalon Inc.	Industry
	Covanta Delaware Valley	Industry
	Stroud Water Research Center	
Cumberland	Naval Support Activity	Government
Dauphin	Airgas, An Air Liquide Company	Industry
	Cardinal Health 414, LLC	Medical
	Exelon Corporation/Amergen - TMI 1	Utility
	PA Department of Environmental Protection	Government
Indiana	Fluid Recovery Services	Industry
Lawrence	Alaron Nuclear Services	Industry
Luzerne	Talen Energy Corporation - SSES	Utility
Montgomery	Exelon Corporation - Limerick	Utility
	Merck and Company Inc.	Industry
	United Phosphorus	Industry
	Pet Net Pharmaceutical Services	Industry
Philadelphia	Temple University	Academic
Westmoreland	Westinghouse Electric Company	Industry
York	Exelon Corporation - Peach Bottom	Utility
	Precision Custom Components Inc.	Industry

Maryland

County	Facility	Generator Type
Allegany	Verso Corporation	Government
Baltimore	Global Pump	Industry
	Johns Hopkins University	Academic
	Johns Hopkins Medical Institution	Medical
	Plexus Corp.	Industry
	Sia Solutions, LLC	Industry
	University of Maryland	Academic
Calvert	Exelon Corporation - Calvert Cliffs	Utility
Frederick	Leidos Biomedical Research, Inc.	Industry
Harford	Aberdeen Proving Grounds	Government
Howard	Ecology Services, Inc.	Industry

Montgomery	Montgomery County Solid Waste Station	Government
	National Institutes of Health	Government
	National Institute of Standards and Technology	Government
Prince George's	2nd Avenue	Industry

West Virginia

County	Facility	Generator Type
Monongalia	West Virginia University	Academic
Tyler	Secur O&G, LLC	Industry

Delaware

County	Facility	Generator Type
New Castle	University of Delaware	Academic

TABLE A-2
TOXICITY TABLE OF INDIVIDUAL RADIONUCLIDES

Radionuclides	Concentration[a] (pCi/L)	Relative[b] Toxicity	Radionuclides	Concentration[a] (pCi/L)	Relative[b] Toxicity
Tritium (H-3)	9.0E04	1.0	Europium-155	7.0E03	12.9
Americium-241	4.0E00	22,500.0	Gadolinium-153	1.0E04	9.0
Americium-23	1.5E01	6,000.0	Hafnium-181	3.0E03	30.0
Antimony-122	2.0E03	45.0	Iodine-125	1.0E03	90.0
Antimony-124	1.0E03	90.0	Iodine-129	1.0E02	900.0
Antimony-125	4.0E03	22.5	Iodine-131	7.0E02	128.6
Barium-131	7.0E03	12.9	Iodine-133	4.0E02	225.0
Barium-140	1.0E03	90.0	Iridium-192	2.0E03	45.0
Beryllium-7	1.0E05	0.9	Iron-55	1.0E04	9.0
Bismuth-207	2.0E03	45.0	Iron-59	1.0E03	90.0
Cadmium-109	5.0E02	180.0	Lanthanum-140	1.0E03	90.0
Calcium-45	2.0E03	45.0	Lead-203	1.0E04	9.0
Californium-252	1.5E01	6,000.0	Manganese-54	3.0E03	30.0
Carbon-14	3.0E03	30.0	Neptunium-237	1.5E01	6,000.0
Cerium-141	4.0E03	22.5	Nickel-59	3.0E04	3.0
Cesium-134	8.0E01	1,125.0	Nickel-63	1.0E04	9.0
Cesium-136	5.0E02	180.0	Niobium-95	5.0E03	18.0
Cesium-137	1.0E02	900.0	Phosphorus-32	7.0E02	128.6
Chlorine-36	2.0E03	45.0	Plutonium-238	1.5E01	6,000.0
Chromium-51	8.0E04	1.1	Plutonium-239	4.0E01	2,250.0
Cobalt-57	6.0E03	15.0	Plutonium-240	1.5E01	6,000.0
Cobalt-58	2.0E03	45.0	Plutonium-241	1.5E01	6,000.0
Cobalt-60	2.0E02	450.0	Plutonium-242	1.5E01	6,000.0
Curium-242	1.5E01	6,000.0	Polonium-210	1.5E01	6,000.0
Curium-243	1.5E01	6,000.0	Promethium-149	3.0E03	30.0
Curium-244	1.5E01	6,000.0	Protactinium-233	3.0E03	30.0
Europium-152	2.0E03	45.0	Radium-226	1.5E01	6,000.0
Europium-154	1.0E03	90.0	Rubidium-86	6.0E02	150.0
Ruthenium-103	4.0E03	22.5	Ruthenium-106	3.0E02	300.0
Scandium-46	2.0E03	45.0	Selenium-75	6.0E02	150.0
Silver-110M	7.0E02	128.6	Sodium-22	5.0E02	180.0
Sodium-24	4.0E03	22.5	Strontium-85	4.0E03	22.5
Strontium-89	9.0E02	100.0	Strontium-90	5.0E01	1,800.0
Sulfur-35	1.0E04	9.0	Tantalum-182	2.0E03	45.0
Technetium-99	5.0E03	18.0	Tellurium-125M	2.0E03	45.0
Thorium-228	1.5E01	6,000.0	Thorium-230	1.5E01	6,000.0
Thorium-232	1.5E01	6,000.0	Thallium-202	4.0E03	22.5
Thallium-204	2.0E03	45.0	Tin-113	4.0E03	22.5
Transuranics	1.5E01	6,000.0	Vanadium-48	2.0E03	45.0
Yttrium-90	1.0E03	90.0	Yttrium-91	1.0E03	90.0
Zinc-65	4.0E02	225.0	Zirconium-95	3.0E03	30.0

[a] Concentration of beta and photon radioactivity in drinking water yielding a risk equal to that from a dose rate of 4 mrem/year (proposed revision to 40 CFR 141, 51 FR 34859, Sept. 30, 1986).

[b] Toxicity of radionuclides compared to tritium, which has a value of 1.

APPENDIX B

TABLE B-1

Appalachian Compact 2020 Disposed LLRW Volume by State and Facility Type

Facility Type/State	WV	DE	MD	PA	Total
Academic	22	3	11	24	59
Government	0	0	100	12,783	12,883
Industry	0	0	12,028	91,914	103,942
Medical	0	0	64	0	64
Utility	0	0	3,506	25,091	28,597
Total	22	3	15,709	129,811	145,545

This data is for LLRW disposal at the Energy*Solutions* site in Clive, Utah, and the WCS site in Andrews, Texas. It does not include TENORM waste volumes. Volume is in cubic feet.

CHART B-1

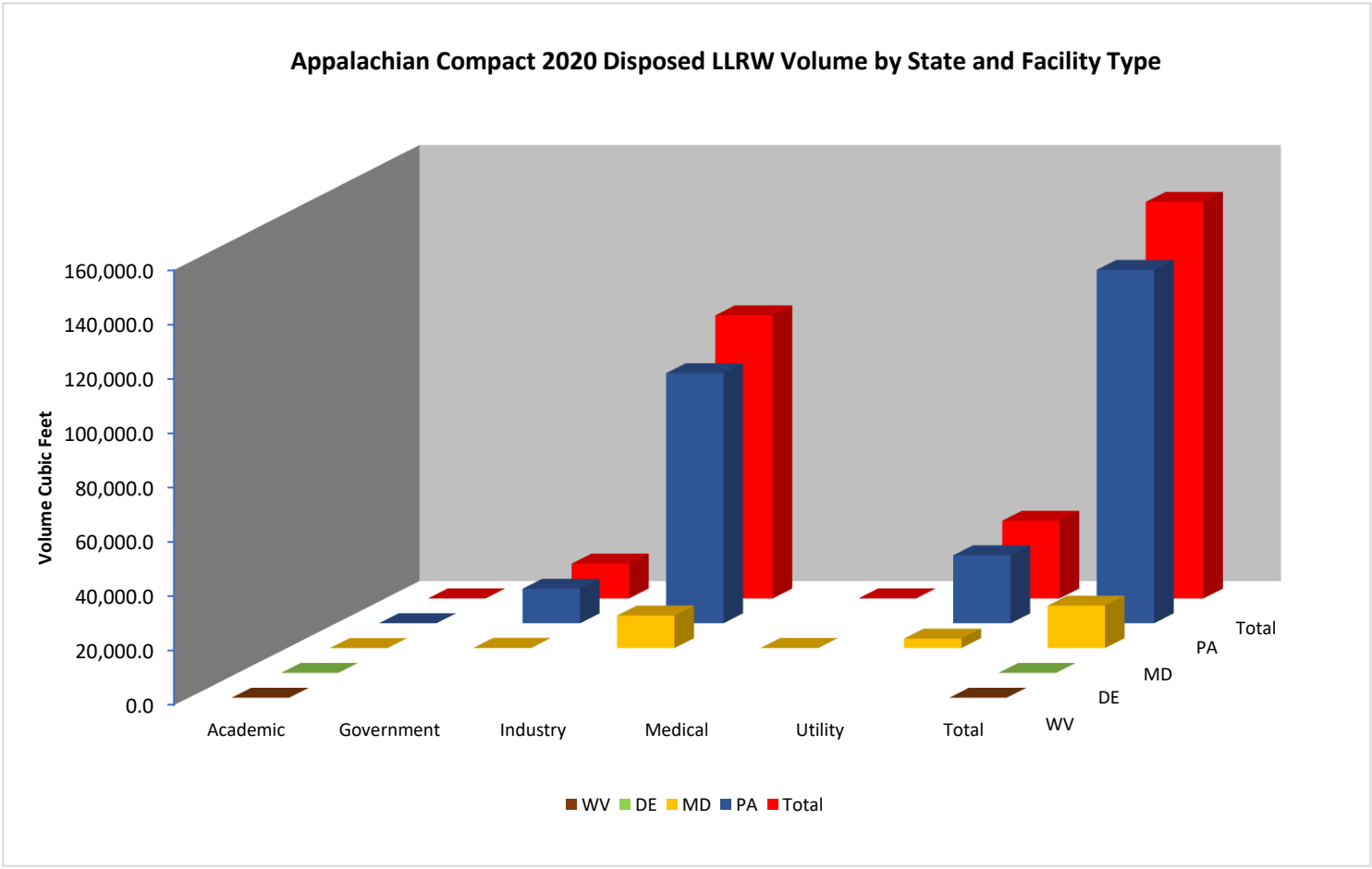


TABLE B-2

Appalachian Compact 2020 Disposed LLRW Activity by State and Facility Type

Facility Type/State	WV	DE	MD	PA	Total
Academic	<0.1	<0.1	<0.1	<0.1	<0.1
Government	0	0	<0.1	0	<0.1
Industry	0	0	1.0	219	220
Medical	0	0	0.3	0	0.3
Utility	0	0	0.2	993	993
Total	<0.1	<0.1	1.5	1,212	1,213

This data is for LLRW disposal at the Energy*Solutions* site in Clive, Utah, and the WCS site in Andrews, Texas. Activity is in curies. This table does not include TENORM waste.

CHART B-2

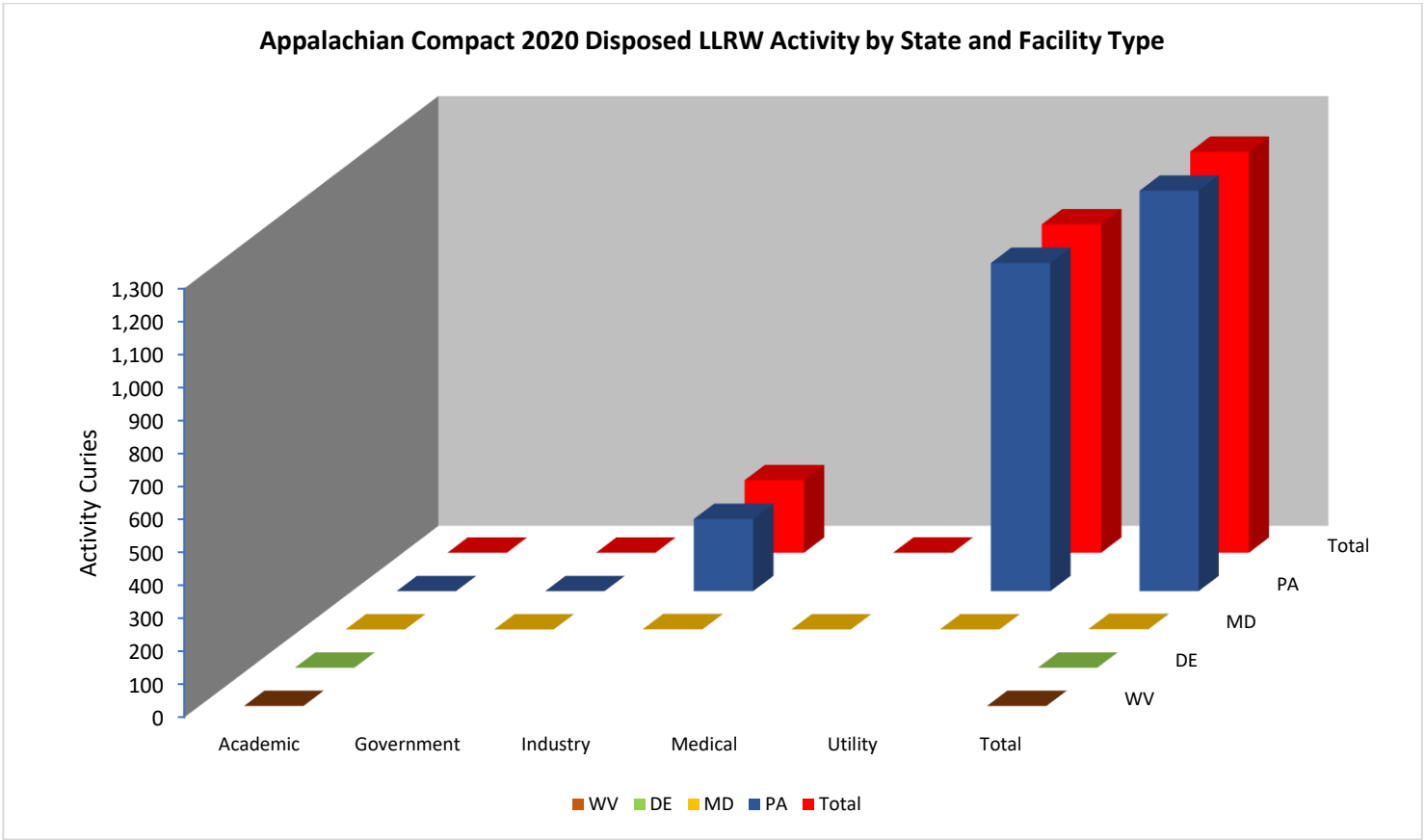


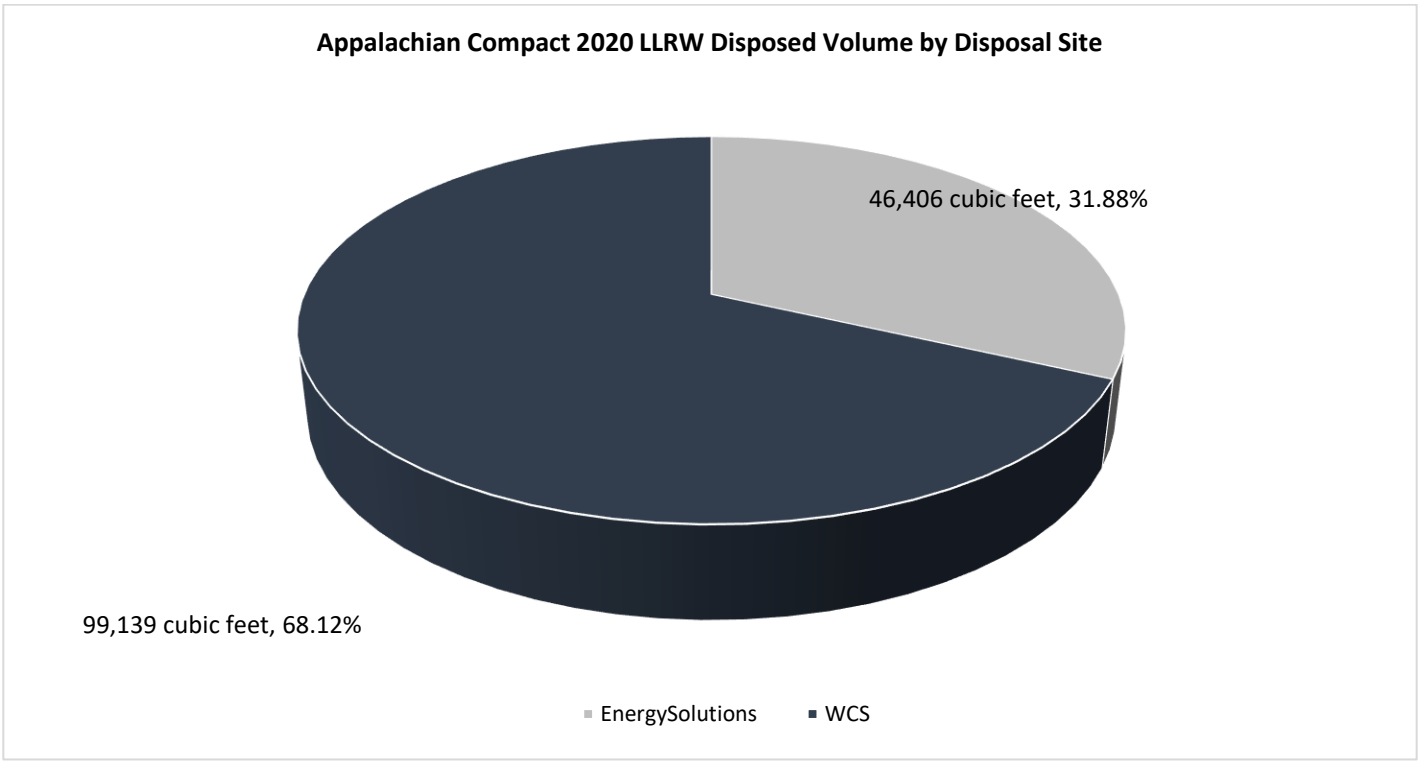
TABLE B-3: Appalachian Compact 2020 LLRW Isotopes Sorted by Isotope*

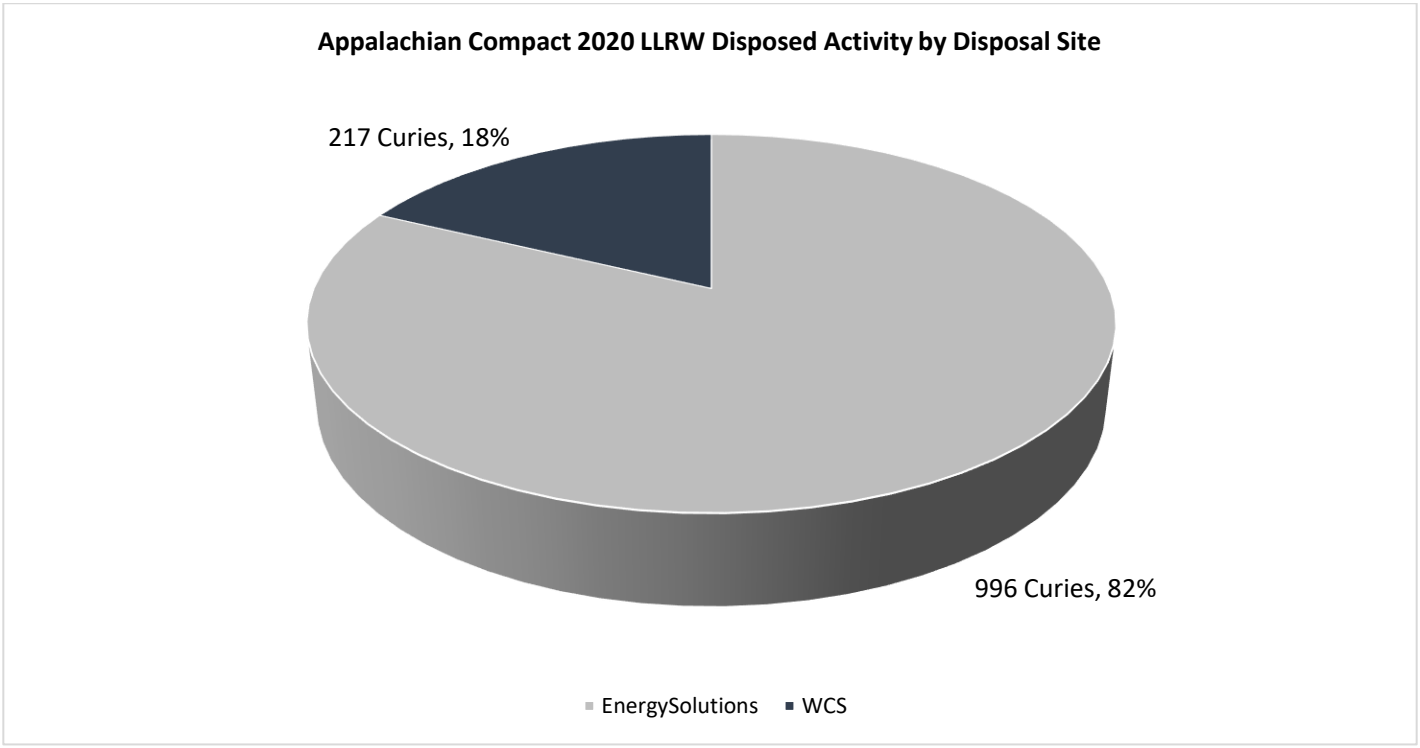
Isotope	Element	Half-life Yr.	Curies		Isotope	Element	Half-life Yr.	Curies
Ac-227	actinium	2.18E+01	0.00		Ni-63	nickel	1.00E+02	36.59
Ag-108M	silver	1.27E+02	0.04		Np-237	neptunium	2.14E+06	0.00
Ag-110M	silver	6.82E-01	0.01		P-32	phosphorus	3.92E-02	0.00
Am-241	americium	4.32E+02	0.14		P-33	phosphorus	6.94E-02	0.00
Am-243	americium	7.37E+03	0.00		Pa-231	protactinium	3.28E+04	0.00
Au-195	gold	5.10E-01	0.00		Pa-234	protactinium	2.23E-06	0.00
Ba-133	barium	1.05E+01	0.09		Pb-210	lead	2.23E+01	0.00
Ba-140	barium	3.50E-02	0.00		Pm-143	promethium	7.26E-01	0.00
Be-7	beryllium	1.46E-01	0.00		Pm-147	promethium	2.62E+00	3.37
Bi-207	bismuth	3.20E+01	0.00		Po-209	polonium	1.24E+02	0.00
Bi-210	bismuth	3.00E+06	0.00		Po-210	polonium	3.79E-01	0.00
C-14	carbon	5.73E+03	0.16		Pu-238	plutonium	8.78E+01	0.01
Cd-109	cadmium	1.27E+00	3.61		Pu-239	plutonium	2.41E+04	0.00
Ce-139	cerium	3.77E-01	0.00		Pu-240	plutonium	6.54E+03	0.00
Ce-141	cerium	8.90E-02	0.00		Pu-241	plutonium	1.44E+01	0.00
Ce-144	cerium	7.78E-01	0.01		Pu-242	plutonium	3.76E+05	0.00
Cf-252	californium	2.64E+00	0.00		Ra-223	radium	3.13E-02	0.00
Cl-36	chlorine	3.01E+05	0.00		Ra-226	radium	1.60E+03	0.48
Cm-242	curium	4.47E-01	0.00		Ra-228	radium	5.75E+00	0.03
Cm-243	curium	2.85E+01	0.00		Rb-87	rubidium	4.88E+10	0.00
Cm-244	curium	1.81E+01	0.04		Ru-103	ruthenium	1.08E-01	0.00
Co-56	cobalt	2.16E-01	0.00		Ru-106	ruthenium	1.01E+00	0.01
Co-57	cobalt	7.42E-01	0.38		S-35	sulfur	2.39E-01	0.05
Co-58	cobalt	1.94E-01	0.48		Sb-124	antimony	1.65E-01	0.01
Co-60	cobalt	5.27E+00	18.89		Sb-125	antimony	2.77E+00	0.08
Cr-51	chromium	7.59E-02	0.45		Sc-46	scandium	2.29E-01	0.00
Cs-134	cesium	2.06E+00	0.02		Se-75	selenium	3.26E-01	0.00
Cs-135	cesium	2.30E+06	0.00		Si-32	silicon	1.72E+02	0.00
Cs-137	cesium	3.02E+01	105.82		Sm-151	samarium	9.00E+01	0.00
Cu-64	copper	1.45E-03	0.00		Sn-113	tin	3.15E-01	0.00
Eu-152	europium	1.36E+01	0.03		Sn-119m	tin	2.93E+02	0.00
Eu-154	europium	8.80E+00	0.00		Sn-121m	tin	5.50E+01	0.00
Eu-155	europium	4.96E+00	0.00		Sn-126	tin	1.00E+05	0.00
Fe-55	iron	2.70E+00	3.23		Sr-82	strontium	6.85E-02	0.00
Fe-59	iron	1.22E-01	0.01		Sr-85	strontium	1.78E-01	0.00
Ga-67	gallium	8.94E-03	0.00		Sr-89	strontium	1.38E-01	0.00
Ga-68	gallium	1.29E-04	0.00		Sr-90	strontium	2.86E+01	5.49
Gd-148	gadolinium	7.50E+01	0.00		Ta-182	tantalum	3.14E-01	0.00
Gd-153	gadolinium	6.61E-01	0.13		Tc-99	technetium	2.13E+05	0.08
Ge-68	germanium	7.89E-01	0.09		Te-123M	tellurium	3.28E-01	0.00
H-3	tritium	1.23E+01	9.60		Th-228	thorium	1.91E+00	0.03
Hg-203	mercury	1.28E-01	0.00		Th-229	thorium	7.34E+03	0.00
I-124	iodine	1.15E-02	0.00		Th-230	thorium	7.70E+04	0.01
I-125	iodine	1.65E-01	0.08		Th-232	thorium	1.41E+10	0.06
I-129	iodine	1.57E+07	0.00		Th-NAT	natural thorium	1.41E+10	0.00
I-131	iodine	2.20E-02	0.00		Tl-202	thallium	3.35E-02	0.00
In-111	indium	7.67E-03	0.00		Tl-204	thallium	3.78E+00	0.00
In-114M	indium	1.36E-01	0.01		U-232	uranium	6.90E+01	0.00
Ir-192	iridium	2.03E-01	0.00		U-233	uranium	4.15E-05	0.00
K-40	potassium	1.28E+09	0.00		U-234	uranium	2.45E+05	0.00
Kr-85	krypton	1.07E+01	2.47		U-235	uranium	7.04E+08	0.00
La-140	lanthanum	4.59E-03	0.00		U-236	uranium	2.34E+07	0.00
Lu-177	lutetium	1.82E-02	0.00		U-238	uranium	4.47E+09	0.01
Mn-54	manganese	8.56E-01	0.48		U-DEP	depleted uranium	4.47E+09	1.29
Mo-99	molybdenum	7.53E-03	0.00		U-NAT	natural uranium	4.47E+09	0.00
Na-22	sodium	2.60E+00	0.05		Y-88	yttrium	2.92E-01	0.00
Nb-93m	niobium	1.60E+01	0.00		Y-90	yttrium	7.33E-03	0.00
Nb-94	niobium	2.03E+04	0.00		Zn-65	zinc	6.69E-01	0.73
Nb-95	niobium	9.60E-02	0.12		Zr-88	zirconium	2.28E-01	0.00
Nb-97	niobium	1.37E-04	0.00		Zr-93	zirconium	1.50E+06	0.00
Ni-59	nickel	7.50E+04	0.00		Zr-95	zirconium	1.78E-01	0.06

*This table is generated from the MIMS database and includes TENORM. The way the data are recorded, TENORM cannot be subtracted.

CHART B-3 and B-4

Appalachian Compact 2020 Percent Disposed LLRW Volume and Activity by Disposal Site





APPENDIX C

Discussion of Low-Level Radioactive Waste Trends in the Appalachian Compact

The DOE's National Low-Level Waste Management Program's MIMS has been collecting data on LLRW generated in Pennsylvania since 1986. MIMS data can be found on the DOE's website at: https://mims.doe.gov.

The total volume of Appalachian Compact LLRW in 2020 is about 145,545 ft^3. The volume of LLRW has been decreasing since 2017. This new trend is evident since TENORM waste has been subtracted from the past volume data generated. During years 2000, 2001, and 2016 through 2019 decontamination & decommissioning (D&D) waste contributed significantly to the amount of waste that is reported for the Appalachian Compact (See Table and Chart C-1). LLRW volumes are expected to increase again as TMI Unit 2 begins active decommissioning.

The traditional volume-reduction methods are not effective for most D&D wastes, which generally consist of building debris and soil. Also, most D&D wastes have extremely low radioactivity per volume (also known as low-specific activity). The majority of the D&D waste produced in the United States is being shipped to the Energy*Solutions* facility in Clive, Utah. Furthermore, low activity D&D waste would not have been disposed of at the proposed Pennsylvania LLRW site due to the proposed design and waste acceptance criteria of the facility.

The 2020 LLRW activity (Ci) from the Appalachian Compact is about 1,213 Ci. The closure of the Barnwell facility to waste disposal from outside the Atlantic Compact has had a significant impact on the activity trend of LLRW in the Appalachian Compact during the years 2009 through 2013. During these years, only the lower activity Class A waste was disposed of by the Appalachian Compact's LLRW generators at the Energy*Solutions* disposal site. Therefore, the reported activity of LLRW during 2009 through 2013 is very low. The activity of the LLRW is trending up after 2014 due to the availability of the WCS facility in Texas and disposal of higher concentration of waste, namely Class B and C wastes, at this facility. Most of the Class C waste is contained in irradiated reactor components, which are being stored at the nuclear power plant sites. This is mainly due to the high cost of disposal of this waste and the curie limit that is established for the imported waste at the WCS disposal facility (See Table and Chart C-2).

Table and Chart C-3 separate the volume and activity of TENORM from routine LLRW for the period of 2016 to 2020. The department will continue to monitor and track the generation of TENORM in the Appalachian Compact.

The DOE's MIMS database does not include LLRW disposed of at the Energy*Solutions* facility prior to 1998. This omission of historical data would affect waste generation trend information for volume but would not have a significant impact on the radioactivity of LLRW. This is because, historically, about 99 percent of the Compact's LLRW activity has been shipped to the Barnwell disposal site for burial. The MIMS database includes LLRW volume and activity data for the Barnwell disposal site from 1986 through 2008 for the Compact.

TABLE C-1: Appalachian Compact Disposed LLRW Volume from 2000 to 2020

Year	WV	DE	MD	PA	Total
2000	53	28	9,767	421,398	431,246
2001	44	76	10,760	534,429	545,310
2002	183	366	6,753	55,371	62,674
2003	152	74	3,703	74,901	78,829
2004	35	49	13,178	55,136	68,397
2005	2	74	107,956	91,293	199,326
2006	38	59	48,132	57,628	105,857
2007	49	43	21,016	78,455	99,562
2008	132	415	6,703	113,483	120,733
2009*	134	431	21,451	103,667	125,684
2010*	11	29	22,958	76,519	99,518
2011*	19	1,061	10,569	155,509	167,157
2012*	21	75	12,364	122,380	134,841
2013*	45	340	23,597	72,067	96,048
2014**	25	43	72,334	56,040	128,442
2015**	19	45	18,203	91,223	109,490
2016**	2	5	7,351	199,292	206,649
2017**	1	34	6,588	377,234	383,857
2018**	17	0	5,498	272,620	278,135
2019**	0	26	17,193	194,052	211,271
2020**	22	3	15,709	129,811	145,545
Total 2000 to 2020	1,004	3,275	461,782	3,332,508	Grand Total 3,798,570

Volume is in cubic feet. * 2009 through 2013 LLRW volume only includes disposal at Energy*Solutions* in Clive, Utah. ** 2014 through 2020 volume includes disposal at Energy*Solutions* in Clive, Utah, and WCS in Andrews, Texas. Years 1998 to 2008 include disposal at Barnwell, South Carolina, and Energy*Solutions*, Clive, Utah. Past LLRW Annual Reports, years 2016 to 2020, erroneously included TENORM waste in the reported LLRW volume and curie activity. That has been corrected in this report; see Table C-3 and Chart C-3 below.

CHART C-1

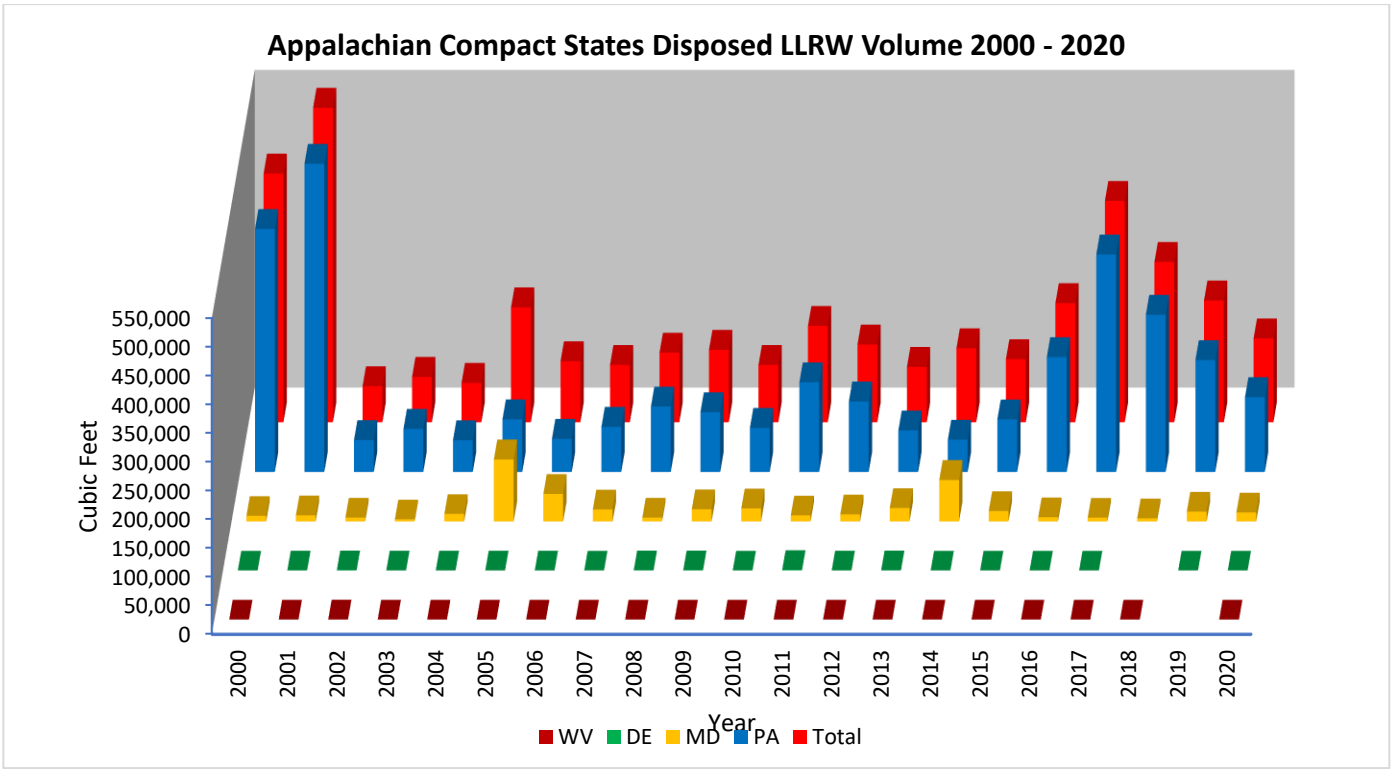


TABLE C-2: Appalachian Compact Disposed LLRW Activity from 2000 to 2020

Year	WV	DE	MD	PA	Total
2000	2.2	<0.1	484	357,624	358,111
2001	<0.1	<0.1	903.3	168,920	169,823
2002	0.1	0.5	244.5	6,777	7,023
2003	0.2	24.7	166.3	241,650	241,841
2004	0.8	0.2	11,831	18,890	30,722
2005	0.7	31.3	156.8	58,786	58,975
2006	<0.1	11.9	60.1	91,719	91,791
2007	0.2	12.9	25,305	492,579	517,897
2008	0.1	12.2	2,182	283,329	285,523
2009*	<0.1	0.5	4.7	1,001	1,007
2010*	<0.1	<0.1	1.4	656	658
2011*	<0.1	1	1.8	493	496
2012*	<0.1	<0.1	2.1	449	451
2013*	<0.1	45.3	15.7	459	520
2014**	<0.1	<0.1	260.7	1,213	1,474
2015**	<0.1	<0.1	27.8	4,147	4,175
2016**	0.4	<0.1	209	2,020	2,229
2017**	<0.1	<0.1	178.5	1,711	1,890
2018**	<0.1	0	125.3	42,027	42,153
2019**	0	<0.1	72.6	834	907
2020**	<0.1	<0.1	1.5	1,212	1,213
Total 2000	4.8	140.6	42,233.1	1,776,498.00	grand total
to 2020					1,818,876

Activity is in curies. * 2009 through 2013 LLRW activity only includes disposal at Energy*Solutions* in Clive, Utah. ** 2014 and 2020 activity includes disposal at Energy*Solutions* in Clive, Utah, and WCS in Andrews, Texas. Years 1998 to 2008 includes disposal at Barnwell, South Carolina, and Energy*Solutions*, Clive, Utah. Past LLRW Annual Reports, years 2016 to 2020, do not include TENORM waste curie activity.

CHART C-2

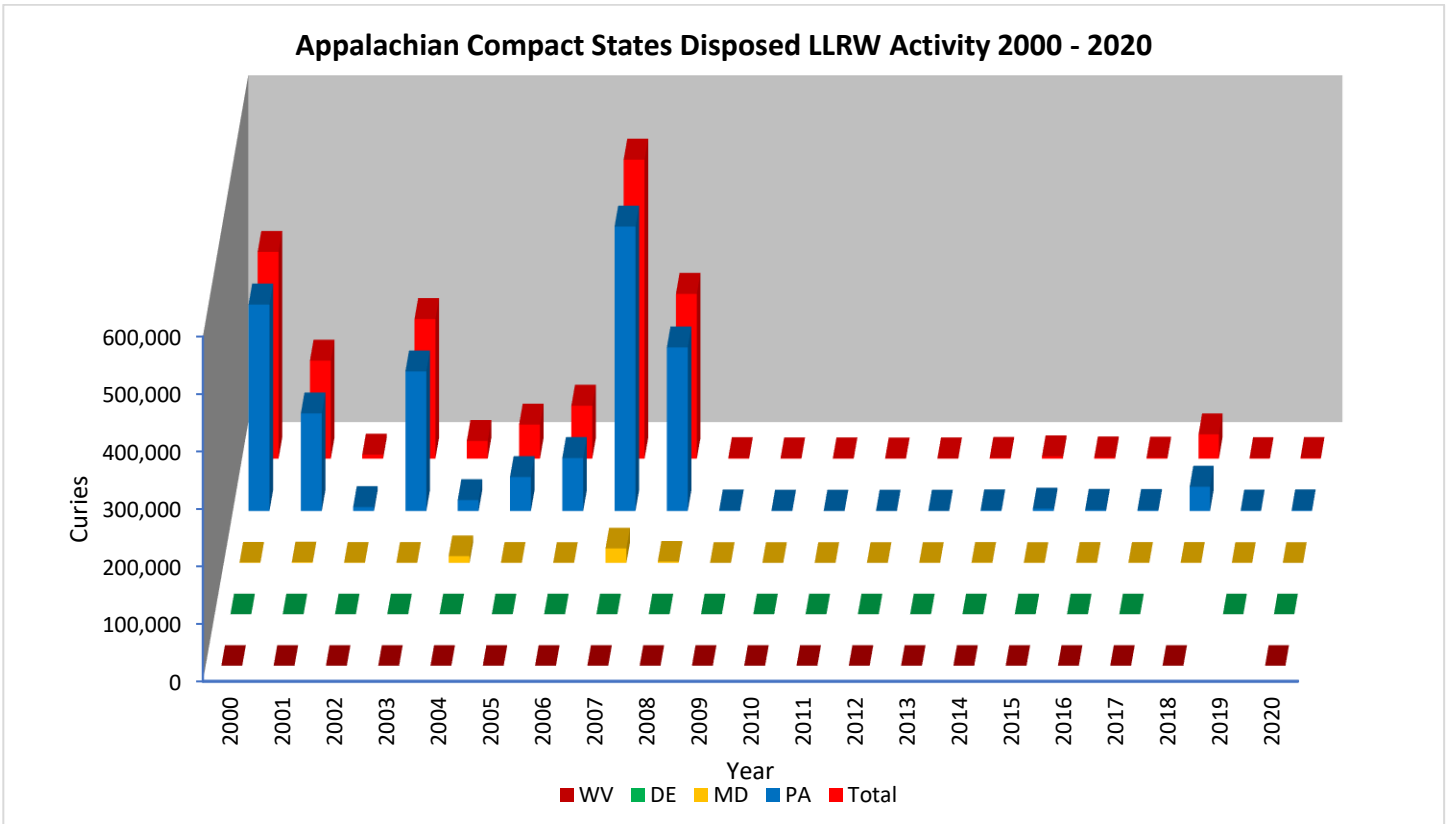
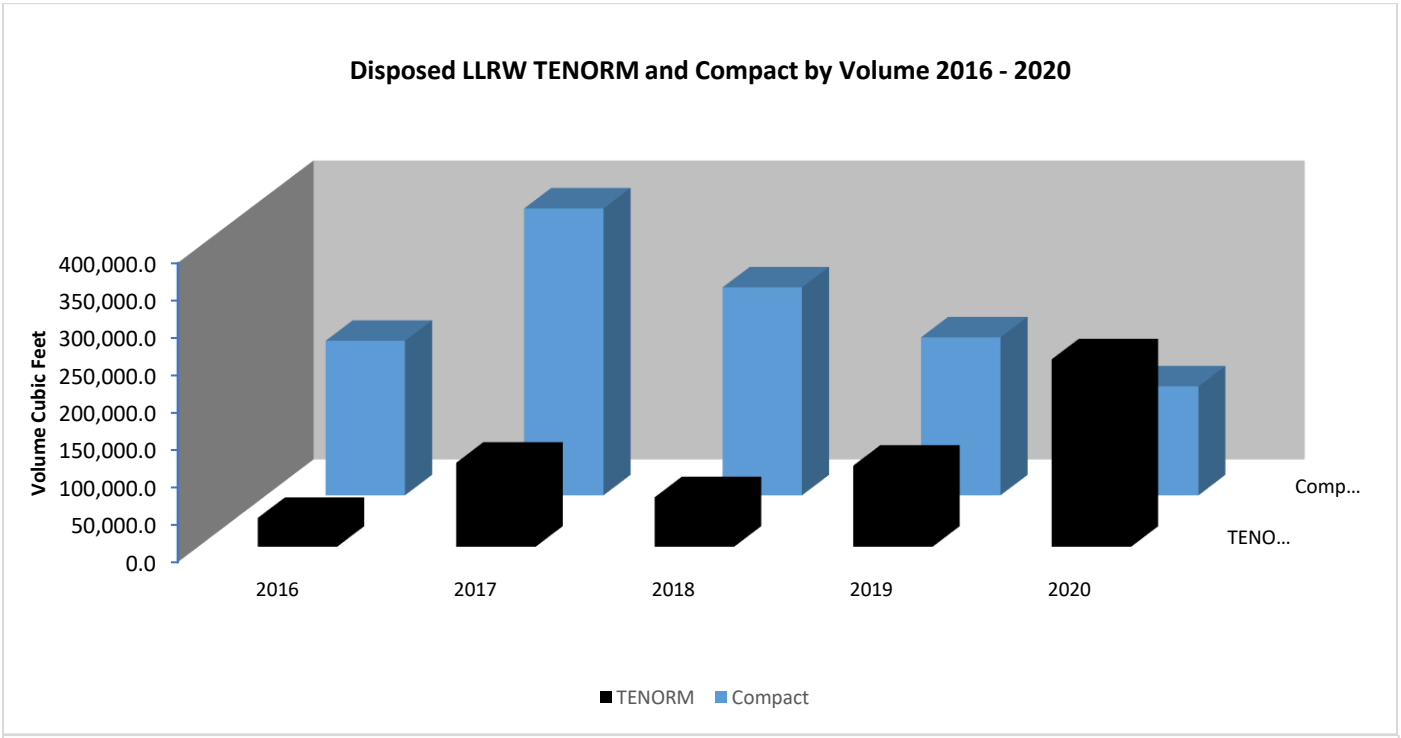


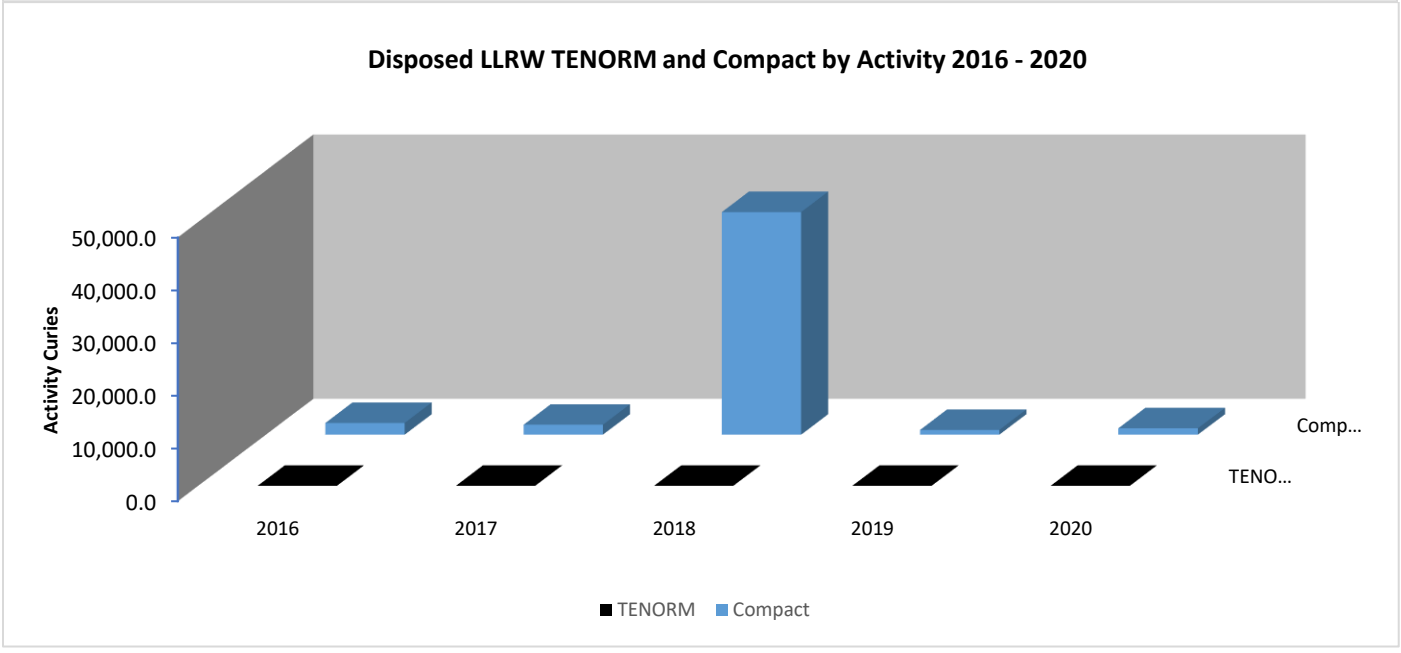
TABLE C-3: Appalachian Compact Disposed LLRW and TENORM Values from 2016 to 2020

	Volume (ft^3)		Activity (Curies)	
Years	**TENORM**	**Routine LLRW**	**TENORM**	**Routine LLRW**
2016	38,400	206,649	0.9123	2,229
2017	112,032	383,856	2.73	1,890
2018	66,048	278,136	1.88	42,153
2019	108,096	211,271	2.86	907
2020	250,344	145,545	3.50	1,213
Total	574,920	122,5457	12.0	48,392

Table C-3 separates Volume and Activity of Appalachian Compact Disposed LLRW and TENORM.

CHART C-3





APPENDIX D

Appalachian States Low-Level Radioactive Waste Commission
Financial Statements

Appalachian States Low-Level Radioactive Waste Commission

Years Ended June 30, 2020 and 2019

Trout CPA
Accounting | Tax | Advisory

Appalachian States Low-Level Radioactive Waste Commission

Financial Statements with Supplementary Information

Years Ended June 30, 2020 and 2019

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Trout CPA
Accounting | Tax | Advisory

INDEPENDENT AUDITORS' REPORT

Commission Members
Appalachian States Low-Level Radioactive Waste Commission
Harrisburg, Pennsylvania

Report on the Financial Statements
We have audited the accompanying financial statements of the governmental activities and each major fund of the **Appalachian States Low-Level Radioactive Waste Commission** (the Commission) as of and for the years ended June 30, 2020 and 2019, and the related notes to the financial statements, which collectively comprise the Commission's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America. Management is also responsible for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility
Our responsibility is to express opinions on these financial statements based on our audits. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards,* issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditors consider internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the governmental activities and each major fund of the **Appalachian States Low-Level Radioactive Waste Commission,** as of June 30, 2020, and the respective changes in financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis on pages 3 through 7 and budgetary comparison information on page 16 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards,* we have also issued our report dated December 9, 2020, on our consideration of the Commissions internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the Commission's internal control over financial reporting or compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Commission's internal control over financial reporting and compliance.

Prior Period Financial Statements

The financial statements as of June 30, 2019, were audited by Greenawalt & Company, P.C., who merged with Trout CPA as of January 1, 2020, and whose report dated August 12, 2019, expressed an unmodified opinion on those statements.

Trout CPA

December 9, 2020
Lancaster, Pennsylvania

Appalachian States Low-Level Radioactive Waste Commission

MANAGEMENT'S DISCUSSION and ANALYSIS

Years Ended June 30, 2020 and 2019

The discussion and analysis of the **Appalachian States Low-Level Radioactive Waste Commission's** (the Commission) financial performance provides an overall review of the Commission's financial activities for the fiscal year ended June 30, 2020. The intent of this discussion and analysis is to look at the Commission's financial performance as a whole. Readers should also review the notes to the basic financial statements and the financial statements as a whole to enhance their understanding of the Commission's financial performance.

Background

The General Assembly of the Commonwealth of Pennsylvania created the Appalachian States Low-Level Radioactive Waste Commission (Commission) by enacting the Appalachian States Low-Level Radioactive Waste Compact Act, 1985-120. Under the authority of this act, the states of Delaware, Maryland, West Virginia, and the Commonwealth of Pennsylvania formed a compact to provide for the regional management and disposal of Low-Level Radioactive Waste (LLRW). Congress consented to the Appalachian States Low-Level Radioactive Waste Compact in 1988.

The Commission consists of ten members; four members from Pennsylvania and two members from each of the other party states of Maryland, Delaware, and West Virginia. The Commission members are appointed according to the laws of each party state. Each party state determined the length of term for which its Members and Alternates are appointed.

The Commission provides for representation of the compact party states throughout the siting process and LLRW disposal facility development and operations. Pennsylvania has been designated as the initial host state for the regional LLRW disposal facility because it generates the largest amount of LLRW in the compact.

In December of 1998, the Pennsylvania Department of Environmental Protection (DEP) suspended the LLRW siting process due to the current availability of out-of-state LLRW disposal facilities and the diminished volume of LLRW that would have been disposed of at the regional LLRW disposal facility in Pennsylvania. As a result, the Commission amended certain provisions of its bylaws to facilitate its continued operations without a business office and transferred the duties and responsibilities of the executive director to the chairman of the Commission. The vice chairman acts as secretary and treasurer of the Commission.

The Commission continues to incur certain expenditures, which are included in the Commission's budget. The budget is reviewed and approved by the Commission at its annual meeting. The Commission's annual expenditures presently exceed its annual interest income from the operating fund. The operating fund accounts for the general operations of the Commission and is managed by the Pennsylvania Department of Treasury's INVEST Program.

Financial Highlights

The Commission's actual expenses amounted to $31,080, which is about $880 more than the budgeted amount. Due to COVID-19 pandemic, and cancellation of in-person meetings, the Commission saved approximately $4,609 in travel cost and meeting expenses. The membership for the LLW Forum had a variance of $5,000 (over) because the Commission mistakenly paid for the Pennsylvania membership to the LLW Forum. A reimbursement check was received from the LLW Forum and was deposited into the Commission's checking account. The Commission has taken appropriate measures to prevent a recurrence of this mistake. Overall, the Commission's expenditures exceeded its investment earnings from the operating fund by $25,204.

The Commission has a liability of $2,500 as of June 30, 2020, related to an invoice that was not received by the Commission until after year end.

Overview of the Financial Statements
This discussion and analysis is intended to serve as an introduction to **Appalachian States Low-Level Radioactive Waste Commission's** basic financial statements. The Commission's basic financial statements are comprised of three components: 1) government-wide financial statements, 2) fund financial statements, and 3) notes to the financial statements. This report also contains supplementary information in addition to the basic financial statements themselves.

Government-Wide Financial Statements
The government-wide financial statements are designed to provide readers with a broad overview of the Commission's finances, in a manner similar to a private-sector business. These statements can be found on pages 8 and 9. The statement of net position presents information on all Commission assets and liabilities, with the difference between the two reported as net position.

Net position represents the difference between the Commission's total assets and total liabilities. The statement of net position identifies the specific components of net position as it relates to the Commission. The two possible components of net position are:

- Restricted - those assets that have restrictions either externally imposed by a creditor, grantors, contributors, or laws or regulation of other governments or imposed by law through constitutional provisions or enabling legislation.
- Unrestricted - assets that are not classified as restricted and may be used to meet the government's ongoing obligations to citizens and creditors.

Over time, increases and decreases may serve as a useful indicator of whether the financial position of the Commission is improving or deteriorating.

The statement of activities presents information showing how the Commission's net position changed during the most recent fiscal year. Revenues are recorded when earned, and expenses are recorded as incurred.

The government-wide financial statements are intended to distinguish the functional activities of a governmental unit, the revenues applicable to a specific function, and the extent to which a function is supported by general revenues. For the Commission, the sole function is administrative in nature, and there are no program-specific revenues.

Governmental activities for the Commission include general administration. A general financial overview is illustrated in the statement of activities which can be found on page 9.

Fund Financial Statements
A fund is a grouping of related accounts that is used to maintain control over resources that have been segregated for specific activities or objectives. **Appalachian States Low-Level Radioactive Waste Commission,** like other state and local governments, uses fund accounting to ensure and demonstrate compliance with finance-related legal requirements. The funds of the Commission include governmental funds.

Fund balance represents the difference between the Commission's assets and liabilities. The two designations for fund balance are:

- Restricted Fund Balance - identifies the portion of fund balance for which the Commission is restricted by external factors, such as regulations or grantor requirements, in how the funds can be spent.

Fund Financial Statements (Continued)

- Unassigned Fund Balance - is the residual balance not restricted or assigned.

Appalachian States Low-Level Radioactive Waste Commission maintains the following major governmental funds: operating fund and surcharge fund. Information is presented separately in the governmental fund balance sheet and in the governmental fund statement of revenue, expenditures, and changes in fund balances for these funds.

Appalachian States Low-Level Radioactive Waste Commission adopts an annual budget for the operating fund. Budgetary comparison statements can be found on page 16. The basic governmental funds financial statements can be found on pages 10 through 11 of this report.

Government-Wide Financial Analysis

As noted earlier, net position may serve over time as a useful indicator of a government's financial position. In the case of the Commission, assets exceeded liabilities by $2,909,387 at the close of the fiscal year ended June 30, 2020. However, the restricted investments with the INVEST Program can not be used for routine expenses of the Commission. The Commission has approached the Department of Energy to seek the agency's concurrence to use the interest income from the restricted fund for the Commission's routine expenses.

Appalachian States Low-Level Radioactive Waste Commission's Net Position - June 30, 2020 and 2019

	2020	2019
Total Assets	2,911,887	2,861,146
Total Liabilities	2,500	-0-
Restricted	2,853,620	2,780,175
Unrestricted	55,767	80,971
Total Net Position	**2,909,387**	**2,861,146**

The balance of net position - unrestricted as of June 30, 2020, is $55,767 and may be used to meet the Commission's ongoing obligations to citizens and Pennsylvania Department of Environmental Protection (DEP).

At the end of the current fiscal year, the Commission is able to report positive balances in all categories of net position.

Government-Wide Financial Analysis (Continued)
Below is a summary of activities for the Commission during the fiscal years ended June 30, 2020 and 2019:

	2020	2019
Revenues:		
Program Revenues	-0-	-0-
General Revenues:		
Investment Earnings	74,321	59,305
Membership Reimbursement	5,000	-0-
	79,321	**59,305**
Expenses:		
General Administrative	31,080	29,285
Changes in Net Position	**48,241**	**30,020**
Net Position:		
Beginning	2,861,146	2,831,126
Ending	**2,909,387**	**2,861,146**

Governmental Funds
The focus of the Commission's governmental funds is to provide information on near-term inflows, outflows, and balances of spendable resources. Such information is useful in assessing the Commission's financing requirements. In particular, unrestricted fund balances may serve as a useful measure of a government's net resources for spending at the end of the fiscal year.

At the end of fiscal year June 30, 2020, the Commission's governmental funds reported combined ending balances of $2,909,387, an increase of $48,241 over the previous year's ending fund balance.

The operating fund is the chief operating fund of the Commission. At the end of fiscal year 2020, unassigned fund balance of the operating fund was $55,767. As a measure of the operating fund's liquidity, it may be useful to compare the unassigned fund balance to total fund expenditures. Unassigned fund balance represents about 179% of operating fund expenditures.

Operating Fund Budgetary Highlights
- Revenues of $5,876 were more than the 2020 budget of $1,000 or 587.6%.
- Expenditures were over budget by $880 or 2.9%.

Business Outlook
The Commission is considering a change to its Bylaws to allow for virtual meetings and to remove the current requirement of having at least four members in attendance. If approved, during a pandemic situation, this could result in a substantial decrease in expenses associated with the annual meeting, including travel cost for the members to attend the meeting.

Requests for Information

This financial report is designed to provide a general overview of the **Appalachian States Low-Level Radioactive Waste Commission's** finances for anyone with an interest in the Commission's finances. Questions concerning any of the information provided in this report or requests for additional financial information should be addressed to the Commission Administrator, Appalachian States Low-Level Radioactive Waste Commission, 400 Market Street, 13th Floor, Harrisburg, PA 17101.

Appalachian States Low-Level Radioactive Waste Commission

STATEMENTS of NET POSITION

June 30, 2020 and 2019

	2020	2019
ASSETS		
Cash and Cash Equivalents	$ 8,086	$ 6,666
Investments	2,898,801	2,854,480
Reimbursable Expenses	5,000	-0-
TOTAL ASSETS	**2,911,887**	**2,861,146**
LIABILITIES	**2,500**	**-0-**
NET POSITION		
Unrestricted	55,767	80,971
Restricted	2,853,620	2,780,175
TOTAL NET POSITION	**$ 2,909,387**	**$ 2,861,146**

See notes to financial statements.

Appalachian States Low-Level Radioactive Waste Commission

STATEMENTS of ACTIVITIES

Years Ended June 30, 2020 and 2019

	Expenses		Program Revenue		Net Revenue (Expense) and Changes in Net Position	
	2020	2019	2020	2019	2020	2019
FUNCTIONS/PROGRAMS						
General Administrative	$ 31,080	$ 29,285	$ -0-	$ -0-	$ (31,080)	$ (29,285)
GENERAL REVENUE						
Investment Earnings					74,321	59,305
Membership Reimbursement					5,000	-0-
					79,321	**59,305**
CHANGES in NET POSITION					**48,241**	**30,020**
NET POSITION						
Beginning of Year					2,861,146	2,831,126
End of Year					**$ 2,909,387**	**$ 2,861,146**

See notes to financial statements.

Appalachian States Low-Level Radioactive Waste Commission

BALANCE SHEETS -
GOVERNMENTAL FUNDS
Years Ended June 30, 2020 and 2019

	Major Funds 2020			Major Funds 2019		
	Operating Fund	Surcharge Fund	Total	Operating Fund	Surcharge Fund	Total
ASSETS						
Cash and Cash Equivalents	$ 8,086	$ -0-	$ 8,086	$ 6,666	$ -0-	$ 6,666
Investments	45,181	2,853,620	2,898,801	74,305	2,780,175	2,854,480
Reimbursable Expenses	5,000	-0-	5,000	-0-	-0-	-0-
TOTAL ASSETS	**58,267**	**2,853,620**	**2,911,887**	**80,971**	**2,780,175**	**2,861,146**
LIABILITIES	**2,500**	**-0-**	**2,500**	**-0-**	**-0-**	**-0-**
FUND BALANCES						
Unassigned	55,767	-0-	55,767	80,971	-0-	80,971
Restricted	-0-	2,853,620	2,853,620	-0-	2,780,175	2,780,175
TOTAL LIABILITIES and FUND BALANCES	**$ 55,767**	**$ 2,853,620**	**$ 2,909,387**	**$ 80,971**	**$ 2,780,175**	**$ 2,861,146**

See notes to financial statements.

Appalachian States Low-Level Radioactive Waste Commission

STATEMENTS of REVENUE, EXPENDITURES,
and CHANGES in FUND BALANCES -
GOVERNMENTAL FUNDS
Years Ended June 30, 2020 and 2019

	Major Funds 2020			Major Funds 2019		
	Operating Fund	Surcharge Fund	Total	Operating Fund	Surcharge Fund	Total
REVENUE						
Investment Earnings	$ 876	$ 73,445	$ 74,321	$ 1,827	$ 57,478	$ 59,305
Membership Reimbursement	5,000	-0-	5,000	-0-	-0-	-0-
	5,876	**73,445**	**79,321**	**1,827**	**57,478**	**59,305**
EXPENDITURES						
Legal Services	10,000	-0-	10,000	10,000	-0-	10,000
Membership Fee	14,500	-0-	14,500	9,500	-0-	9,500
Meeting Expenses	1,554	-0-	1,554	1,435	-0-	1,435
Audit	3,200	-0-	3,200	3,000	-0-	3,000
Travel	837	-0-	837	4,776	-0-	4,776
Insurance	200	-0-	200	200	-0-	200
Advertising	247	-0-	247	356	-0-	356
Office Supplies	365	-0-	365	-0-	-0-	-0-
Miscellaneous	177	-0-	177	18	-0-	18
	31,080	**-0-**	**31,080**	**29,285**	**-0-**	**29,285**
EXCESS (DEFICIENCY) of REVENUES OVER EXPENDITURES	**(25,204)**	**73,445**	**48,241**	**(27,458)**	**57,478**	**30,020**
FUND BALANCE						
Beginning of Year	80,971	2,780,175	2,861,146	108,429	2,722,697	2,831,126
End of Year	**$ 55,767**	**$ 2,853,620**	**$ 2,909,387**	**$ 80,971**	**$ 2,780,175**	**$ 2,861,146**

See notes to financial statements.

NOTE 1 - SUMMARY of SIGNIFICANT ACCOUNTING POLICIES

The **Appalachian States Low-Level Radioactive Waste Commission** (the Commission) was established to meet state responsibilities outlined in the federal Low-Level Radioactive Waste Policy Act of 1980 (P.L. 96-573) and the Low-Level Radioactive Waste Policy Amendments Act of 1985 (P.L. 99-240).

The accounting policies of **Appalachian States Low-Level Radioactive Waste Commission** conform with accounting principles generally accepted in the United States of America as applicable to governmental units. The Governmental Accounting Standards Board (GASB) is the authoritative standard-setting body for the establishment of governmental accounting and financial reporting principles. The more significant of these accounting policies are as follows:

Reporting Entity
The reporting entity consists of all funds over which the Commission exercises oversight responsibility. Oversight responsibility is determined on the basis of financial interdependency, selection of governing authority, designation of management, ability to significantly influence operations and accountability for fiscal matters and scope of public service. The Commission is not a component unit of any of the Party States and is not included in any of the Party State's financial statements. Additionally, no other component units exist.

Basis of Presentation
Entity-wide financial statements (i.e., the statement of net position and the statement of activities) report information on all activities of the Commission.

The statement of activities demonstrates the degree to which the direct expenses are offset by revenues.

The government-wide statements are prepared using the economic resources measurement focus.

Fund Accounting
The accounts of the Commission are organized on the basis of funds, each of which is considered a separate accounting entity. The operations of each fund are accounted for with a separate set of self-balancing accounts that comprise its assets, liabilities, fund balance, revenues, and expenditures. Resources are allocated to and accounted for in individual funds based upon the purposes for which they are to be spent and the means by which spending activities are controlled. The Commission has the following funds:

Operating Fund - This is the general fund for the Commission. This fund accounts for the general operations of the Commission.

Surcharge Fund - This a special revenue fund for the Commission. This fund accounts for the surcharge payments received by the Commission.

NOTE 1 - SUMMARY of SIGNIFICANT ACCOUNTING POLICIES (Continued)

Surcharge Payments
Surcharge payments came from a disposal surcharge levied by the Federal government on generators of low-level waste. This surcharge was mandated by the 1985 Low-Level Radioactive Waste Policy Amendments Act. The surcharge was to serve as an incentive to regions and states to meet federally set milestones in the development of their own disposal facilities.

Fund Financial Statements and Basis of Accounting
Fund financial statements are provided for governmental funds. Major individual governmental funds are reported in separate columns.

The accounting and financial reporting treatment applied to a fund is determined by its measurement focus. All governmental fund types are accounted for using a flow of current financial resources measurement focus. The financial statements for governmental funds are a balance sheet, which generally includes only current assets and current liabilities, and a statement of revenues, expenditures, and changes in fund balances, which reports on the sources (i.e., revenues and other financing sources) and uses (i.e., expenditures and other financing uses) of current financial resources.

Income Tax
The Commission is exempt under the Internal Revenue Code and, accordingly, there is no provision for income taxes in the accompanying financial statements.

Investments, Income Recognition, and Fair Value
The Commission categorizes the fair value measurements of its investments based on the hierarchy established by generally accepted accounting principles. The fair value hierarchy, which has three levels, is based on the valuation inputs used to measure an asset's fair value: Level 1 inputs are quoted prices in active markets for identical assets; Level 2 inputs are significant other observable inputs; Level 3 inputs are significant unobservable inputs.

Investments with remaining maturities at the time of purchase of one year or less are stated at amortized cost which approximates fair value. The securities of 2a7-like investment pools are valued at amortized cost, which approximates fair value of the pool.

NOTE 2 - CASH and CASH EQUIVALENTS and INVESTMENTS

Cash and Cash Equivalents
All of the Commission's cash deposits are FDIC insured up to $250,000. The Commission does not have a formal policy regarding cash deposits.

NOTE 2 - CASH and CASH EQUIVALENTS and INVESTMENTS (Continued)

Investments

Investments are measured at fair value on a recurring basis. Recurring fair value measurements are those that GASB Statements require or permit in the statement of net position at the end of each reporting period. Fair value measurements are categorized based on the valuation inputs used to measure an asset's fair value: Level 1 inputs are quoted prices in active markets for identical assets; Level 2 inputs are significant other observable inputs; Level 3 inputs are significant unobservable inputs.

At June 30, 2020 and 2019, the Commission held the following investments recorded at cost or amortized cost:

	2020	2019
INVEST Community Fund	2,898,801	2,854,480

The INVEST Community Fund positions have a weighted average maturity that does not exceed 60 days. The INVEST Community Fund balances are liquid.

The INVEST Community Fund is a 2a7-like pool. The amortized cost, which approximates fair value of the pool, is determined by the pool's share price. The Commission has no regulatory oversight for the pool, which is administered by the Pennsylvania Treasury Department and managed by the Treasury Department's investment staff. The Compliance Division, within Treasury's Bureaus of Cash Management and Investments, has implemented investment monitoring procedures for the INVEST Community Fund to ensure strict adherence to the Policy.

Credit Risk

The Commission has no investment policy that would limit its investment choices to certain credit ratings. As of June 30, 2020, the Commission investments were rated as:

Investments	Standard & Poor's
Pennsylvania INVEST Community Fund	AAAm

Concentration of Credit Risk

The Commission places no limit on the amount they may invest in any one issuer. At June 30, 2020 and 2019, the Commission does not have any concentration of credit risk in its investments.

Custodial Credit Risk

For an investment, custodial credit risk is the risk that, in the event of the failure of the counterparty, the Commission will not be able to recover the value of its investments or collateral security that are in the possession of an outside party. The Commission has no investments which are subject to custodial credit risk at June 30, 2020.

NOTE 3 - NET POSITION and FUND BALANCES

The Commission has restricted a portion of the June 30 net position and fund balances as follows:

	2020	2019
Surcharge Fund	**2,853,620**	**2,780,175**

Surcharge Fund is the money allocated by the 1985 Low-Level Radioactive Waste Policy Amendments Act.

NOTE 4 - LEGAL SERVICES

Legal services are primarily to assist the Commission in fulfilling its activity as disclosed in Note 1. In the opinion of management, the Commission is not involved in any litigation that would have a material adverse effect on the financial position of the Commission.

NOTE 5 - UNCERTANTIES

On March 11, 2020, the World Health Organization declared the coronavirus (COVID-19) a pandemic. On March 19, 2020, Governor Tom Wolf ordered the closure of non-life-sustaining businesses in Pennsylvania. The Commission is considered a non-life-sustaining business. The physical location has closed, but the administrator is working remotely and the Commission continues to operate as normal. The extent of the impact of COVID-19 on the Commission's operational and financial performance will depend on certain developments, including the duration and spread of the outbreak and impact on vendors and investment markets all of which are uncertain and cannot be predicted. At this point, the extent to which COVID-19 may impact the Commission's financial condition or results of operations is uncertain.

NOTE 6 - RISK MANAGEMENT

The Commission maintains insurance contracts to deal with the risk of loss arising from the following events: torts; theft of, damage to, or destruction of assets; business interruptions; errors and omissions; acts of God. Insurance contracts cover public officials, automobile, and umbrella liabilities. The contracts also provide employee, treasurer, and employee blanket bonds. During the year ended June 30, 2020, and the two previous fiscal years, no settlements exceeded insurance coverage.

Appalachian States Low-Level Radioactive Waste Commission

BUDGETARY COMPARISON INFORMATION -
OPERATING FUND
Year Ended June 30, 2020

	Actual	Final Budget	Variance Over (Under) Budget
REVENUE			
Investment Earnings	$ 876	$ 1,000	$ (124)
Membership Reimbursement	5,000	-0-	5,000
	5,876	**1,000**	**4,876**
EXPENDITURES			
Legal Services	10,000	10,000	-0-
Membership Fee	14,500	9,500	5,000
Meeting Expenses	1,554	2,000	(446)
Audit	3,200	3,000	200
Travel	837	5,000	(4,163)
Insurance	200	200	-0-
Advertising	247	500	(253)
Office Supplies	365	-0-	365
Miscellaneous	177	-0-	177
	31,080	**30,200**	**880**
Excess (Deficiency) of Revenues over Expenditures	**$ (25,204)**	**$ (29,200)**	**$ 3,996**

See independent auditors' report.

INDEPENDENT AUDITORS' REPORT on INTERNAL CONTROL over FINANCIAL REPORTING and on COMPLIANCE and OTHER MATTERS BASED on an AUDIT of FINANCIAL STATEMENTS PERFORMED in ACCORDANCE WITH *GOVERNMENT AUDITING STANDARDS*

Commission Members
Appalachian States Low-Level Radioactive Waste Commission
Harrisburg, Pennsylvania

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the financial statements of the governmental activities and each major fund of **Appalachian States Low-Level Radioactive Waste Commission**, as of and for the year ended June 30, 2020, and the related notes to the financial statements, which collectively comprise **Appalachian States Low-Level Radioactive Waste Commission's** basic financial statements, and have issued our report thereon dated December 9, 2020.

Internal Control over Financial Reporting
In planning and performing our audit of the financial statements, we considered **Appalachian States Low-Level Radioactive Waste Commission's** internal control over financial reporting (internal control) to determine the audit procedures that are appropriate in the circumstances for the purpose of expressing our opinions on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of **Appalachian States Low-Level Radioactive Waste Commission's** internal control. Accordingly, we do not express an opinion on the effectiveness of **Appalachian States Low-Level Radioactive Waste Commission's** internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies and therefore, material weaknesses or significant deficiencies may exist that have not been identified. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

Compliance and Other Matters

As part of obtaining reasonable assurance about whether **Appalachian States Low-Level Radioactive Waste Commission's** financial statements are free from material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

Trout CPA

December 9, 2020
Lancaster, Pennsylvania

GLOSSARY OF COMMON RADIOACTIVE WASTE TERMS

Glossary of Common Radioactive Waste Terms

Atomic Energy Act (AEA) – This 1954 Act created the federal Atomic Energy Commission (AEC). The AEC later split into the Nuclear Regulatory Commission (NRC) and the Energy Research and Development Administration (ERDA). ERDA then became part of the U.S. Department of Energy (DOE) in 1977. This Act encouraged the development and use of nuclear energy and research for the general welfare and the common defense and security of the United States. It is the basis of authority for the NRC, the DOE, and the U.S. Environmental Protection Agency (EPA) in regulating radioactive materials defined in the AEA. NARM is not defined under this act and, therefore, is not subject to its requirements. (See Glossary entry for "NARM.")

By-product Material – There are three types of by-product materials: (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure incident to the process of producing or utilizing special nuclear material; (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 solution extraction processes (underground ore bodies depleted by these solution extraction operations do not constitute "by-product material" within this definition); and (3) the Energy Policy Act in 2005 added discrete Ra-226 sources to the by-product definition. Also included is any other naturally occurring radioactive material made into a discrete source that would pose a similar hazard to an Ra-226 discrete source.

CERCLA (Superfund) – Passed in 1980, the Comprehensive Environmental Response, Compensation and Liability Act (also known as Superfund) addresses immediate and long-term threats to the public's health and the environment from abandoned or active sites contaminated with hazardous or radioactive materials. Under the Superfund program, EPA has the authority to clean up the nation's worst hazardous waste sites using money from a trust fund supported primarily from a tax on chemical feed stocks used by manufacturers. Companies or individuals responsible for the wastes are identified by EPA, if possible, and made to pay for the cleanups. The Superfund Amendments and Reauthorization Act (SARA) of 1986 authorized CERCLA to continue cleanup activities around the country. Several site-specific amendments, definitions, clarifications, and technical requirements were added to the legislation, including additional enforcement authorities. Title III of SARA also authorized the Emergency Planning and Community Right-to-Know Act (EPCRA).

CFR – Code of Federal Regulations.

Class A Waste – Waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in 10 CFR 61.56(a). If Class A waste also meets the stability requirements set forth in 10 CFR 61.56(b), it is not necessary to segregate the waste for disposal.

Class B Waste – Waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in 10 CFR 61.56.

Class C Waste – Waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in 10 CFR 61.56.

Curie (Ci) – Radioactive atoms are unstable and break down by disintegrating into other atoms. A curie is the unit of radioactivity equal to 3.7×10^{10} disintegrations per second or 3.7×10^{10} becquerel (Bq). A common unit used in environmental measurements is the picocurie (pCi), which is equal to 10^{-12} Ci or 0.37 disintegrations per second or 0.037 Bq.

Decay-in-Storage– Radioactive elements will break down and emit energetic gamma rays, X-rays, and particles. After enough time has elapsed (usually ten half-lives), the material has decayed to a point where a sensitive radiation survey meter cannot distinguish between it and natural background radiation levels. Often radioactive materials licensees utilizing very short half-life materials will be permitted to ‘decay-in-store’ their LLRW.

Department of Energy (DOE) – This federal agency's mission is to achieve efficiency in energy use, diversity in energy sources, a more productive and competitive economy, improved environmental quality, and a secure national defense. DOE was created on Oct. 1, 1977, out of the Energy Research and Development Agency, as well as various aspects of non-nuclear federal energy policy and programs. The DOE complex, which is located across 22 states, produced, and tested nuclear weapons. For more information, visit DOE's website at www.doe.gov.

Energy*Solutions* – A company that operates a LLRW disposal facility in Clive, Utah.

Environmental Protection Agency (EPA) – Created in 1970, the federal EPA is responsible for working with state and local governments to control and prevent pollution in areas of solid and hazardous waste, pesticides, water, air, drinking water, and toxic and radioactive substances.

Federal Facilities Compliance Act (FFCA or FFCAct) – An amendment to Resource Conservation and Recovery Act (RCRA), the FFCA waives immunity for DOE and other federal agencies, allowing states and the EPA to impose penalties for non-compliance, and requires DOE to develop plans for treating hazardous components of radioactive wastes subject to RCRA requirements.

Half-Life – The half-life of a radioactive material is the time it takes for half of the material to radiate energetic particles and rays and transform into a new stable or unstable nuclide. For example, the half-life of cesium-137 (Cs-137) is 30 years, after which time half of it decays to a non-radioactive stable nuclide, barium-137 metastable (Ba-137m), which then decays to stable Ba-137. For example, if one starts with 100 atoms of Cs-137, 50 atoms of Cs-137 remain after 30 years.

Hazardous Waste – A subset of solid wastes that poses substantial or potential threats to public health or the environment and meets any of the following criteria identified in 40 CFR Parts 260 and 261:

- Is specifically listed as a hazardous waste by EPA;
- Exhibits one or more of the characteristics of hazardous waste (ignitability, corrosivity, reactivity, and/or toxicity); or
- Is generated by the treatment of hazardous waste or is contained in a hazardous waste.

Hazardous and Solid Waste Amendments (HSWA) – This 1984 Act amended RCRA and required the phasing out of land disposal of untreated hazardous waste by more stringent hazardous waste management standards (broken down into thirds with a timetable for each third). Some of the other mandates of this law include increased enforcement authority for EPA and a program requiring corrective action.

High-Level Radioactive Waste (HLW) – The radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly from reprocessing, and any solid waste derived from the liquid that contains a combination of transuranic and fission product nuclides in quantities that require permanent isolation. HLW is also a mixed waste because it has highly corrosive components or has organics or heavy metals that are regulated under RCRA. HLW may include other highly radioactive material that NRC determines by rule, consistent with existing law, requires permanent isolation.

Heavy Metal (RCRA Metals) – This is a common hazardous waste that can damage organisms at low concentrations and tends to accumulate in the food chain. Examples are lead, chromium, cadmium, and mercury.

Land Disposal Restrictions (LDR) – These restrictions were mandated by the 1984 HSWA amendments to RCRA. They prohibit the disposal of hazardous wastes into or on the land unless the waste meets treatability standards of lower toxicity.

Liquid Scintillation Cocktail (LSC) – A common fluid used in medical laboratories to analyze DNA and proteins. It often uses radioactive tracers and RCRA-listed hazardous materials such as Toluene and Xylene. The combinations of the two make it a mixed waste. By volume, it is the most common form of commercially generated (non-DOE) mixed waste (71 percent in a 1990 national study).

Low-Level Mixed Waste (LLMW) – LLMW is waste that contains LLRW and hazardous waste.

Low-Level Radioactive Waste (LLRW or LLW) – LLRW is waste that satisfies the definition of LLRW in the Low-Level Radioactive Waste Policy Amendments Act (LLRWPAA) of 1985. The LLRWPAA defines LLRW as "radioactive material that (A) is not high-level radioactive waste, spent nuclear fuel, or byproduct material as defined in Section 11e.2 of the Atomic Energy Act of 1954; and (B) which the NRC, consistent with existing law and in accordance with paragraph (A), classifies as low-level radioactive waste."

Manifest Information Management System (**MIMS**) **–** It is a database used to monitor the management of commercial low-level radioactive waste (LLW) in the United States and is operated by the U.S. Department of Energy.

Mixed Transuranic Waste (MTRU) – MTRU contains both transuranic (TRU) and hazardous wastes. Approximately 55 percent of DOE's TRU is MTRU.

Mixed Waste (MW) – MW contains both hazardous waste (as defined by RCRA and its amendments) and radioactive waste (as defined by AEA and its amendments). The NRC or the NRC's agreement states and EPA or EPA's RCRA authorized states jointly regulate mixed waste. The fundamental and most comprehensive statutory definition is found in the Federal Facilities Compliance Act (FFCA), where Section 1004(41) was added to RCRA: "The term 'mixed waste' means waste that contains both hazardous waste and source, special nuclear or byproduct material subject to the Atomic Energy Act of 1954."

Naturally Occurring or Accelerator-Produced Radioactive Materials (NARM) – Radioactive materials not previously covered under the AEA that are naturally occurring or produced by an accelerator. Accelerators are used in sub-atomic particle physics research. These materials have been traditionally regulated by the states. Discrete naturally occurring (e.g., Ra-226) and accelerator produced radionuclides are now classified as by-product material under the Energy Policy Act of 2005.

Naturally Occurring Radioactive 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.

Nuclear Regulatory Commission (NRC) – NRC is an independent regulatory agency created out of the Atomic Energy Commission in 1975 to regulate the civilian uses of nuclear material. Specifically, the NRC is responsible for ensuring that activities associated with the operation of nuclear power plants and fuel cycle plants, and medical, industrial, and research applications are carried out with adequate protection of the public health and safety, environment, and national security. At full complement, the NRC has five commissioners nominated by the President and confirmed by the Senate. The President designates one of the commissioners as Chairman. NRC regulates all commercial AEA materials. Except in a few cases, NRC does not regulate DOE. NRC does not regulate diffuse NORM or TENORM. This site (http://www.nrc.gov) will link you to NRC's home page.

Resource Conservation and Recovery Act (RCRA) – RCRA gave EPA authority to control hazardous waste from "cradle-to-grave." This includes the minimization, generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. RCRA focuses only on active and future facilities and does not address abandoned or historical sites (see CERCLA).

Rad (radiation absorbed dose) – One rad is defined as the absorption of 100 ergs per gram of material. The unit rad can be used for any type of radiation. The rad is a unit used to measure a quantity called absorbed dose. This relates to the amount of energy absorbed in some material and is used for any type of radiation and any material.

Radiation – Ionizing radiation is comprised of highly energetic and penetrating X-rays and gamma rays and lesser penetrating particles. Beta particles are simply energetic electrons, and alpha particles are helium nuclei both arising from the nucleus of a decaying atom. The alpha particle is the easiest of these radiations to stop and the gamma rays are the most difficult to shield against. A piece of paper can stop an alpha particle, but it may take as much as many inches of lead shielding to stop most of the X-rays or gamma rays in a beam. Depending on the dose, kind of radiation, and observed endpoint, the biological effects of radiation can differ widely. Ionizing radiation has been proven to cause cancer at high doses and is assumed to cause cancer and other deleterious health effects at low doses.

Rem (roentgen equivalent man) – The rem is a unit used to derive a quantity called equivalent dose. This relates the absorbed dose in human tissue modified to reflect the effective biological damage of the radiation. Equivalent dose is often expressed in terms of thousandths of a rem or mrem.

Solid Waste – As defined under RCRA, any solid, semi-solid, liquid, or contained gaseous materials discarded from industrial, commercial, mining, agricultural operations and from community activities. Solid waste includes garbage, construction debris, commercial refuse, sludge from water supply or waste treatment plants, or air pollution control facilities and other discarded materials. Solid waste does not include solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under Section 402 of the Clean Water Act or source, special nuclear, or byproduct material as defined by the AEA.

Source Material – Source material is the uranium or thorium ores mined from the earth. Source material is defined in 10 CFR 20.1003 as “(1) uranium or thorium or any combination of uranium and thorium in any physical or chemical form; or (2) ores that contain, by weight, one-twentieth of one percent (0.05 percent) or more of uranium, thorium, or any combination of uranium and thorium. Source material does not include special nuclear material."

Special Nuclear Material (SNM) – SNM is defined in 10 CFR 20.1003 as "(1) plutonium, uranium-233, uranium enriched in the isotope 233 or in isotope 235, and any other material that the NRC, pursuant to the provisions of Section 51 of the AEA, determines to be SNM, but does not include source material; (2) or any material artificially enriched by any of the foregoing but does not include source material.” SNM is important in the fabrication of weapons-grade materials and, as such, has strict licensing and handling controls.

Specific Activity – The amount of radioactivity per unit weight or volume.

Spent Nuclear Fuel (SNF) – Fuel is withdrawn from a nuclear reactor following irradiation and has undergone at least one year's decay since being used as a source of energy in a power reactor. SNF has not been chemically separated from its constituent elements by reprocessing. SNF includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies. See 10 CFR 72.3 for more details.

Superfund – See "CERCLA."

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. § 2015 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 Radioactive Waste (TRU) – TRU waste contains more than 100 nanocuries of alpha-emitting transuranic isotopes with half-lives greater than 20 years per gram of waste except for (1) high-level radioactive waste; (2) wastes that DOE has determined, with the concurrence of EPA, do not need the degree of isolation required by EPA's high-level waste rule (40 CFR 191); or (3) waste that has been approved for disposal on a case-by-case basis in accordance with NRC's radioactive land disposal regulation (10 CFR Part 61). TRU is not generally found outside the DOE complex and is mainly produced from the reprocessing of spent nuclear fuel, nuclear weapons production, and reactor fuel assembly. TRU wastes mainly emit alpha particles as they break down. DOE is currently proceeding with plans for TRU waste disposal at a geologic repository called the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico. DOE categorizes TRU as either contact handled (CH) or remote handled (RH) with RH being the more radioactive of the two.

Vitrification – Vitrification is the process of converting materials into a glass-like substance, typically through a thermal process. Radionuclides and other inorganics are chemically bonded in the glass matrix. Consequently, vitrified materials generally perform very well in leach tests. EPA has specified, under the land disposal restrictions, vitrification to be the treatment technology for high-level waste (55 FR 22627, June 1, 1990).

Waste Control Specialists LLC (WCS) – A company that operates a LLRW, byproducts and hazardous waste disposal facility in Andrews, Texas. The facility is within the jurisdiction of the Texas Low-Level Radioactive Waste Disposal Compact (member states are Texas and Vermont).

Waste Isolation Pilot Plant (WIPP) – The WIPP, which is managed by the DOE, is a geologic disposal facility for TRU radioactive waste generated as by-products from DOE's nuclear weapons production. The WIPP is located underground in excavated, natural salt formations near Carlsbad, New Mexico.

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