DOE Occupational Radiation Exposure Report for CY 2019
Exhibit A-1. Labor Categories and Occupation Codes.

The following is a list of the Occupation Codes that are reported with each individual's dose record to the DOE Radiation Exposure Monitoring System (REMS) in accordance with DOE Order 231.1B. Occupation Codes are grouped into Labor Categories for the purposes of analysis and summary in this report. The occupation codes are listed in the REMS Reporting Guide, Table G-7, and represent a subset of the occupations listed in the Department of Commerce's Standard Occupational Classification (SOC) Manual (1980).

Labor Category	Occupation Code	Occupation Name
Agriculture	562	Groundskeepers
	570	Forest Workers
	580	Misc. Agriculture
Construction/Repair	610	Mechanics/Repairers
	641	Masons
	642	Carpenters
	643	Electricians
	644	Painters
	645	Pipe Fitter
	650	Miners/Drillers
	660	Misc. Repair/Construction
Laborers	850	Handlers/Laborers/Helpers
Management	110	Manager - Adminstrator
	400	Sales
	450	Admin. Support and Clerical
Misc.	910	Military
	990	Miscellaneous
Production	681	Machinists
	682	Sheet Metal Workers
	690	Operators, Plant/System/Utility
	710	Machine Setup/Operators
	771	Welders and Solderers
	780	Misc. Precision/Production
Professional	160	Engineer
	170	Scientist
	184	Health Physicist
	200	Misc. Professional
	260	Doctors and Nurses
Service Workers	512	Firefighters
	513	Security Guards
	521	Food Service Employees
	524	Janitors
	525	Misc. Service
Technicians	350	Technicians
	360	Health Technicians
	370	Engineering Technicians
	380	Science Technicians
	383	Radiation Monitors/Techs.
	390	Misc. Technicians
Transport Workers	820	Truck Drivers
	821	Bus Drivers
	825	Pilots
	830	Equipment Operators
	840	Misc. Transport
Unknown	001	Unknown

DOE Occupational Radiation Exposure Report for CY 2019

Exhibit A-2. Organizations Reporting to DOE REMS, 2015–2019.

The following is a list of all organizations reporting to the DOE REMS from 2015–2019.
The list provides the Site groupings used in this report as well as the organization reporting code and name.

Site	Org. Code	Organization Name	2015	2016	2017	2018	2019
Albuquerque	OST3100	Office of Secure Transportation	●	●	●	●	●
Ames Laboratory	1000503	Ames Laboratory (Iowa State)	●	●	●	●	●
Argonne National Laboratory (ANL)	1000703	Argonne National Laboratory	●	●	●	●	●
	1004031	New Brunswick Laboratory	-	●	-	-	-
Brookhaven National Laboratory (BNL)	1001003	Brookhaven National Laboratory	●	●	●	●	●
DOE Headquarters	1504001	DOE Headquarters	●	●	●	●	●
Energy Technology Engineering Center	8002001	Cabrera Services	●	●	●	●	●
Fermi National Accelerator Lab. (FERMI)	1002503	Fermilab	●	●	●	●	●
Grand Junction Site	3260615	Navarro Research and Engineering	-	-	●	●	●
Hanford	4700805	Bechtel National Corporation	●	●	●	●	●
	4701001	DOE, Office of River Protection	●	●	●	●	●
	4702004	Advance Technology Laboratories	●	●	-	-	-
	4702005	Wastren Advantage, Inc.	●	●	●	●	●
	4707104	Washington River Protection Solutions, LLC	●	●	●	●	●
	NA-2000	NNSA - Visitors	●	●	●	●	●
	NA-2100	NNSA - Management and Support Personnel	●	●	●	●	●
	NA-2101	NNSA - Mgmt. & Support Personnel: MELE Assoc.	●	●	●	●	●
	NA-2110	NNSA - North and South America	●	●	●	●	●
	NA-2120	NNSA - Europe, Africa and the Middle East	●	●	●	●	●
	NA-2130	NNSA - Asia and Members of the Former Soviet	-	●	-	-	-
	7500503	Battelle - PNNL	●	●	●	●	●
	7500504	Battelle -PNNL- Subs	●	●	●	●	●
	7500521	Pacific Northwest Site Office	●	●	●	●	●
	7500605	Washington Closure Hanford	●	●	-	-	-
	7502504	HPMC Occupational Medical Services	●	●	●	●	●
	7505214	Mission Support Alliance (MSA)	●	●	●	●	●
	7505304	CH2M Hill Plateau Remediation Company	●	●	●	●	●
	7506001	DOE-Richland Field Office	●	●	●	●	●
Idaho Site	3004001	Idaho Field Office	●	●	●	●	●
	3004404	BBWI Service Subs	●	-	-	-	-
	3005003	INL - BEA, LLC - Research	●	●	●	●	●
	3005004	INL - BEA, LLC - Services	●	●	●	●	●
	3005009	INL - BEA, LLC - Security	●	●	●	●	●
	3005012	INL - BEA, LLC - Production	●	●	●	●	●
	3006002	INL - CWI - Projects	●	-	-	-	-
	3006002	INL - Fluor- Projects	-	●	●	●	●
	3006004	ICP - CWI - Subcontractors	●	-	-	-	-
	3006004	ICP - Fluor - Subcontractors	-	●	●	●	●
	3006005	ICP - CWI - Support	●	-	-	-	-
	3006005	ICP - Fluor - Support	-	●	●	●	●
	3006016	ICP - CWI - Construction Subs	●	-	-	-	-
	3006016	ICP - Fluor - Construction Subs	-	●	-	-	-
Kansas City Plant	0531002	Honeywell FM & T/KC Production	●	-	-	-	-
Kansas City National Security Campus	0531002	Honeywell FM & T	-	●	●	●	●
Lawrence Berkeley National Lab. (LBNL)	8003003	Lawrence Berkeley National Laboratory	●	●	●	●	●
Lawrence Livermore National Lab. (LLNL)	0580403	Lawrence Livermore National Laboratory	●	●	●	●	●
	0580416	LLLNL - Construction Subcontractors	-	-	-	●	●
	0580503	LLNL - Nevada	-	●	●	●	●
	0580701	LLNL - DOE Site Office	●	●	●	●	●
Los Alamos National Lab. (LANL)	0540001	NNSA Los Alamos Site Office	●	●	●	●	●
	0544003	Los Alamos National Laboratory	●	●	●	●	●
	0544006	Los Alamos National Lab Construction Subs	-	-	●	●	●
	0544809	Protection Technologies Los Alamos	●	●	●	-	-
	0544904	Johnson Controls, Inc.	●	●	●	●	-

Site	Org. Code	Organization Name	2015	2016	2017	2018	2019
	1530001	Newport News Nuclear BWXT Los Alamos (N3B)	-	-	-	●	●
National Renewable Energy Laboratory	2806003	National Renewable Energy Laboratory	●	●	●	●	●
Nevada National Security Site	0501001	NNSA Service Center	●	●	●	●	-
	0520001	NNSA Nevada Site Office	●	●	●	●	●
	0521104	Bechtel Nevada - Amador Valley	●	●	-	-	-
	0521104	MSTS - Livermore Operations	-	-	●	●	●
	0521204	Bechtel Nevada - Las Vegas	●	●	-	-	-
	0521204	MSTS - Las Vegas	-	-	●	●	●
	0521304	Bechtel Nevada - Los Alamos	●	●	-	-	-
	0521304	MSTS - Los Alamos	-	-	●	●	●
	0521314	NSTec - Sandia	-	-	●	-	●
	0521405	Bechtel Nevada - NTS	●	●	-	-	-
	0521405	MSTS - NTS	-	-	●	●	●
	0521416	Bechtel Nevada - NTS - subcontractors	●	●	-	-	-
	0521416	MSTS - NTS subcontractors	-	-	●	●	●
	0521503	Bechtel Nevada - Special Tech Lab.	●	●	-	-	-
	0521503	MSTS - Special Tech. Lab	-	-	●	●	●
	0528002	Centerra-Nevada	●	●	-	-	-
	0528004	Centerra-Nevada Subcontractors Lockheed	●	●	-	-	-
	0529004	Nevada	-	-	●	●	●
	0529009	Wackenhut Services Inc. - NV	-	-	●	●	●
	3505104	Navarro-Intera LLC	●	●	●	●	●
	3508004	Nye County Sheriff - NSTec	●	●	●	-	-
	3508703	SAIC - NV	-	-	●	-	-
	9708001	USGS - Yucca	-	-	●	●	-
New Brunswick Laboratory	1004031	New Brunswick Laboratory - Research	●	●	-	-	-
Oak Ridge Site	4003602	UT-Battelle: ORNL-Isotek	●	●	●	●	-
	4004203	Oak Ridge Inst. For Science & Educ. (ORISE)	●	●	●	●	●
	4004602	Wastren Advantage, Inc.	●	-	-	-	-
	4004602	Tru Waste Processing Center - ORNL	-	●	●	●	●
	4005104	USEC: Oak Ridge, K25	●	●	-	-	-
	4006002	UCOR - ETTP	●	●	●	●	●
	4006503	UT-Battelle - ORNL	●	●	●	●	●
	4006510	UCOR - ORNL	●	●	●	●	●
	4007509	National Strategic Protective Services	●	●	●	●	-
	4008010	UCOR- Y-12	●	●	●	●	●
	4018102	CNS, LLC, Y-12	●	●	●	●	●
Paducah Gaseous Diff. Plant (PGDP)	4007002	Swift & Staley Team	●	●	●	●	●
	6203004	LATA Environmental Services	●	-	-	-	-
	6203106	B&W Conversions Services, LLC	●	-	-	-	-
	6203106	DUF6 Paducah Construction Subs - MACS	-	●	●	●	●
	6503304	Fluor Paducah Deactivation Project	-	●	-	-	-
	6503304	Four Rivers Nuclear Partnership	-	-	●	●	●
Pantex Plant (PP)	0510001	CNS Pantex - NNSA and DOE Couriers	●	●	●	●	●
	0514004	Battelle - Pantex	●	●	●	●	●
	0515002	CNS Pantex	●	●	●	●	●
	0515006	CNS Pantex - Construction Subs	●	●	●	●	●
	0515009	CNS Pantex - Security	●	●	-	●	●
Portsmouth Gaseous Diff. Plant (PORTS)	6202106	Uranium Disposition Services - Portsmouth Sub	●	-	-	-	-
	6202106	DUF6 Portsmouth Construction Subs - MACS	-	●	●	●	●
	6202204	Wastren - Portsmouth Services	●	-	-	-	-
	6202204	Portsmouth Mission Alliance (PMA)	-	●	●	●	●
	6202304	Fluor B & W Portsmouth	●	●	●	●	●
Princeton Plasma Physics Laboratory	1005003	Princeton Plasma Physics Laboratory	●	●	●	●	●
Sandia National Laboratories (SNL)	0578003	Sandia National Laboratories	●	●	●	●	●
Savannah River	0595112	Tritium Extractopm Facility	-	●	●	●	●
	8500505	Bechtel Construction - SR	●	●	●	●	-
	8500516	Miscellaneous SRS Construction Subs	●	●	●	●	●
	8501042	SRR Operations	●	●	●	●	●
	8501044	SRR Service Subs	●	●	●	●	●

Site	Org. Code	Organization Name	2015	2016	2017	2018	2019
	8505501	Savannah River Field Office	●	●	●	●	●
	8505504	Misc. DOE Contractors - SR	●	●	●	●	●
	8505525	Savannah River Nuclear Solutions, Inc.	●	●	●	●	●
	8505526	SR Construction - Parsons Subcontractors	●	●	●	●	●
	8509003	Univ. of Georgia Ecology Laboratories	●	●	●	●	●
	8509509	Wackenhut Services, Inc. - SRNS	●	●	-	-	-
	8509509	Centerra - SR	-	-	●	●	●
	8511002	Savannah River Nuclear Solutions, Inc.	●	●	●	●	●
	8511003	Savannah River National Laboratory	-	●	●	●	●
	8511004	SRNS Service Subs	●	●	●	●	●
	8511005	SRNS Construction	●	●	●	●	●
	8511006	SRNS Construction Subs	●	●	●	●	●
Separations Process Research Unit	1523016	NY SPRU	●	●	●	●	●
SLAC National Accelerator Facility	8008003	Stanford Linear Accelerator Center	●	●	●	●	●
Thomas Jefferson National Accelerator Facility	1509503	Thomas Jefferson National Accelerator Facility	●	●	●	●	●
	1509521	Jefferson Laboratory - DOE Employees	●	●	●	●	●
Uranium Mill Tailings Remediation Action Project	3260645	Uranium Mill Tailings Remedial Action - Moab	●	●	●	●	●
Waste Isolation Pilot Plant	0701001	Carlsbad Field Office	●	●	●	●	-
	0702003	LANL - WIPP	●	●	●	●	-
	0703104	Washington TRU Solutions LLC-WIPP	●	●	●	●	●
	0703109	Santa Fe Protective Services - WIPP	●	●	●	●	●
	0703114	WTS Subcontractors - WIPP	●	●	●	●	●
	0704003	Sandia National Laboratories - WIPP	-	●	-	-	-
West Valley Project	4539004	West Valley Nuclear Services, Inc. (WVNS)	●	●	●	●	●
Pittsburg Naval Reactor Office	6007504	PNR - BAPL & BPMI-P	●	●	●	●	●
	6008003	PNR - BAPL & BPMI-P	●	●	●	●	●
	6009003	Naval Reactors - Idaho	●	●	●	●	●
Schenectady Naval Reactor Office	9004003	Knolls Atomic Power Laboratory	●	●	-	●	●
	9005003	Knolls Atomic Power Laboratory	●	●	●	●	●
	9005004	Knolls Atomic Power Laboratory	●	●	-	●	●

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Exhibit A-3. Facility Type Codes.

The following is a list of Facility Type Codes reported to REMS in accordance with the REMS Reporting Guide. A facility type code is reported with each individual's dose record and indicates the facility type where the majority of the individual's dose was accrued during the monitoring year.

Facility Type Code	Description
10	Accelerator
21	Fuel/Uranium Enrichment
22	Fuel Fabrication
23	Fuel Processing
40	Maintenance and Support (Site-Wide)
50	Reactor
61	Research, General
62	Research, Fusion
70	Waste Processing/Mgmt.
80	Weapons Fab. and Testing
99	Other

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Exhibit B-1. Site Dose Data, 2017.

Site	Collective TED (person-rem)	Percent Change - Coll. TED		Number with Meas. Dose	Percent Change - # with Meas. Dose		Avg. Meas. TED (rem)	Percent Change - Avg. Meas. TED		Percentage of Coll. TED above 0.500 rem	Percent Change - Coll. TED above 0.500 rem	
Ames Laboratory	1.053	-15%	▼	38	-7%	▼	0.028	-8%	▼	-	-	-
Argonne National Laboratory	9.885	-24%	▼	75	7%	▲	0.132	-29%	▼	**50%**	-11%	▼
Brookhaven National Laboratory	6.076	**89%**	▲	77	-8%	▼	0.079	106%	▲	-	-	-
Energy Technology Engineering Center	0.026	-	-	2	-	-	0.013	-	-	-	-	-
Fermi National Accelerator Laboratory	10.210	-14%	▼	201	-13%	▼	0.051	-1%	▼	-	-	-
Grand Junction Site	0.010	-	-	2	-	-	0.005	-	-	-	-	-
Hanford: Hanford Site	27.003	-34%	▼	717	-41%	▼	0.038	12%	▲	-	-	-
Hanford: Office of River Protection	24.387	-34%	▼	597	-36%	▼	0.041	2%	▲	-	-	-
Hanford: Pacific Northwest National Laboratory	13.555	17%	▲	517	23%	▲	0.026	-5%	▼	-	-	-
Idaho National Laboratory	79.008	-15%	▼	1,175	-8%	▼	0.067	-8%	▼	1%	-76%	▼
Kansas City National Security Campus	0.171	-	-	44	-	-	0.004	-	-	-	-	-
Lawrence Berkeley National Laboratory	1.257	53%	▲	18	38%	▲	0.070	10%	▲	-	-	-
Lawrence Livermore National Laboratory	6.947	-13%	▼	110	17%	▲	0.063	-26%	▼	29%	-15%	▼
Los Alamos National Laboratory	**160.772**	68%	▲	1,850	**67%**	▲	0.087	1%	▲	24%	0%	-
National Renewable Energy Laboratory	0.020	-	-	4	-	-	0.005	-	-	-	-	-
Nevada National Security Site	3.858	17%	▲	94	12%	▲	0.041	5%	▲	-	-	-
Oak Ridge: East Tennessee Technology Park	0.093	-	-	6	-	-	0.016	-	-	-	-	-
Oak Ridge: Oak Ridge Institute for Science and Education	0.243	-	-	23	-	-	0.011	-	-	-	-	-
Oak Ridge: Oak Ridge National Laboratory	87.621	26%	▲	661	7%	▲	0.133	18%	▲	32%	**80%**	▲
Oak Ridge: Y-12 National Security Complex	75.761	4%	▲	1,455	0%	-	0.052	4%	▲	2%	1%	▲
Office of Secure Transportation	0.311	-	-	8	-	-	0.039	-	-	-	-	-
Paducah Gaseous Diffusion Plant	5.159	-17%	▼	113	-80%	▼	0.046	**312%**	▲	-	-	-
Pantex Plant	24.986	-4%	▼	333	13%	▲	0.075	-15%	▼	8%	-28%	▼
Portsmouth Gaseous Diffusion Plant	2.553	2%	▲	41	2%	▲	0.062	-1%	▼	-	-	-
Princeton Plasma Physics Laboratory	0.361	-	-	49	-	-	0.007	-	-	-	-	-
Sandia National Laboratories	2.146	-22%	▼	73	7%	▲	0.029	-27%	▼	-	-	-
Savannah River National Lab	20.051	62%	▲	576	60%	▲	0.035	2%	▲	-	-	-
Savannah River Site	152.495	54%	▲	**3,835**	57%	▲	0.040	-2%	▼	5%	0%	-
Separations Process Research Unit	5.185	-89%	▼	59	-42%	▼	0.088	-81%	▼	-	-	-
SLAC National Accelerator Laboratory	0.057	-	-	4	-	-	0.014	-	-	-	-	-
Thomas Jefferson National Accelerator Facility	0.270	-	-	20	-	-	0.014	-	-	-	-	-
Uranium Mill Tailings Remedial Action Project	5.656	-20%	▼	66	-50%	▼	0.086	59%	▲	-	-	-
Waste Isolation Pilot Plant	0.279	-	-	17	-	-	0.016	-	-	-	-	-
West Valley Demonstration Project	33.653	-18%	▼	154	5%	▲	**0.219**	-22%	▼	40%	-15%	▼
Service Center Personnel*	0.091	-	-	5	-	-	0.018	-	-	-	-	-
Totals	**761.209**	**7%**	▲	**13,019**	**9%**	▲	**0.058**	**-1%**	▼	**13%**	**-16%**	▼

Note: Boxed values (gray background) indicate the greatest value in each column.

* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

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Exhibit B-2. Site Dose Data, 2018.

Site	Collective TED (person-rem)	Percent Change - Coll. TED		Number with Meas. Dose	Percent Change - # with Meas. Dose		Avg. Meas. TED (rem)	Percent Change - Avg. Meas. TED		Percentage of Coll. TED above 0.500 rem	Percent Change - Coll. TED above 0.500 rem	
Ames Laboratory	0.935	-	-	33	-	-	0.028	-	-	-	-	-
Argonne National Laboratory	7.174	-28%	▼	77	0%	-	0.095	-28%	▼	26%	-48%	▼
Brookhaven National Laboratory	3.924	-35%	▼	125	62%	▲	0.031	-60%	▼	-	-	-
Energy Technology Engineering Center	0.059	-	-	3	-	-	0.020	-	-	-	-	-
Fermi National Accelerator Laboratory	9.980	-2%	▼	188	-6%	▼	0.053	5%	▲	-	-	-
Grand Junction Site	0.336	-	-	22	-	-	0.015	-	-	-	-	-
Hanford: Hanford Site	27.008	1%	▲	565	-21%	▼	0.048	27%	▲	18%	0%	-
Hanford: Office of River Protection	24.926	2%	▲	570	-5%	▼	0.044	7%	▲	-	-	-
Hanford: Pacific Northwest National Laboratory	12.225	-10%	▼	494	-4%	▼	0.025	-6%	▼	-	-	-
Idaho National Laboratory	86.799	9%	▲	1,373	16%	▲	0.063	-6%	▼	1%	**88%**	▲
Kansas City National Security Campus	0.428	-	-	58	-	-	0.007	-	-	-	-	-
Lawrence Berkeley National Laboratory	1.014	-19%	▼	22	22%	▲	0.046	-34%	▼	-	-	-
Lawrence Livermore National Laboratory	8.691	22%	▲	145	26%	▲	0.060	-3%	▼	14%	-51%	▼
Los Alamos National Laboratory	**207.051**	29%	▲	1,953	6%	▲	0.106	22%	▲	28%	20%	▲
National Renewable Energy Laboratory	0.006	-	-	1	-	-	0.006	-	-	-	-	-
Nevada National Security Site	3.893	1%	▲	74	-21%	▼	0.053	**28%**	▲	-	-	-
Oak Ridge: East Tennessee Technology Park	0.147	-	-	18	-	-	0.008	-	-	-	-	-
Oak Ridge: Oak Ridge Institute for Science and Education	0.317	-	-	20	-	-	0.016	-	-	-	-	-
Oak Ridge: Oak Ridge National Laboratory	76.833	-12%	▼	615	-7%	▼	0.125	-6%	▼	34%	4%	▲
Oak Ridge: Y-12 National Security Complex	65.917	-13%	▼	1,524	4%	▲	0.043	-17%	▼	1%	-56%	▼
Office of Secure Transportation	0.288	-	-	14	-	-	0.021	-	-	-	-	-
Paducah Gaseous Diffusion Plant	4.593	-11%	▼	110	-4%	▼	0.043	-8%	▼	-	-	-
Pantex Plant	22.927	-8%	▼	312	-6%	▼	0.073	-2%	▼	8%	1%	▲
Portsmouth Gaseous Diffusion Plant	3.588	41%	▲	69	68%	▲	0.052	-16%	▼	-	-	-
Princeton Plasma Physics Laboratory	0.239	-	-	38	-	-	0.006	-	-	-	-	-
Sandia National Laboratories	5.819	**171%**	▲	175	**140%**	▲	0.033	13%	▲	-	-	-
Savannah River National Lab	8.463	-58%	▼	314	-45%	▼	0.027	-23%	▼	-	-	-
Savannah River Site	126.869	-17%	▼	**4,101**	7%	▲	0.031	-22%	▼	-	-	-
Separations Process Research Unit	0.208	-	-	10	-	-	0.021	-	-	-	-	-
SLAC National Accelerator Laboratory	0.047	-	-	3	-	-	0.016	-	-	-	-	-
Thomas Jefferson National Accelerator Facility	0.526	-	-	26	-	-	0.020	-	-	-	-	-
Uranium Mill Tailings Remedial Action Project	5.485	-3%	▼	77	17%	▲	0.071	-17%	▼	-	-	-
Waste Isolation Pilot Plant	0.909	-	-	42	-	-	0.022	-	-	-	-	-
West Valley Demonstration Project	35.549	6%	▲	160	4%	▲	**0.222**	2%	▲	**48%**	21%	▲
Service Center Personnel*	0.149	-	-	4	-	-	0.037	-	-	-	-	-
Totals	**753.322**	**-1%**	▼	**13,335**	**2%**	▲	**0.056**	**-4%**	▼	**15%**	**13%**	▲

Note: Boxed values (gray background) indicate the greatest value in each column.

* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

DOE Occupational Radiation Exposure Report for CY 2019

Exhibit B-3. Site Dose Data, 2019.

Site	Collective TED (person-rem)	Percent Change - Coll. TED		Number with Meas. Dose	Percent Change - # with Meas. Dose		Avg. Meas. TED (rem)	Percent Change - Avg. Meas. TED		Percentage of Coll. TED above 0.500 rem	Percent Change - Coll. TED above 0.500 rem	
Ames Laboratory	0.837	-	-	31	-	-	0.027	-	-	-	-	-
Argonne National Laboratory	8.650	21%	▲	83	8%	▲	0.104	12%	▲	**39%**	52%	▲
Brookhaven National Laboratory	3.191	-19%	▼	137	10%	▲	0.002	-26%	▼	-	-	-
Energy Technology Engineering Center	0.009	-	-	2	-	-	0.005	-	-	-	-	-
Fermi National Accelerator Laboratory	7.060	-29%	▼	154	-18%	▼	0.045	-14%	▼	-	-	-
Grand Junction Site	0.041	-	-	13	-	-	0.003	-	-	-	-	-
Hanford: Hanford Site	32.673	21%	▲	822	**45%**	▲	0.040	4%	▲	3%	-81%	▼
Hanford: Office of River Protection	24.153	-3%	▼	671	18%	▲	0.035	4%	▲	-	-	-
Hanford: Pacific Northwest National Laboratory	9.717	-21%	▼	446	-10%	▼	0.021	2%	▲	-	-	-
Idaho National Laboratory	76.511	-12%	▼	1,203	-12%	▼	0.063	6%	▲	3%	**129%**	▲
Kansas City National Security Campus	0.364	-	-	66	-	-	0.005	-	-	-	-	-
Lawrence Berkeley National Laboratory	1.810	78%	▲	23	5%	▲	0.078	**71%**	▲	-	-	-
Lawrence Livermore National Laboratory	10.648	22%	▲	152	5%	▲	0.070	17%	▲	14%	0%	-
Los Alamos National Laboratory	**224.472**	8%	▲	1,983	2%	▲	0.113	7%	▲	31%	9%	▲
National Renewable Energy Laboratory	0.001	-	-	1	-	-	0.001	-	-	-	-	-
Nevada National Security Site	1.940	-50%	▼	50	-32%	▼	0.039	-26%	▼	-	-	-
Oak Ridge: East Tennessee Technology Park	0.186	-	-	19	-	-	0.010	-	-	-	-	-
Oak Ridge: Oak Ridge Institute for Science and Education	0.237	-	-	22	-	-	0.011	-	-	-	-	-
Oak Ridge: Oak Ridge National Laboratory	70.689	-8%	▼	539	-12%	▼	0.131	5%	▲	30%	-10%	▼
Oak Ridge: Y-12 National Security Complex	61.531	-7%	▼	1,664	9%	▲	0.034	-15%	▼			-
Office of Secure Transportation	0.448	-	-	13	-	-	0.034	-	-	-	-	-
Paducah Gaseous Diffusion Plant	5.554	21%	▲	100	-9%	▼	0.055	33%	▲	-	-	-
Pantex Plant	24.248	6%	▲	758	1%	▲	0.032	-56%	▼			-
Portsmouth Gaseous Diffusion Plant	4.289	20%	▲	71	3%	▲	0.060	16%	▲	-	-	-
Princeton Plasma Physics Laboratory	0.391	-	-	72	-	-	0.005	-	-	-	-	-
Sandia National Laboratories	5.323	-9%	▼	154	-12%	▼	0.035	4%	▲	-	-	-
Savannah River National Lab	16.631	**97%**	▲	547	74%	▲	0.030	13%	▲	4%	0%	-
Savannah River Site	126.763	-1%	▼	**3,651**	-11%	▼	0.035	12%	▲	1%	0%	-
Separations Process Research Unit	0.029	-	-	2	-	-	0.015	-	-	-	-	-
SLAC National Accelerator Laboratory	0.206	-	-	11	-	-	0.019	-	-	-	-	-
Thomas Jefferson National Accelerator Facility	1.266	-	-	52	**100%**	▲	0.024	20%	▲	-	-	-
Uranium Mill Tailings Remedial Action Project	9.748	78%	▲	95	23%	▲	0.103	44%	▲		-	-
Waste Isolation Pilot Plant	1.113	22%	▲	54	29%	▲	0.021	-4%	▼	-	-	-
West Valley Demonstration Project	20.459	-42%	▼	139	-13%	▼	**0.147**	-34%	▼	11%	-76%	▼
Service Center Personnel*	0.996	-	-	22	-	-	0.045	-	-	-	-	-
Totals	**752.184**	**0%**	▼	**13,822**	**4%**	▲	**0.054**	**-4%**	▼	**14%**	**-9%**	▼

Note: Boxed values (gray background) indicate the greatest value in each column.

* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

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Exhibit B-4. Internal Dose by Site, 2017–2019.

Site	No. of Individuals with Measurable CED* 2017	No. of Individuals with Measurable CED* 2018	No. of Individuals with Measurable CED* 2019	Collective CED Dose (person-rem) 2017	Collective CED Dose (person-rem) 2018	Collective CED Dose (person-rem) 2019	Average Measurable CED 2017	Average Measurable CED 2018	Average Measurable CED 2019
Argonne National Laboratory	3	2	–	0.261	0.062	–	0.087	0.031	–
Hanford: Hanford Site	22	–	2	0.102	–	0.003	0.005	–	0.002
Hanford: Pacific Northwest National Laboratory	–	4	4	–	0.007	0.006	–	0.002	0.002
Idaho National Laboratory	3	2	2	0.063	0.171	0.093	0.021	0.086	0.047
Lawrence Livermore National Laboratory	–	3	2	–	0.045	0.115	–	0.015	0.058
Los Alamos National Laboratory	11	15	22	0.062	3.649	0.081	0.006	**0.243** ◀	0.004
Oak Ridge: Oak Ridge National Laboratory	2	3	1	0.233	0.045	0.010	**0.117** ◀	0.015	0.010
Oak Ridge: Y-12 National Security Complex	**1,206** ◀	**1,273** ◀	**1,312** ◀	**63.961** ◀	**54.619** ◀	**47.884** ◀	0.053	0.043	0.036
Paducah Gaseous Diffusion Plant	5	5	3	0.099	0.089	0.044	0.020	0.018	0.015
Pantex Plant	1	–	–	0.001	–	–	0.001	–	–
Sandia National Laboratories	4	7	10	0.190	0.034	0.036	0.048	0.005	0.004
Savannah River Site	1	2	2	0.004	0.007	0.007	0.004	0.004	0.004
Uranium Mill Tailings Remedial Action Project	29	29	51	0.947	0.828	2.179	0.033	0.029	0.043
Service Center Personnel**	–	–	1	–	–	0.083	–	–	**0.083** ◀
Totals	**1,287**	**1,345**	**1,412**	**65.923**	**59.556**	**50.541**	**0.051**	**0.044**	**0.036**

Note: Boxed values (gray background) indicate the greatest value in each column.

* The number of internal depositions represents the number of internal dose records with positive results reported for each individual.

** Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

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Exhibit B-5. Neutron Dose Distribution by Site, 2019.

Site	No. Meas. Dose	Meas. < 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.00	1.0–2.0	>2.0	Total Monitored *	No. of Individuals with Meas. Dose	% of Individuals with Meas. Dose	Collective Neutron Dose (person-rem)	Avg. Meas. Neutron Dose (rem)
Ames Laboratory	164	–	–	–	–	–	–	–	164	–	–	–	–
Argonne National Laboratory	1,852	–	–	–	–	–	–	–	1,852	–	–	–	–
Brookhaven National Laboratory	2,382	2	–	–	–	–	–	–	2,384	2	0%	0.014	0.007
Energy Technology Engineering Center	5	–	–	–	–	–	–	–	5	–	–	–	–
Fermi National Accelerator Laboratory	1,488	–	–	–	–	–	–	–	1,488	–	–	–	–
Grand Junction Site	26	–	–	–	–	–	–	–	26	–	–	–	–
Hanford: Hanford Site	3,534	189	–	–	–	–	–	–	3,723	189	5%	1.850	0.010
Hanford: Office of River Protection	2,877	9	–	–	–	–	–	–	2,886	9	0%	0.049	0.005
Hanford: Pacific Northwest National Laboratory	2,734	1	–	–	–	–	–	–	2,735	1	0%	0.030	0.030
Idaho National Laboratory	7,480	91	13	–	–	–	–	–	7,584	104	1%	4.650	0.045
Kansas City Security Campus	227	–	–	–	–	–	–	–	227	–	–	–	–
Lawrence Berkeley National Laboratory	962	–	–	–	–	–	–	–	962	–	–	–	–
Lawrence Livermore National Laboratory	3,784	55	5	2	–	–	–	–	3,846	62	2%	3.137	0.051
Los Alamos National Laboratory	10,722	1,041	188	77	26	3	2	–	**12,059** ◄	**1,337** ◄	**11%** ◄	**107.54** ◄	0.080
National Renewable Energy Laboratory	7	–	–	–	–	–	–	–	7	–	–	–	–
Nevada National Security Site	901	2	–	–	–	–	–	–	903	2	0%	0.043	0.022
Oak Ridge: East Tennessee Technology Park	434	–	–	–	–	–	–	–	434	–	–	–	–
Oak Ridge: Oak Ridge Institute for Science and Education	89	–	–	–	–	–	–	–	89	–	–	–	–
Oak Ridge: Oak Ridge National Laboratory	4,120	160	32	14	3	–	–	–	4,329	209	5%	18.430	0.088
Oak Ridge: Y-12 National Security Complex	6,326	9	1	–	–	–	–	–	6,336	10	0%	0.349	0.035
Office of Secure Transportation	336	–	–	–	–	–	–	–	336	–	–	–	–
Paducah Gaseous Diffusion Plant	1,340	–	–	–	–	–	–	–	1,340	–	–	–	–
Pantex Plant	5,001	60	2	–	–	–	–	–	5,063	62	1%	2.438	0.039
Portsmouth Gaseous Diffusion Plant	2,456	17	4	–	–	–	–	–	2,477	21	1%	1.050	0.050
Princeton Plasma Physics Laboratory	345	–	–	–	–	–	–	–	345	–	–	–	–
Sandia National Laboratories	2,010	30	–	–	–	–	–	–	2,040	30	1%	0.870	0.029
Savannah River National Lab	691	2	–	–	–	–	–	–	693	2	0%	0.072	0.036
Savannah River Site	6,470	70	28	14	–	–	–	–	6,582	112	2%	13.087	**0.117** ◄
Separations Process Research Unit	9	–	–	–	–	–	–	–	9	–	–	–	–
SLAC National Accelerator Facility	2,692	–	–	–	–	–	–	–	2,692	–	–	–	–
Thomas Jefferson National Accelerator Facility	1,396	–	–	–	–	–	–	–	1,396	–	–	–	–
Uranium Mill Tailings Remediation Action Project	138	–	–	–	–	–	–	–	138	–	–	–	–
Waste Isolation Pilot Plant	427	1	–	–	–	–	–	–	428	1	0%	0.010	0.010
West Valley Project	378	–	–	–	–	–	–	–	378	–	–	–	–
Service Center Personnel**	164	–	–	–	–	–	–	–	164	–	–	–	–
Totals	**73,967**	**1,739**	**273**	**107**	**29**	**3**	**2**	–	**76,120**	**2,153**	**3%**	**153.619**	**0.071**

Note: Boxed values (gray background) indicate the greatest value in each column.

*Represents the total number of monitoring records. The number of individuals specifically monitored for neutron radiation cannot be determined.

**Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

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Exhibit B-6a. Distribution of TED by Facility Type, 2017.

TOTAL EFFECTIVE DOSE (TED)

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Facility Type	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Accelerator	7,984	234	43	8	–	–	–	–	–	–	–	8,269	3%	285	15.149	0.053
Fuel Processing	298	353	18	–	–	–	–	–	–	–	–	669	**55%** ◀	371	11.098	0.030
Fuel/Uranium Enrichment	366	6	–	–	–	–	–	–	–	–	–	372	2%	6	0.093	0.016
Maintenance and Support	10,927	2,202	366	121	19	5	17	–	–	–	–	13,657	20%	2,730	196.110	**0.072** ◀
Other	6,095	804	31	11	–	–	–	–	–	–	–	6,941	12%	846	23.918	0.028
Reactor	91	13	1	–	–	–	–	–	–	–	–	105	13%	14	0.586	0.042
Research, Fusion	388	50	–	–	–	–	–	–	–	–	–	438	11%	50	0.376	0.008
Research, General	27,417	2,801	351	94	30	8	4	–	–	–	–	**30,705** ◀	11%	3,288	188.563	0.057
Waste Processing/Management	3,618	2,777	372	180	48	–	–	–	–	–	–	6,995	48%	**3,377** ◀	**221.068** ◀	0.065
Weapons Fabrication and Testing	9,703	1,766	214	66	6	–	–	–	–	–	–	11,755	17%	2,052	104.248	0.051
Totals	**66,887**	**11,006**	**1,396**	**480**	**103**	**13**	**21**	**–**	**–**	**–**	**–**	**79,906**	**16%**	**13,019**	**761.209**	**0.058**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-6b. Distribution of TED by Facility Type, 2018.

TOTAL EFFECTIVE DOSE (TED)

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Facility Type	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Accelerator	9,398	417	67	12	3	–	–	–	–	–	–	9,897	5%	499	26.049	0.052
Fuel Processing	341	436	18	–	–	–	–	–	–	–	–	795	**57%** ◀	454	12.000	0.026
Fuel/Uranium Enrichment	342	18	–	–	–	–	–	–	–	–	–	360	5%	18	0.147	0.008
Maintenance and Support	5,880	831	91	23	2	–	–	–	–	–	–	6,827	14%	947	42.329	0.045
Other	5,504	807	56	21	7	1	–	–	–	–	–	6,396	14%	892	36.662	0.041
Reactor	84	17	4	–	–	–	–	–	–	–	–	105	20%	21	1.163	0.055
Research, Fusion	377	46	–	–	–	–	–	–	–	–	–	423	11%	46	0.507	0.011
Research, General	25,404	3,417	376	132	17	15	1	–	–	–	–	**29,362** ◀	13%	**3,958** ◀	213.352	0.054
Waste Processing/Management	3,846	2,965	295	95	30	6	–	–	–	–	–	7,237	47%	3,391	177.419	0.052
Weapons Fabrication and Testing	11,122	2,464	429	146	38	17	14	–	1	–	–	14,231	22%	3,109	**243.694** ◀	**0.078** ◀
Totals	**62,298**	**11,418**	**1,336**	**429**	**97**	**39**	**15**	**–**	**1**	**–**	**–**	**75,633**	**18%**	**13,335**	**753.322**	**0.056**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-6c. Distribution of TED by Facility Type, 2019.

TOTAL EFFECTIVE DOSE (TED)

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Facility Type	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Accelerator	7,863	431	45	11	1	–	–	–	–	–	–	8,351	6%	488	20.840	0.043
Fuel Processing	417	402	11	2	–	–	–	–	–	–	–	832	**50%** ◀	415	11.189	0.027
Fuel/Uranium Enrichment	2,821	79	10	1	–	–	–	–	–	–	–	2,911	3%	90	4.475	0.050
Maintenance and Support	5,446	977	78	16	–	–	–	–	–	–	–	6,517	16%	1,071	41.174	0.038
Other	5,273	788	65	14	2	–	–	–	–	–	–	6,142	14%	869	33.154	0.038
Reactor	127	23	5	1	–	–	–	–	–	–	–	156	19%	29	1.593	0.055
Research, Fusion	345	77	–	–	–	–	–	–	–	–	–	422	18%	77	0.467	0.006
Research, General	24,373	3,088	361	99	25	14	4	–	–	–	–	**27,964** ◀	13%	3,591	200.396	0.056
Waste Processing/Management	4,418	2,996	347	122	6	–	–	–	–	–	–	7,889	44%	3,471	174.997	0.050
Weapons Fabrication and Testing	11,215	3,084	388	157	57	28	7	–	–	–	–	14,936	25%	**3,721** ◀	**263.899** ◀	**0.071** ◀
Totals	**62,298**	**11,945**	**1,310**	**423**	**91**	**42**	**11**	**–**	**–**	**–**	**–**	**76,120**	**18%**	**13,822**	**752.184**	**0.054**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-7a. Collective TED by Site and Facility Type, 2017.

Site	Accelerator	Fuel/Uranium Enrichment	Fuel Processing	Maintenance and Support	Reactor	Research, General	Research, Fusion	Waste Processing/ Management	Weapons Fabrication and Testing	Other	Totals
Ames Laboratory	–	–	–	–	–	1.053	–	–	–	–	1.053
Argonne National Laboratory	–	–	–	–	–	9.885	–	–	–	–	9.885
Brookhaven National Laboratory	4.513	–	–	1.289	–	–	–	0.274	–	–	6.076
Energy Technology Engineering Center	–	–	–	–	–	–	–	–	–	0.026	0.026
Fermi National Accelerator Laboratory	**10.210**	–	–	–	–	–	–	–	–	–	10.210
Grand Junction Site	–	–	–	–	–	–	–	–	–	0.010	0.010
Hanford: Hanford Site	–	–	–	20.425	–	–	–	–	–	6.578	27.003
Hanford: Office of River Protection	–	–	–	0.135	–	–	–	16.276	–	**7.976**	24.387
Hanford: Pacific Northwest National Laboratory	–	–	–	–	–	13.555	–	–	–	–	13.555
Idaho National Laboratory	–	–	–	–	–	**79.008**	–	–	–	–	79.008
Kansas City National Security Campus	–	–	–	–	–	–	–	–	0.171	–	0.171
Lawrence Berkeley National Laboratory	–	–	–	–	–	1.257	–	–	–	–	1.257
Lawrence Livermore National Laboratory	–	–	–	–	–	6.947	–	–	–	–	6.947
Los Alamos National Laboratory	0.012	–	–	**159.080**	–	0.071	–	–	–	1.609	**160.772**
National Renewable Energy Laboratory	–	–	–	–	–	0.020	–	–	–	–	0.020
Nevada National Security Site	–	–	–	3.858	–	–	–	–	–	–	3.858
Oak Ridge: East Tennessee Technology Park	–	**0.093**	–	–	–	–	–	–	–	–	0.093
Oak Ridge: Oak Ridge Institute for Science and Education	–	–	–	–	–	0.243	–	–	–	–	0.243
Oak Ridge: Oak Ridge National Laboratory	–	–	–	–	–	54.943	–	32.678	–	–	87.621
Oak Ridge: Y-12 National Security Complex	–	–	–	–	–	–	–	–	**75.761**	–	75.761
Office of Secure Transportation	–	–	–	–	–	–	–	–	0.311	–	0.311
Paducah Gaseous Diffusion Plant	–	–	–	0.020	–	0.119	–	5.020	–	–	5.159
Pantex Plant	–	–	–	–	–	–	–	–	24.986	–	24.986
Portsmouth Gaseous Diffusion Plant	–	–	–	–	–	2.553	–	–	–	–	2.553
Princeton Plasma Physics Laboratory	–	–	–	–	–	–	**0.361**	–	–	–	0.361
Sandia National Laboratories	0.087	–	–	0.151	0.586	0.376	0.015	0.240	0.174	0.517	2.146
Savannah River National Laboratory	–	–	0.084	5.684	–	13.922	–	0.277	–	0.084	20.051
Savannah River Site	–	–	**11.014**	5.468	–	4.520	–	**121.530**	2.845	7.118	152.495
Separations Process Research Unit	–	–	–	–	–	–	–	5.185	–	–	5.185
SLAC National Accelerator Laboratory	0.057	–	–	–	–	–	–	–	–	–	0.057
Thomas Jefferson National Accelerator Facility	0.270	–	–	–	–	–	–	–	–	–	0.270
Uranium Mill Tailings Remedial Action Project	–	–	–	–	–	–	–	5.656	–	–	5.656
Waste Isolation Pilot Plant	–	–	–	–	–	–	–	0.279	–	–	0.279
West Valley Demonstration Project	–	–	–	–	–	–	–	33.653	–	–	33.653
Service Center Personnel*	–	–	–	–	–	0.091	–	–	–	–	0.091
Totals	**15.149**	**0.093**	**11.098**	**196.110**	**0.586**	**188.563**	**0.376**	**221.068**	**104.248**	**23.918**	**761.209**

Note: Boxed values (gray background) indicate the greatest value in each column.

* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP.

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Exhibit B-7b. Collective TED by Site and Facility Type, 2018.

Site	Accelerator	Fuel/Uranium Enrichment	Fuel Processing	Maintenance and Support	Reactor	Research, General	Research, Fusion	Waste Processing/ Management	Weapons Fabrication and Testing	Other	Totals
Ames Laboratory	–	–	–	–	–	0.935	–	–	–	–	0.935
Argonne National Laboratory	–	–	–	–	–	7.174	–	–	–	–	7.174
Brookhaven National Laboratory	3.372	–	–	0.454	–	–	–	0.098	–	–	3.924
Energy Technology Engineering Center	–	–	–	–	–	0.059	–	–	–	–	0.059
Fermi National Accelerator Laboratory	9.980	–	–	–	–	–	–	–	–	–	9.980
Grand Junction Site	–	–	–	–	–	–	–	–	–	0.336	0.336
Hanford: Hanford Site	–	–	–	**18.863**	–	–	–	–	–	8.145	27.008
Hanford: Office of River Protection	–	–	–	–	–	–	–	12.931	–	**11.995**	24.926
Hanford: Pacific Northwest National Laboratory	–	–	–	–	–	12.225	–	–	–	–	12.225
Idaho National Laboratory	–	–	–	–	–	**86.799**	–	–	–	–	86.799
Kansas City National Security Campus	–	–	–	–	–	–	–	–	0.428	–	0.428
Lawrence Berkeley National Laboratory	–	–	–	–	–	1.014	–	–	–	–	1.014
Lawrence Livermore National Laboratory	–	–	–	1.286	–	7.405	–	–	–	–	8.691
Los Alamos National Laboratory	**11.149**	–	–	7.169	–	26.627	–	3.230	**150.241**	8.635	**207.051**
National Renewable Energy Laboratory	–	–	–	–	–	0.006	–	–	–	–	0.006
Nevada National Security Site	–	–	–	3.893	–	–	–	–	–	–	3.893
Oak Ridge: East Tennessee Technology Park	–	**0.147**	–	–	–	–	–	–	–	–	0.147
Oak Ridge: Oak Ridge Institute for Science and Education	–	–	–	–	–	0.317	–	–	–	–	0.317
Oak Ridge: Oak Ridge National Laboratory	–	–	–	–	–	48.647	–	28.186	–	–	76.833
Oak Ridge: Y-12 National Security Complex	–	–	–	–	–	–	–	–	65.917	–	65.917
Office of Secure Transportation	–	–	–	–	–	–	–	–	0.260	0.028	0.288
Paducah Gaseous Diffusion Plant	–	–	–	0.051	–	0.100	–	4.442	–	–	4.593
Pantex Plant	–	–	–	–	–	–	–	–	22.927	–	22.927
Portsmouth Gaseous Diffusion Plant	–	–	–	–	–	3.588	–	–	–	–	3.588
Princeton Plasma Physics Laboratory	–	–	–	–	–	–	0.239	–	–	–	0.239
Sandia National Laboratories	0.975	–	–	0.627	**1.163**	1.437	**0.268**	0.541	0.132	0.676	5.819
Savannah River National Laboratory	–	–	0.027	1.007	–	7.117	–	0.156	0.040	0.116	8.463
Savannah River Site	–	–	**11.973**	8.979	–	9.753	–	**85.684**	3.749	6.731	126.869
Separations Process Research Unit	–	–	–	–	–	–	–	0.208	–	–	0.208
SLAC National Accelerator Laboratory	0.047	–	–	–	–	–	–	–	–	–	0.047
Thomas Jefferson National Accelerator Facility	0.526	–	–	–	–	–	–	–	–	–	0.526
Uranium Mill Tailings Remedial Action Project	–	–	–	–	–	–	–	5.485	–	–	5.485
Waste Isolation Pilot Plant	–	–	–	–	–	–	–	0.909	–	–	0.909
West Valley Demonstration Project	–	–	–	–	–	–	–	35.549	–	–	35.549
Service Center Personnel*	–	–	–	–	–	0.149	–	–	–	–	0.149
Totals	**26.049**	**0.147**	**12.000**	**42.329**	**1.163**	**213.352**	**0.507**	**177.419**	**243.694**	**36.662**	**753.322**

Note: Boxed values (gray background) indicate the greatest value in each column.

* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP.

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Exhibit B-7c. Collective TED by Site and Facility Type, 2019.

Site	Accelerator	Fuel/Uranium Enrichment	Fuel Processing	Maintenance and Support	Reactor	Research, General	Research, Fusion	Waste Processing/ Management	Weapons Fabrication and Testing	Other	Totals
Ames Laboratory	–	–	–	–	–	0.837	–	–	–	–	0.837
Argonne National Laboratory	–	–	–	–	–	8.650	–	–	–	–	8.650
Brookhaven National Laboratory	2.720	–	–	0.392	–	–	–	0.079	–	–	3.191
Energy Technology Engineering Center	–	–	–	–	–	0.009	–	–	–	–	0.009
Fermi National Accelerator Laboratory	7.060	–	–	–	–	–	–	–	–	–	7.060
Grand Junction Site	–	–	–	–	–	–	–	–	–	0.041	0.041
Hanford: Hanford Site	–	–	–	**20.406**	–	–	–	–	–	**12.267**	32.673
Hanford: Office of River Protection	–	–	–	–	–	–	–	15.045	–	9.108	24.153
Hanford: Pacific Northwest National Laboratory	–	–	–	–	–	9.717	–	–	–	–	9.717
Idaho National Laboratory	–	–	–	–	–	**76.511**	–	–	–	–	76.511
Kansas City National Security Campus	–	–	–	–	–	–	–	–	0.364	–	0.364
Lawrence Berkeley National Laboratory	–	–	–	–	–	1.810	–	–	–	–	1.810
Lawrence Livermore National Laboratory	–	–	–	1.573	–	9.075	–	–	–	–	10.648
Los Alamos National Laboratory	**8.749**	–	–	6.245	–	24.333	–	4.278	**174.284**	6.583	**224.472**
National Renewable Energy Laboratory	–	–	–	–	–	0.001	–	–	–	–	0.001
Nevada National Security Site	–	–	–	1.940	–	–	–	–	–	–	1.940
Oak Ridge: East Tennessee Technology Park	–	0.186	–	–	–	–	–	–	–	–	0.186
Oak Ridge: Oak Ridge Institute for Science and Education	–	–	–	–	–	0.237	–	–	–	–	0.237
Oak Ridge: Oak Ridge National Laboratory	–	–	–	–	–	53.233	–	17.456	–	–	70.689
Oak Ridge: Y-12 National Security Complex	–	–	–	–	–	–	–	–	61.531	–	61.531
Office of Secure Transportation	–	–	–	–	–	–	–	–	0.448	–	0.448
Paducah Gaseous Diffusion Plant	–	–	–	–	–	0.044	–	5.510	–	–	5.554
Pantex Plant	–	–	–	–	–	–	–	–	24.248	–	24.248
Portsmouth Gaseous Diffusion Plant	–	**4.289**	–	–	–	–	–	–	–	–	4.289
Princeton Plasma Physics Laboratory	–	–	–	–	–	–	**0.391**	–	–	–	0.391
Sandia National Laboratories	0.839	–	–	0.224	**1.593**	1.014	0.076	0.124	0.636	0.817	5.323
Savannah River National Laboratory	–	–	0.005	4.609		11.543		0.385	0.024	0.065	16.631
Savannah River Site	–	–	**11.184**	5.762	–	3.382	–	**100.757**	2.364	3.314	126.763
Separations Process Research Unit	–	–	–	–	–	–	–	0.029	–	–	0.029
SLAC National Accelerator Laboratory	0.206	–	–	–	–	–	–	–	–	–	0.206
Thomas Jefferson National Accelerator Facility	1.266	–	–	–	–	–	–	–	–	–	1.266
Uranium Mill Tailings Remedial Action Project	–	–	–	–	–	–	–	9.748	–	–	9.748
Waste Isolation Pilot Plant	–	–	–	–	–	–	–	1.113	–	–	1.113
West Valley Demonstration Project	–	–	–	–	–	–	–	20.459	–	–	20.459
Service Center Personnel*	–	–	–	–	–	–	–	0.014	–	0.959	0.996
Totals	**20.840**	**4.475**	**11.189**	**41.174**	**1.593**	**200.396**	**0.467**	**174.997**	**263.899**	**33.154**	**752.184**

Note: Boxed values (gray background) indicate the greatest value in each column.

* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP.

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Exhibit B-8. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Accelerator Facilities, 2019.

ACCELERATORS

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Los Alamos National Laboratory	577	105	19	7	1	–	–	–	–	–	–	709	**19%**	**132**	**8.749**	**0.066**
Fermi National Accelerator Lab	1,334	130	20	4	–	–	–	–	–	–	–	1,488	10%	154	7.060	0.046
Sandia National Laboratories	412	31	–	–	–	–	–	–	–	–	–	443	7%	31	0.839	0.027
Brookhaven National Laboratory	1,513	103	5	–	–	–	–	–	–	–	–	1,621	7%	108	2.720	0.025
Thomas Jefferson Natl. Accel. Facil.	1,339	51	1	–	–	–	–	–	–	–	–	1,391	4%	52	1.266	0.024
SLAC National Accelerator Laboratory	2,681	11	–	–	–	–	–	–	–	–	–	**2,692**	0%	11	0.206	0.019
CH2M Hill Plateau Remediation Company (CHPRC)	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
N3B	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
Thomas Jefferson Site Office-DOE Employees	5	–	–	–	–	–	–	–	–	–	–	5	0%	–	0.000	0.000
Totals	**7,863**	**431**	**45**	**11**	**1**	–	–	–	–	–	–	**8,351**	**6%**	**488**	**20.840**	**0.043**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-9. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Fuel Facilities, 2019.

FUEL FACILITIES

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
ENRICHMENT																
BWCS-Portsmouth	183	40	10	1	–	–	–	–	–	–	–	234	**22%**	**51**	**3.424**	**0.067**
Fluor/B&W - Portsmouth	2,070	20	–	–	–	–	–	–	–	–	–	**2,090**	1%	20	0.865	0.043
URS/CH2MHill - Oak Ridge (UCOR): ETTP	415	19	–	–	–	–	–	–	–	–	–	434	4%	19	0.186	0.010
Wastren - Portsmouth Services	153	–	–	–	–	–	–	–	–	–	–	153	0%	–	0.000	0.000
Totals	**2,821**	**79**	**10**	**1**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**2,911**	**3%**	**90**	**4.475**	**0.050**
PROCESSING																
Savannah River Field Office	10	7	–	–	–	–	–	–	–	–	–	17	41%	7	0.151	**0.022**
Savannah River National Laboratory	3	1	–	–	–	–	–	–	–	–	–	4	25%	1	0.005	0.005
Savannah River Nuclear Solutions	304	299	11	2	–	–	–	–	–	–	–	**616**	**51%**	**312**	**9.572**	0.031
SRNS Construction	35	35	–	–	–	–	–	–	–	–	–	70	50%	35	0.535	0.015
SRNS Construction Subs	1	1	–	–	–	–	–	–	–	–	–	2	50%	1	0.020	0.020
SRNS Service Subs	8	6	–	–	–	–	–	–	–	–	–	14	43%	6	0.075	0.013
SRR Service Subs	3	–	–	–	–	–	–	–	–	–	–	3	0%	–	0.000	0.000
Tritium Extraction Facility (SRS)	2	2	–	–	–	–	–	–	–	–	–	4	50%	2	0.030	0.015
Wackenhut Services Inc - SR	51	51	–	–	–	–	–	–	–	–	–	102	50%	51	0.801	0.016
Totals	**417**	**402**	**11**	**2**	–	–	–	–	–	–	–	**832**	**50%**	**415**	**11.189**	**0.027**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-10. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Maintenance and Support, 2019.

MAINTENANCE AND SUPPORT

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
SRR Operations	–	4	13	–	–	–	–	–	–	–	–	17	**100%**	17	2.090	**0.123**
Lawrence Livermore National Laboratory Nevada	121	10	4	2	–	–	–	–	–	–	–	137	12%	16	1.573	0.098
Savannah River National Laboratory	2	51	14	2	–	–	–	–	–	–	–	69	97%	67	4.609	0.069
Los Alamos National Laboratory	905	89	6	7	–	–	–	–	–	–	–	1,007	10%	102	6.227	0.061
NSTec - NTS	480	29	4	–	–	–	–	–	–	–	–	513	6%	33	1.565	0.047
CH2M Hill Plateau Remediation Company (CHPRC)	1,066	380	32	4	–	–	–	–	–	–	–	**1,482**	28%	**416**	**16.411**	0.039
Sandia National Laboratories	392	8	–	–	–	–	–	–	–	–	–	400	2%	8	0.224	0.028
Savannah River Nuclear Solutions	89	122	1	–	–	–	–	–	–	–	–	212	58%	123	3.223	0.026
DOE Headquarters	14	1	–	–	–	–	–	–	–	–	–	15	7%	1	0.023	0.023
NSTec - Las Vegas	228	14	–	–	–	–	–	–	–	–	–	242	6%	14	0.324	0.023
Mission Support Alliance	1,038	208	3	1	–	–	–	–	–	–	–	1,250	17%	212	3.995	0.019
NNSA Nevada Site Office	60	1	–	–	–	–	–	–	–	–	–	61	2%	1	0.019	0.019
Los Alamos National Lab Construction Subs	5	1	–	–	–	–	–	–	–	–	–	6	17%	1	0.018	0.018
Tritium Extraction Facility	–	3	–	–	–	–	–	–	–	–	–	3	**100%**	3	0.050	0.017
Navarro-Intera LLC	15	2	–	–	–	–	–	–	–	–	–	17	12%	2	0.032	0.016
Savannah River Field Office	1	6	–	–	–	–	–	–	–	–	–	7	86%	6	0.093	0.016
Brookhaven National Laboratory	666	25	1	–	–	–	–	–	–	–	–	692	4%	26	0.392	0.015
SRNS Construction	7	12	–	–	–	–	–	–	–	–	–	19	63%	12	0.169	0.014
SRNS Service Subs	6	9	–	–	–	–	–	–	–	–	–	15	60%	9	0.121	0.013
Wackenhut Services Inc. - SR	1	2	–	–	–	–	–	–	–	–	–	3	67%	2	0.016	0.008
Battelle - Pantex	18	–	–	–	–	–	–	–	–	–	–	18	0%	–	0.000	0.000
Batelle - PNNL	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
DOE-Richland Field Office	6	–	–	–	–	–	–	–	–	–	–	6	0%	–	0.000	0.000
LLNL Construction Subcontractors	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
N3B	5	–	–	–	–	–	–	–	–	–	–	5	0%	–	0.000	0.000
Nevada	9	–	–	–	–	–	–	–	–	–	–	9	0%	–	0.000	0.000
NNSA Albuquerque Complex	2	–	–	–	–	–	–	–	–	–	–	2	0%	–	0.000	0.000
NSTec - Livermore Operations	4	–	–	–	–	–	–	–	–	–	–	4	0%	–	0.000	0.000
NSTec - Los Alamos	7	–	–	–	–	–	–	–	–	–	–	7	0%	–	0.000	0.000
NSTec - NTS subcontractors	28	–	–	–	–	–	–	–	–	–	–	28	0%	–	0.000	0.000
NSTec - Sandia	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
NSTec - Special Tech. Lab	17	–	–	–	–	–	–	–	–	–	–	17	0%	–	0.000	0.000
Office of Secure Transportation	2	–	–	–	–	–	–	–	–	–	–	2	0%	–	0.000	0.000
Swift and Staley Team	237	–	–	–	–	–	–	–	–	–	–	237	0%	–	0.000	0.000
UT-Batelle ORNL	4	–	–	–	–	–	–	–	–	–	–	4	0%	–	0.000	0.000
Wackenhut Services Inc. - NV	4	–	–	–	–	–	–	–	–	–	–	4	0%	–	0.000	0.000
Washington River Protection Solutions LLC	4	–	–	–	–	–	–	–	–	–	–	4	0%	–	0.000	0.000
Totals	**5,446**	**977**	**78**	**16**	–	–	–	–	–	–	–	**6,517**	**16%**	**1,071**	**41.174**	**0.038**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-11. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Reactor Facilities, 2019.

REACTOR FACILITIES

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Sandia National Laboratories	119	23	5	1	–	–	–	–	–	–	–	**148**	**20%**	**29**	**1.593**	**0.055**
Brookhaven National Laboratory	8	–	–	–	–	–	–	–	–	–	–	8	0%	–	–	0.000
Totals	**127**	**23**	**5**	1	–	–	–	–	–	–	–	**156**	**19%**	**29**	**1.593**	**0.055**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-12. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Research, General, 2019.

RESEARCH, GENERAL

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
UT-Batelle ORNL	3,158	239	56	39	18	7	4	–	–	–	–	3,521	10%	363	**52.400**	**0.144**
Argonne National Laboratory	1,769	63	13	3	–	4	–	–	–	–	–	1,852	4%	83	8.650	0.104
N3B	133	3	2	–	–	–	–	–	–	–	–	138	4%	5	0.465	0.093
INL - BEA LLC - Research	275	31	7	5	–	–	–	–	–	–	–	318	14%	43	3.823	0.089
Lawrence Berkeley Laboratory	939	18	3	2	–	–	–	–	–	–	–	962	2%	23	1.810	0.079
ICP - Fluor - Projects	457	145	30	6	1	–	–	–	–	–	–	639	28%	182	12.256	0.067
Lawrence Livermore National Laboratory	3,353	113	16	4	1	1	–	–	–	–	–	3,488	4%	135	9.047	0.067
INL - BEA LLC - Services	4,185	411	89	22	3	–	–	–	–	–	–	**4,710**	11%	525	33.927	0.065
INL - BEA LLC - Production	279	22	3	1	–	–	–	–	–	–	–	305	9%	26	1.674	0.064
ICP - Fluor - Subcontractors	868	328	68	7	–	–	–	–	–	–	–	1,271	32%	403	23.928	0.059
Los Alamos National Laboratory	3,891	405	44	6	1	2	–	–	–	–	–	4,349	11%	458	23.815	0.052
ICP - Fluor - Support	26	10	1	–	–	–	–	–	–	–	–	37	30%	11	0.440	0.040
INL - BEA LLC - Security	50	10	1	–	–	–	–	–	–	–	–	61	18%	11	0.418	0.038
Sandia National Laboratories	411	26	2	–	–	–	–	–	–	–	–	439	6%	28	1.014	0.036
Lawrence Livermore National Laboratories	219	1	–	–	–	–	–	–	–	–	–	220	0%	1	0.028	0.028
Ames Laboratory (Iowa State)	133	31	–	–	–	–	–	–	–	–	–	164	19%	31	0.837	0.027
Savannah River National Laboratory	117	447	13	–	1	–	–	–	–	–	–	578	80%	**461**	11.543	0.025
Batelle - PNNL	2,113	401	13	4	–	–	–	–	–	–	–	2,531	17%	418	9.428	0.023
Idaho Field Office	241	2	–	–	–	–	–	–	–	–	–	243	1%	2	0.045	0.023
Misc. DOE Contractors - SR	1	1	–	–	–	–	–	–	–	–	–	2	50%	1	0.019	0.019
NNSA Los Alamos Site Office	69	3	–	–	–	–	–	–	–	–	–	72	4%	3	0.053	0.018
SRNS Construction Subs	4	8	–	–	–	–	–	–	–	–	–	12	67%	8	0.141	0.018
Fluor Paducah Deactivation Project	782	3	–	–	–	–	–	–	–	–	–	785	0%	3	0.044	0.015
Savannah River Field Office	2	17	–	–	–	–	–	–	–	–	–	19	**89%**	17	0.233	0.014
Savannah River Nuclear Solutions	59	92	–	–	–	–	–	–	–	–	–	151	61%	92	1.262	0.014
SRNS Construction	30	60	–	–	–	–	–	–	–	–	–	90	67%	60	0.839	0.014
URS/CH2MHill - Oak Ridge (UCOR): ORNL	496	60	–	–	–	–	–	–	–	–	–	556	11%	60	0.833	0.014
Battelle -PNNL- Subs	160	17	–	–	–	–	–	–	–	–	–	177	10%	17	0.209	0.012
Oak Ridge Institue for Science & Education	67	22	–	–	–	–	–	–	–	–	–	89	25%	22	0.237	0.011
SRNS Service Subs	11	32	–	–	–	–	–	–	–	–	–	43	74%	32	0.354	0.011
Univ. of Georgia Ecology Laboratory	8	18	–	–	–	–	–	–	–	–	–	26	69%	18	0.182	0.010
Wackenhut Services Inc. - SR	42	26	–	–	–	–	–	–	–	–	–	68	38%	26	0.271	0.010
Tritium Extraction Facility	–	8	–	–	–	–	–	–	–	–	–	8	100%	8	0.073	0.009
SRR Operations	–	1	–	–	–	–	–	–	–	–	–	1	100%	1	0.008	0.008
Pacific Northwest Site Office	15	11	–	–	–	–	–	–	–	–	–	26	42%	11	0.080	0.007
Cabrera Services	3	2	–	–	–	–	–	–	–	–	–	5	40%	2	0.009	0.005
National Renewable Energy Laboratory	6	1	–	–	–	–	–	–	–	–	–	7	14%	1	0.001	0.001
Brookhaven National Laboratory	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
Totals	**24,373**	**3,088**	**361**	**99**	**25**	**14**	**4**	–	–	–	–	**27,964**	**13%**	**3,591**	**200.396**	**0.056**

Note: Boxed values (gray background) indicate the greatest value in each column.

DOE Occupational Radiation Exposure Report for CY 2019

Exhibit B-13. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Research, Fusion, 2019.

RESEARCH, FUSION

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Sandia National Laboratories	72	5	–	–	–	–	–	–	–	–	–	77	6%	5	0.076	**0.015**
Princeton Plasma Physics Laboratory	273	72	–	–	–	–	–	–	–	–	–	**345**	**21%**	72	**0.391**	0.005
Totals	**345**	**77**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**422**	**18%**	**77**	**0.467**	**0.006**

Note: Boxed values (gray background) indicate the greatest value in each column.

DOE Occupational Radiation Exposure Report for CY 2018

Exhibit B-14. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Waste Processing, 2019.

WASTE PROCESSING

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Wastren Advantage Inc. - TWPC	132	58	26	32	–	–	–	–	–	–	–	248	47%	116	17.456	**0.150**
West Valley Nuclear Services Inc.	239	67	45	23	4	–	–	–	–	–	–	378	37%	139	20.459	0.147
Energy Solutions - UMTRA Project - Moab	43	66	15	14	–	–	–	–	–	–	–	138	69%	95	9.748	0.103
B & W Conversion Services LLC - Paducah	221	76	21	–	–	–	–	–	–	–	–	318	31%	97	5.510	0.057
Los Alamos National Laboratory	175	64	19	–	–	–	–	–	–	–	–	258	32%	83	4.278	0.052
SRR Operations	663	1,431	164	32	–	–	–	–	–	–	–	**2,290**	71%	**1,627**	**74.687**	0.046
Savannah River Nuclear Solutions	572	434	36	19	2	–	–	–	–	–	–	1,063	46%	491	21.020	0.043
Misc. DOE Contractors - SR	6	11	1	–	–	–	–	–	–	–	–	18	67%	12	0.429	0.036
Washington River Protection Solutions LLC	1,559	420	19	2	–	–	–	–	–	–	–	2,000	22%	441	15.045	0.034
WTS Subcontractors - WIPP	41	3	–	–	–	–	–	–	–	–	–	44	7%	3	0.098	0.033
Savannah River National Laboratory	8	13	–	–	–	–	–	–	–	–	–	21	62%	13	0.385	0.030
Brookhaven National Laboratory	59	3	–	–	–	–	–	–	–	–	–	62	5%	3	0.079	0.026
Misc. S.R.S. Const. Subcontractors	4	14	–	–	–	–	–	–	–	–	–	18	78%	14	0.281	0.020
SRNS Construction Subs	1	3	–	–	–	–	–	–	–	–	–	4	75%	3	0.061	0.020
Tritium Extraction Facility	5	13	–	–	–	–	–	–	–	–	–	18	72%	13	0.254	0.020
Wackenhut Services Inc. - SR	118	113	1	–	–	–	–	–	–	–	–	232	49%	114	2.264	0.020
Washington TRU Solutions LLC-WIPP	333	50	–	–	–	–	–	–	–	–	–	383	13%	50	1.005	0.02
Sandia National Laboratories	36	7	–	–	–	–	–	–	–	–	–	43	16%	7	0.124	0.018
SPRU-NY (Building remediation)	7	2	–	–	–	–	–	–	–	–	–	9	22%	2	0.029	0.015
SRNS Service Subs	44	40	–	–	–	–	–	–	–	–	–	84	48%	40	0.610	0.015
Los Alamos National Lab - WIPP	2	1	–	–	–	–	–	–	–	–	–	3	33%	1	0.014	0.014
Savannah River Field Office	31	25	–	–	–	–	–	–	–	–	–	56	45%	25	0.274	0.011
SRNS Construction	75	50	–	–	–	–	–	–	–	–	–	125	40%	50	0.568	0.011
Santa Fe Protective Services (WIPP)		1	–	–	–	–	–	–	–	–	–	1	**100%**	1	0.010	0.010
SR construction - Parsons Subcontractors	1	7	–	–	–	–	–	–	–	–	–	8	88%	7	0.069	0.010
SRR Service Subs	14	24	–	–	–	–	–	–	–	–	–	38	63%	24	0.240	0.010
Carlsbad Field Office	13	–	–	–	–	–	–	–	–	–	–	13	0%	–	0.000	0.000
Mission Support Alliance	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
N3B	9	–	–	–	–	–	–	–	–	–	–	9	0%	–	0.000	0.000
NNSA Los Alamos Site Office	3	–	–	–	–	–	–	–	–	–	–	3	0%	–	0.000	0.000
SR construction - Parsons	2	–	–	–		–	–	–	–	–	–	2	0%	–	0.000	0.000
Wastren Advantage, Inc.	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
Totals	**4,418**	**2,996**	**347**	**122**	**6**	–	–	–	–	–	–	**7,889**	**44%**	**3,471**	**174.997**	**0.050**

Note: Boxed values (gray background) indicate the greatest value in each column.

DOE Occupational Radiation Exposure Report for CY 2019

Exhibit B-15. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Weapons Fabrication, 2019.

WEAPONS FABRICATION

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Los Alamos National Laboratory	1,434	553	227	143	57	28	7	–	–	–	–	2,449	41%	1,015	**174.191**	**0.172**
NNSA Los Alamos Site Office	3	2	–	–	–	–	–	–	–	–	–	5	40%	2	0.093	0.047
CNS, LLC - Y-12	4,567	1,528	128	3	–	–	–	–	–	–	–	**6,226**	27%	**1,659**	61.411	0.037
Sandia National Laboratories	119	17	1	–	–	–	–	–	–	–	–	137	13%	18	0.636	0.035
CNS, LLC - Pantex	3,745	641	31	11	–	–	–	–	–	–	–	4,428	15%	683	23.105	0.034
Office of Secure Transportation	289	12	1	–	–	–	–	–	–	–	–	302	4%	13	0.448	0.034
CNS, LLC - Subcontractors	38	3	–	–	–	–	–	–	–	–	–	41	7%	3	0.084	0.028
PXSO/NNSA and DOE Couriers	25	3	–	–	–	–	–	–	–	–	–	28	11%	3	0.076	0.025
URS/CH2MHill - Oak Ridge (UCOR): Y-12	105	5	–	–	–	–	–	–	–	–	–	110	5%	5	0.120	0.024
Savannah River Field Office	4	4	–	–	–	–	–	–	–	–	–	8	**50%**	4	0.078	0.020
CNS, LLC - Security	479	69	–	–	–	–	–	–	–	–	–	548	13%	69	0.983	0.014
SRNS Construction	20	12	–	–	–	–	–	–	–	–	–	32	38%	12	0.163	0.014
Tritium Extraction Facility	193	159	–	–	–	–	–	–	–	–	–	352	45%	159	2.064	0.013
Savannah River Nuclear Solutions	10	6	–	–	–	–	–	–	–	–	–	16	38%	6	0.053	0.009
Savannah River National Laboratory	16	3	–	–	–	–	–	–	–	–	–	19	16%	3	0.024	0.008
Kansas City Plant	161	66	–	–	–	–	–	–	–	–	–	227	29%	66	0.364	0.006
SRNS Service Subs	2	1	–	–	–	–	–	–	–	–	–	3	33%	1	0.006	0.006
N3B	4	–	–	–	–	–	–	–	–	–	–	4	0%	–	0.000	0.000
SRR Operations	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	–
Totals	**11,215**	**3,084**	**388**	**157**	**57**	**28**	**7**	–	–	–	–	**14,936**	**25%**	**3,721**	**263.899**	**0.071**

Note: Boxed values (gray background) indicate the greatest value in each column.

DOE Occupational Radiation Exposure Report for CY 2019

Exhibit B-16. Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Other, 2019.

OTHER

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
CH2M Hill Plateau Remediation Company (CHPRC)	398	104	14	13	2	–	–	–	–	–	–	531	25%	133	**11.046**	**0.083**
Wastren Advantage, Inc.	37	28	7	–	–	–	–	–	–	–	–	72	49%	35	1.831	0.052
Isotek (Bldg 3019)	111	18	2	–	–	–	–	–	–	–	–	131	15%	20	0.959	0.048
N3B	356	20	4	–	–	–	–	–	–	–	–	380	6%	24	1.121	0.047
Washington River Protection Solutions LLC	500	173	15	–	–	–	–	–	–	–	–	688	27%	**188**	7.177	0.038
Los Alamos National Laboratory	2,405	140	14	1	–	–	–	–	–	–	–	**2,560**	6%	155	5.392	0.035
SRR Operations	2	2	–	–	–	–	–	–	–	–	–	4	50%	2	0.068	0.034
Savannah River National Laboratory	–	2	–	–	–	–	–	–	–	–	–	2	**100%**	2	0.065	0.033
Sandia National Laboratories	325	26	2	–	–	–	–	–	–	–	–	353	8%	28	0.817	0.029
SRNS Service Subs	67	29	3	–	–	–	–	–	–	–	–	99	32%	32	0.790	0.025
NNSA Los Alamos Site Office	101	3	–	–	–	–	–	–	–	–	–	104	3%	3	0.070	0.023
DOE-Richland Field Office	307	54	2	–	–	–	–	–	–	–	–	363	15%	**56**	1.148	0.021
SRR Service Subs	4	1	–	–	–	–	–	–	–	–	–	5	20%	1	0.018	0.018
Wackenhut Services Inc. - SR	27	10	–	–	–	–	–	–	–	–	–	37	27%	10	0.173	0.017
Mission Support Alliance	76	5	–	–	–	–	–	–	–	–	–	81	6%	5	0.073	0.015
Office of River Protection	90	4	–	–	–	–	–	–	–	–	–	94	4%	4	0.059	0.015
Savannah River Field Office	17	14	–	–	–	–	–	–	–	–	–	31	45%	14	0.206	0.015
Savannah River Nuclear Solutions	300	119	2	–	–	–	–	–	–	–	–	421	29%	121	1.840	0.015
Bechtel National Corporation	24	3	–	–	–	–	–	–	–	–	–	27	11%	3	0.041	0.014
Univ. of Georgia Ecology Laboratory	4	5	–	–	–	–	–	–	–	–	–	9	56%	5	0.069	0.014
SRNS Construction	58	13	–	–	–	–	–	–	–	–	–	71	18%	13	0.137	0.011
Tritium Extraction Facility	2	2	–	–	–	–	–	–	–	–	–	4	50%	2	0.013	0.007
Navarro - Grand Junction	13	13	–	–	–	–	–	–	–	–	–	26	50%	13	0.041	0.003
CSC Hanford Occupational Health Services	8	–	–	–	–	–	–	–	–	–	–	8	–	–	0.000	0.000
Misc. DOE Contractors - SR	5	–	–	–	–	–	–	–	–	–	–	5	–	–	0.000	0.000
Office of Secure Transportation	32	–	–	–	–	–	–	–	–	–	–	32	–	–	0.000	0.000
SRNS Construction Subs	4	–	–	–	–	–	–	–	–	–	–	4	–	–	0.000	0.000
Totals	**5,273**	**788**	**65**	**14**	**2**	–	–	–	–	–	–	**6,142**	**14%**	**869**	**33.154**	**0.038**

Note: Boxed values (gray background) indicate the greatest value in each column.

DOE Occupational Radiation Exposure Report for CY 2019

Exhibit B-17. Internal Dose by Facility Type and Nuclide, 2017–2019.

Facility Type	Nuclide*	No. of Individuals with Measurable CED** 2017	No. of Individuals with Measurable CED** 2018	No. of Individuals with Measurable CED** 2019	Collective CED Dose (person-rem) 2017	Collective CED Dose (person-rem) 2018	Collective CED Dose (person-rem) 2019	Average Measurable CED (rem) 2017	Average Measurable CED (rem) 2018	Average Measurable CED (rem) 2019
Accelerator	Hydrogen-3	–	–	1	–	–	0.001	–	–	0.001
	Total	–	–	1	–	–	0.001	–	–	0.001
Fuel Fabrication	Total	–	–	–	–	–	–	–	–	–
Fuel Processing	Plutonium	–	–	–	–	–	–	–	–	–
	Total	–	–	–	–	–	–	–	–	–
Fuel/Uranium Enrichment	Total	–	–	–	–	–	–	–	–	–
Maintenance and Support	Americium	20	–	1	0.091	–	0.002	0.005	–	0.002
	Hydrogen-3	2	–	1	0.004	–	0.004	0.002	–	0.004
	Other	–	1	2	–	0.007	0.002	–	0.007	0.001
	Plutonium	2	–	1	0.011	–	–	0.006	–	–
	Uranium	9	–	–	0.058	–	–	0.006	–	–
	Total	33	1	5	0.164	0.007	0.009	0.005	0.007	0.002
Other	Other	–	1	4	–	0.001	0.026	–	0.001	0.007
	Uranium	–	–	1	–	–	0.083	–	–	**0.083** ◄
	Total	–	1	5	–	0.001	0.109	–	0.001	0.022
Reactor	Total	–	–	–	–	–	–	–	–	–
Research, Fusion	Total	–	–	–	–	–	–	–	–	–
Research, General	Americium	3	–	–	0.063	–	–	0.021	–	–
	Hydrogen-3	–	7	6	–	0.052	0.121	–	0.007	0.020
	Mixed	–	1	–	–	0.087	–	–	0.087	–
	Other	2	1	1	0.057	0.019	0.010	0.029	0.019	0.010
	Polonium	–	–	2	–	–	0.093	–	–	–
	Uranium	9	19	9	0.543	0.219	0.056	0.060	0.012	0.006
	Total	14	28	18	0.663	0.377	0.280	0.047	0.014	0.016
Waste Processing/Mgmt.	Other	3	4	4	0.183	0.007	0.008	**0.061** ◄	0.002	0.002
	Uranium	29	29	51	0.947	0.828	2.179	0.033	0.029	0.043
	Total	32	33	55	1.130	0.835	2.187	0.035	0.025	0.040
Weapons Fab. and Testing	Hydrogen-3	1	3	16	0.004	0.008	0.071	0.004	0.003	0.004
	Mixed	13	14	6	0.193	0.196	0.093	0.015	0.014	0.016
	Plutonium	–	1	–	–	3.600		–	**3.600** ◄	–
	Uranium	**1,194** ◄	**1,251** ◄	**1,306** ◄	**63.769** ◄	**53.740** ◄	**47.791** ◄	0.053	0.043	0.037
	Total	1,208	1,268	1,328	63.966	58.227	47.955	0.053	0.043	0.036
	Totals	**1,287**	**1,331**	**1,412**	**65.923**	**59.522**	**50.541**	**0.051**	**0.044**	**0.036**

Note: Boxed values (gray background) indicate the greatest value in each column.

*Intakes grouped by nuclide. Intakes involving multiple nuclides were grouped into "mixed." Nuclides where fewer than 10 individuals had intakes were grouped as "other."

**The number of internal depositions represents the number of internal dose records with positive results reported for each individual.

DOE Occupational Radiation Exposure Report for CY 2019

Exhibit B-18a. Distribution of TED by Labor Category, 2017.

TOTAL EFFECTIVE DOSE (TED)

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Labor Category	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Agriculture	75	–	–	–	–	–	–	–	–	–	–	75	–	–	–	–
Construction/Repair	3,351	1,306	218	59	11	–	–	–	–	–	–	4,945	32%	1,594	96.104	0.060
Laborers	936	261	69	33	–	–	–	–	–	–	–	1,299	28%	363	30.504	0.084
Management	6,355	1,174	45	17	4	–	–	–	–	–	–	7,595	16%	1,240	38.765	0.031
Miscellaneous	4,627	575	98	22	2	–	1	–	–	–	–	5,325	13%	698	40.182	0.058
Production	2,209	1,128	249	116	40	1	–	–	–	–	–	3,743	**41%** ◀	1,534	139.643	0.091
Professional/Scientists	18,686	3,232	190	55	7	2	7	–	–	–	–	**22,179** ◀	16%	**3,493** ◀	132.978	0.038
Service Workers	5,827	771	49	9	–	–	–	–	–	–	–	6,656	12%	829	28.185	0.034
Technicians	7,160	1,663	381	147	38	10	12	–	–	–	–	9,411	24%	2,251	**208.734** ◀	**0.093** ◀
Transport Workers	793	98	10	9	–	–	–	–	–	–	–	910	13%	117	7.969	0.068
Unknown	16,868	798	87	13	1	–	1	–	–	–	–	17,768	5%	900	38.145	0.042
Totals	**66,887**	**11,006**	**1,396**	**480**	**103**	**13**	**21**	**–**	**–**	**–**	**–**	**79,906**	**16%**	**13,019**	**761.209**	**0.058**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-18b. Distribution of TED by Labor Category, 2018.

TOTAL EFFECTIVE DOSE (TED)

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Labor Category	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Agriculture	59	–	–	–	–	–	–	–	–	–	–	59	–	–	–	–
Construction/Repair	3,175	1,363	158	37	2	–	–	–	–	–	–	4,735	33%	1,560	72.434	0.046
Laborers	928	285	62	22	5	1	–	–	–	–	–	1,303	29%	375	29.060	0.077
Management	5,412	1,064	61	10	2	–	–	–	–	–	–	6,549	17%	1,137	34.641	0.030
Miscellaneous	8,228	1,282	121	31	1	1	–	–	–	–	–	9,664	15%	1,436	61.968	0.043
Production	2,305	1,123	237	95	37	7	–	–	–	–	–	3,804	**39%** ◄	1,499	134.876	0.090
Professional/Scientists	18,257	3,140	210	55	12	5	–	–	–	–	–	**21,679** ◄	16%	**3,422** ◄	130.532	0.038
Service Workers	5,677	829	55	18	–	–	–	–	–	–	–	6,579	14%	902	33.161	0.037
Technicians	5,733	1,705	383	148	35	25	15	–	1	–	–	8,045	29%	2,312	**227.088** ◄	**0.098** ◄
Transport Workers	845	110	15	5	1	–	–	–	–	–	–	976	13%	131	8.523	0.065
Unknown	11,679	517	34	8	2	–	–	–	–	–	–	12,240	5%	561	21.039	0.038
Totals	**62,298**	**11,418**	**1,336**	**429**	**97**	**39**	**15**	–	**1**	–	–	**75,633**	**18%**	**13,335**	**753.322**	**0.056**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-18c. Distribution of TED by Labor Category, 2019.

TOTAL EFFECTIVE DOSE (TED)

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Labor Category	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Agriculture	51	1	–	–	–	–	–	–	–	–	–	52	2%	1	0.010	0.010
Construction/Repair	3,360	1,522	179	56	4	–	–	–	–	–	–	5,121	34%	1,761	87.835	0.050
Laborers	1,038	350	48	19	1	–	–	–	–	–	–	1,456	29%	418	25.589	0.061
Management	5,532	1,170	46	9	–	–	–	–	–	–	–	6,757	18%	1,225	32.398	0.026
Miscellaneous	7,712	754	100	10	–	3	–	–	–	–	–	8,579	10%	867	39.188	0.045
Production	2,339	1,324	253	82	11	–	–	–	–	–	–	4,009	**42%** ◀	1,670	115.754	0.069
Professional/Scientists	17,887	3,328	208	62	12	7	1	–	–	–	–	**21,505** ◀	17%	**3,618** ◀	133.861	0.037
Service Workers	5,940	838	72	12	2	–	–	–	–	–	–	6,864	13%	924	35.183	0.038
Technicians	6,095	2,019	346	147	58	32	10	–	–	–	–	8,707	30%	2,612	**246.165** ◀	**0.094** ◀
Transport Workers	838	133	15	13	2	–	–	–	–	–	–	1,001	16%	163	11.900	0.074
Unknown	11,506	506	43	13	1	–	–	–	–	–	–	12,069	5%	563	24.301	0.043
Totals	**62,298**	**11,945**	**1,310**	**423**	**91**	**42**	**11**	**–**	**–**	**–**	**–**	**76,120**	**18%**	**13,822**	**752.184**	**0.054**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-19. Internal Dose by Labor Category, 2017–2019.

Labor Category	No. of Individuals with Measurable CED* 2017	No. of Individuals with Measurable CED* 2018	No. of Individuals with Measurable CED* 2019	Collective CED Dose (person-rem) 2017	Collective CED Dose (person-rem) 2018	Collective CED Dose (person-rem) 2019	Average Measurable CED (rem) 2016	Average Measurable CED (rem) 2017	Average Measurable CED (rem) 2018
Construction/Repair	224	267	314	8.923	9.633	11.500	0.040	0.036	0.037
Laborers	72	80	70	6.470	5.172	3.641	**0.090**	**0.065**	**0.052**
Management	91	102	98	6.213	5.944	3.231	0.068	0.058	0.033
Miscellaneous	8	10	11	0.140	0.195	0.289	0.018	0.020	0.026
Production	**352**	**375**	**362**	**22.434**	**18.214**	**14.511**	0.064	0.049	0.040
Professional/Scientists	188	196	213	6.814	6.106	6.091	0.036	0.031	0.029
Service Workers	43	38	31	2.515	1.554	1.314	0.058	0.041	0.042
Technicians	115	108	111	5.590	7.382	3.660	0.049	0.068	0.033
Transport Workers	19	20	34	0.678	0.647	1.563	0.036	0.032	0.046
Unknown	175	149	168	6.146	4.709	4.741	0.035	0.032	0.028
Totals	**1,287**	**1,345**	**1,412**	**65.923**	**59.556**	**50.541**	**0.051**	**0.044**	**0.036**

Note: Boxed values (gray background) indicate the greatest value in each column.
*The number of internal depositions represents the number of internal dose records with positive results reported for each individual.

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Exhibit B-20. Dose Distribution by Labor Category and Occupation, 2019.

Labor Category	Occupation	Less than Meas.	Meas. to 0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Agriculture	Forest Workers	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Groundskeepers	35	–	–	–	–	–	–	–	–	–	–	35	–	–	–	–
	Misc. Agriculture	16	1	–	–	–	–	–	–	–	–	–	17	6%	1	0.010	0.01
Construction/Repair	Carpenters	294	129	24	14	–	–	–	–	–	–	–	461	36%	167	12.019	0.072
	Electricians	1,168	402	32	15	1	–	–	–	–	–	–	1,618	28%	450	19.730	0.044
	Masons	19	17	–	–	–	–	–	–	–	–	–	36	47%	17	0.335	0.020
	Mechanics/Repairers	466	214	27	4	2	–	–	–	–	–	–	713	35%	247	12.623	0.051
	Miners/Drillers	48	8	–	–	–	–	–	–	–	–	–	56	14%	8	0.125	0.016
	Misc. Repair/Construction	796	504	53	10	1	–	–	–	–	–	–	1,364	42%	568	25.491	0.045
	Painters	161	60	2	1	–	–	–	–	–	–	–	224	28%	63	2.064	0.033
	Pipe Fitter	408	188	41	12	–	–	–	–	–	–	–	649	37%	241	15.448	0.064
Laborers	Handlers/Laborers/Helpers	1,038	350	48	19	1	–	–	–	–	–	–	1,456	29%	418	25.589	0.061
Management	Admin. Support & Clerical Sec.	804	84	–	–	–	–	–	–	–	–	–	888	9%	84	1.402	0.017
	Manager - Administrator	4,696	1086	46	9	–	–	–	–	–	–	–	5,837	20%	1,141	30.996	0.027
	Sales	32	–	–	–	–	–	–	–	–	–	–	32				
Miscellaneous	Military	36	1	–	–	–	–	–	–	–	–	–	37	3%	1	0.013	0.013
	Miscellaneous	7,676	753	100	10	–	3	–	–	–	–	–	8,542	10%	866	39.175	0.045
Production	Machine Setup/Operators	145	181	38	–	–	–	–	–	–	–	–	364	**60%** ◄	219	12.206	0.056
	Machinists	115	19	5	2	2	–	–	–	–	–	–	143	20%	28	3.633	0.130
	Misc. Precision/Production	512	241	31	5	–	–	–	–	–	–	–	789	35%	277	14.542	0.052
	Operators, Plant/ System/Util.	1,261	790	158	71	7	–	–	–	–	–	–	2,287	45%	1,026	77.104	0.075
	Sheet Metal Workers	273	85	21	4	2	–	–	–	–	–	–	385	29%	112	8.036	0.072
	Welders and Solderers	33	8	–	–	–	–	–	–	–	–	–	41	20%	8	0.233	0.029
Professional/Scientists	Doctors and Nurses	21	1	–	–	–	–	–	–	–	–	–	22	5%	1	0.011	0.011
	Engineer	5,746	1,005	53	16	6	3	1					6,830	16%	1,084	40.556	0.037
	Health Physicist	324	81	10	–	–	–	–	–	–	–	–	415	22%	91	3.821	0.042
	Misc. Professional	8,005	1,708	110	33	3	–	–	–	–	–	–	9,859	19%	**1,854** ◄	62.390	0.034
	Scientist	3,791	533	35	13	3	4	–	–	–	–	–	4,379	13%	588	27.083	0.046
Service Workers	Firefighters	495	66	–	1	–	–	–	–	–	–	–	562	12%	67	1.491	0.022
	Food Service Employees	2	1	–	–	–	–	–	–	–	–	–	3	33%	1	0.034	0.034
	Janitors	249	25	2	–	–	–	–	–	–	–	–	276	10%	27	0.838	0.031
	Misc. Service	3,642	380	65	11	2	–	–	–	–	–	–	4,100	11%	458	25.919	0.057
	Security Guards	1,552	366	5	–	–	–	–	–	–	–	–	1,923	19%	371	6.901	0.019
Technicians	Engineering Technicians	1,610	288	41	14	1	1	–	–	–	–	–	1,955	18%	345	19.323	0.056
	Health Technicians	144	33	4	–	–	–	–	–	–	–	–	181	20%	37	1.925	0.052
	Misc. Technicians	1,609	399	45	29	4	6	3	–	–	–	–	2,095	23%	486	39.785	0.082
	Radiation Monitors/Techs.	1,039	857	160	51	13	8	1	–	–	–	–	2,129	51%	1,090	**89.543** ◄	0.082
	Science Technicians	719	286	80	51	40	17	6	–	–	–	–	1,199	40%	480	88.363	**0.184** ◄
	Technicians	974	156	16	2	–	–	–	–	–	–	–	1,148	15%	174	7.226	0.042
Transport Workers	Bus Drivers	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
	Equipment Operators	129	62	8	9	2	–	–	–	–	–	–	210	39%	81	7.510	0.093
	Misc. Transport	336	30	1	–	–	–	–	–	–	–	–	367	8%	31	0.887	0.029
	Pilots	6	–	–	–	–	–	–	–	–	–	–	6	–	–	–	–
	Truck Drivers	366	41	6	4	–	–	–	–	–	–	–	417	12%	51	3.477	0.068
Unknown	Unknown	11,506	506	43	13	1	–	–	–	–	–	–	**12,069** ◄	5%	563	24.301	0.043
Totals		**62,298**	**11,945**	**1,310**	**423**	**91**	**42**	**11**	–	–	–	–	**76,120**	**18%**	**13,822**	**752.184**	**0.054**

Note: Boxed values (gray background) indicate the greatest value in each column.

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Exhibit B-21. Internal Dose Distribution by Site and Nuclide, 2019.

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)															
Site	Nuclide*	Meas. to 0.020	0.020–0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	>5.0	Total Indiv. with Meas. CED	Collective CED (person-rem)	Avg. CED (rem)
Hanford: Hanford Site	Americium	1	–	–	–	–	–	–	–	–	–	–	1	0.002	0.002
Hanford: Hanford Site	Plutonium	1	–	–	–	–	–	–	–	–	–	–	1	0.001	0.001
Hanford: Pacific Northwest National Laboratory	Hydrogen-3	4	–	–	–	–	–	–	–	–	–	–	4	0.006	0.002
Idaho National Laboratory	Plutonium	–	2	–	–	–	–	–	–	–	–	–	2	0.093	**0.047** ◀
Lawrence Livermore National Laboratory	Hydrogen-3	–	2	–	–	–	–	–	–	–	–	–	2	0.115	0.058
Los Alamos National Laboratory	Hydrogen-3	16		–	–	–	–	–	–	–	–	–	16	0.069	0.004
Los Alamos National Laboratory	Uranium	6	–	–	–	–	–	–	–	–	–	–	6	0.012	0.002
Oak Ridge: Oak Ridge National Laboratory	Other	1		–	–	–	–	–	–	–	–	–	1	0.010	0.010
Oak Ridge: Y-12 National Security Complex	Mixed	4	2	–	–	–	–	–	–	–	–	–	6	0.093	0.016
Oak Ridge: Y-12 National Security Complex	Uranium	614	583	107	2	–	–	–	–	–	–	–	**1,306** ◀	**47.791** ◀	0.037
Paducah Gaseous Diffusion Plant	Uranium	3	–	–	–	–	–	–	–	–	–	–	3	0.044	0.015
Sandia National Laboratories	Other	10	–	–	–	–	–	–	–	–	–	–	10	0.036	0.004
Savannah River Site	Hydrogen-3	2	–	–	–	–	–	–	–	–	–	–	2	0.007	0.004
Uranium Mill Tailings Remedial Action Project	Uranium	20	23	8	–	–	–	–	–	–	–	–	51	2.179	0.043
Service Center Personnel*	Uranium	–	1	–	–	–	–	–	–	–	–	–	1	0.083	0.083
Totals		**682**	**613**	**115**	**2**	–	–	–	–	–	–	–	**1,412**	**50.541**	**0.036**

Note: Boxed values (gray background) indicate the greatest value in each column.

*Intakes grouped by nuclide. Intakes involving multiple nuclides were grouped into "mixed." Nuclides where fewer than 10 individuals had intakes were grouped as "other."

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Exhibit B-22. Extremity Dose Distribution by Site, 2019.

Site	No. Meas. Dose	Meas. to 0.100	0.100–1.0	1.0–5.0	5.0–10.0	10.0–20.0	20.0–30.0	>30.0	Total Monitored*	No. with Meas.	No. Above Monitoring Threshold (5 rems)**	Collective Extremity Dose (person-rem)	Avg. Meas. Extremity Dose (rem)
Ames Laboratory	33	131	–	–	–	–	–	–	164	131	–	5.986	0.046
Argonne National Laboratory	1,728	98	18	4	2	2	–	–	1,852	124	4	52.651	0.425
Brookhaven National Laboratory	2,351	15	16	2	–	–	–	–	2,384	33	–	8.953	0.271
Energy Technology Engineering Center	5	–	–	–	–	–	–	–	5	–	–	–	–
Fermi National Accelerator Laboratory	1,484	4	–	–	–	–	–	–	1,488	4	–	0.091	0.023
Grand Junction Site	26	–	–	–	–	–	–	–	26	–	–	–	–
Hanford: Hanford Site	3,550	69	70	34	–	–	–	–	3,723	173	–	88.769	0.513
Hanford: Office of River Protection	2,418	199	249	20	–	–	–	–	2,886	468	–	117.455	0.251
Hanford: Pacific Northwest National Laboratory	2,235	435	56	8	1	–	–	–	2,735	500	1	51.833	0.104
Idaho National Laboratory	6,283	931	311	53	6	–	–	–	7,584	1,301	6	278.862	0.214
Kansas City National Security Plant	143	83	1	–	–	–	–	–	227	84	–	3.790	0.045
Lawrence Berkeley National Laboratory	924	12	17	8	1	–	–	–	962	38	1	26.006	0.684
Lawrence Livermore National Laboratory	3,806	9	21	10	–	–	–	–	3,846	40	–	28.764	0.719
Los Alamos National Laboratory	9,997	1,275	585	178	23	1	–	–	**12,059** ◀	**2,062** ◀	**24** ◀	**790.646** ◀	0.383
National Renewable Energy Laboratory	1	6	–	–	–	–	–	–	7	6	–	0.183	0.031
Nevada National Security Site	902	1	–	–	–	–	–	–	903	1	–	0.041	0.041
Oak Ridge: East Tennessee Technology Park	434	–	–	–	–	–	–	–	434	–	–	–	–
Oak Ridge: Oak Ridge Institute for Science and Education	89	–	–	–	–	–	–	–	89	–	–	–	–
Oak Ridge: Oak Ridge National Laboratory	4,166	32	79	30	19	3	–	–	4,329	163	22	266.299	**1.634** ◀
Oak Ridge: Y-12 National Security Complex	6,255	24	41	16	–	–	–	–	6,336	81	–	42.397	0.523
Office of Secure Transportation	336	–	–	–	–	–	–	–	336	–	–	–	–
Paducah Gaseous Diffusion Plant	1,340	–	–	–	–	–	–	–	–	–	–	–	–
Pantex Plant	4,769	121	158	15	–	–	–	–	5,063	294	–	82.369	0.280
Portsmouth Gaseous Diffusion Plant	2,477	–	–	–	–	–	–	–	2,477	–	–	–	–
Princeton Plasma Physics Laboratory	345	–	–	–	–	–	–	–	345	–	–	–	–
Sandia National Laboratories	2,040	–	–	–	–	–	–	–	2,040	–	–	–	–
Savannah River National Laboratory	542	54	84	13	–	–	–	–	693	151	–	49.411	0.327
Savannah River Site	5,819	285	404	73	1				6,582	763	1	287.729	0.377
Separations Process Research Unit	9	–	–	–	–	–	–	–	9	–	–	–	–
SLAC National Accelerator Laboratory	2,692	–	–	–	–	–	–	–	2,692	–	–	–	–
Thomas Jefferson National Accelerator Facility	1,396	–	–	–	–	–	–	–	1,396	–	–	–	–
Uranium Mill Tailings Remedial Action Project	138	–	–	–	–	–	–	–	138	–	–	–	–
Waste Isolation Pilot Plant	428	–	–	–	–	–	–	–	428	–	–	–	–
West Valley Demonstration Project	349	14	15	–	–	–	–	–	378	29	–	3.277	0.113
Service Center Personnel***	137	21	6	–	–	–	–	–	164	27	–	3.006	0.111
Totals	**69,647**	**3,819**	**2,131**	**464**	**53**	**6**	–	–	**76,120**	**6,473**	**59**	**2,188.518**	**0.338**

Note: Boxed values (gray background) indicate the greatest value in each column.

* Represents the total number of monitoring records. The number of individuals provided extremity monitoring cannot be determined.

** All extremity doses above 5 rems were for the upper extremities (hands and forearms). DOE annual limit for extremities is 50 rems.
10 CFR 835.402(a)(1)(ii) requires extremity monitoring for a shallow dose equivalent to the skin or extremity of 5 rems or more in a year.

*** Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP.