

Oak Ridge Reservation

Annual Site Environmental Report 2019

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Oak Ridge Reservation Annual Site Environmental Report 2019

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Acronyms and Abbreviations

A	AAM	ambient air monitor	
	ACM	asbestos-containing material	
	AFFF	aqueous film-forming foams	
	AFV	alternative fuel vehicle	
	ALARA	as low as reasonably achievable	
	ANSI	American National Standards Institute	
	AOC	area of concern	
	AOEC	Agent Operations Eastern Command	
	ASER	<i>Oak Ridge Reservation Annual Site Environmental Report</i>	
AWQC	ambient water quality criterion		
B	BCG	biota concentration guide	
	BCK	Bear Creek kilometer	
	BFK	Brushy Fork kilometer	
	BMAP	Biological Monitoring and Abatement Program	
C	C&D	construction and demolition	
	CAA	Clean Air Act	
	CAP-88	Clean Air Act Assessment Package (software)	
	CEQ	Council on Environmental Quality	
	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980	
	CEUSP	Consolidated Edison Uranium Solidification Project	
	CFR	<i>Code of Federal Regulations</i>	
	CFTF	Carbon Fiber Technology Facility	
	CH	contact-handled	
	COLEX	column exchange	
	CRK	Clinch River kilometer	
	CROET	Community Reuse Organization of East Tennessee	
	CRSP	Chestnut Ridge Security Pits	
	CWA	Clean Water Act	
	CWTS	Chromium Water Treatment System (ETTP)	
	CX	categorical exclusion	
	CY	calendar year	
	D	D&D	decontamination and decommissioning
		DCE	dichloroethene/dichloroethylene
DCS		derived concentration standard	
DOE		US Department of Energy	
DOI		US Department of Interior	

E	EC&P	environmental compliance and protection
	ED	effective dose
	EESP	Energy Efficiency and Sustainability Program
	EFK	East Fork Poplar Creek kilometer
	EFPC	East Fork Poplar Creek
	EISA	Energy Independence and Security Act
	EM	environmental management
	EMS	environmental management system
	EMWMF	Environmental Management Waste Management Facility
	EO	executive order
	EPA	US Environmental Protection Agency
	EPCRA	Emergency Planning and Community Right-to-Know Act
	EPEAT	Electronic Product Environmental Assessment Tool
	EPSD	Environmental Protection Services Division (UT-Battelle)
	EPT	ephemeroptera, plecoptera, and trichoptera (taxa)
	ES&H	environment, safety, and health
	ESS	Environmental Surveillance System (ORNL)
	ETTP	East Tennessee Technology Park
	EU	exposure unit
	EUI	energy use intensity
EV	electric vehicle	
F	FCK	First Creek kilometer
	FFA	Federal Facility Agreement for the Oak Ridge Reservation
	FFCA	Federal Facilities Compliance Agreement
	FFK	Fifth Creek kilometer
	FMD	ORNL Facilities Management Division
	FWS	US Fish and Wildlife Service
	FY	fiscal year
G	GHG	greenhouse gas
	GI	green infrastructure
	GP	guiding principle
	GSF	gross square feet
H	HAP	hazardous air pollutant
	HFIR	High Flux Isotope Reactor
	HPSB	high-performance sustainable building
	HQ	hazard quotient
	HVC	Hardin Valley Campus
I	ID	identification number
	IDMS	Integrated Document Management System (UT-Battelle)
	IRIS	Integrated Risk Information System

	ISMS	Integrated Safety Management System
	ISO	International Organization for Standardization
	Isotek	Isotek Systems, LLC
L	LEED	Leadership in Energy and Environmental Design
	LID	low-impact design
	LLW	low-level (radioactive) waste
M	MARSAME	<i>Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual</i>
	MARSSIM	<i>Multi-Agency Radiation Survey and Site Investigation Manual</i>
	MBK	Mill Branch kilometer
	MCK	McCoy Branch kilometer
	MCL	maximum contaminant level
	MDF	Manufacturing Demonstration Facility
	MEI	maximally exposed individual
	MEK	Melton Branch kilometer
	MIK	Mitchell Branch kilometer
	MOA	memorandum of agreement
	MSL	mean sea level
	MSRE	Molten Salt Reactor Experiment
	MT	meteorological tower (followed by a numeral as in “MT2”)
	N	NAAQS
NCRP		National Council on Radiation Protection and Management
NEPA		National Environmental Policy Act
NESHAPs		National Emission Standards for Hazardous Air Pollutants
NNSA		National Nuclear Security Administration
NPDES		National Pollutant Discharge Elimination System
NPL		National Priorities List (EPA)
NRC		US Nuclear Regulatory Commission
NRCS		Natural Resources Conservation Service
NRHP		National Register of Historic Places
NSF-ISR		National Science Foundation International Strategic Registrations, Ltd.
NTRC		National Transportation Research Center
NWSol		North Wind Solutions, LLC
O		ODS
	OMP	operational monitoring plan
	OREM	DOE Oak Ridge Office of Environmental Management
	ORGDP	Oak Ridge Gaseous Diffusion Plant
	ORISE	Oak Ridge Institute for Science and Education
	ORNL	Oak Ridge National Laboratory
	ORO	DOE Oak Ridge Office

	ORR	Oak Ridge Reservation
	ORRLF	Oak Ridge Reservation Landfill
	ORSSAB	Oak Ridge Site Specific Advisory Board
	ORWMA	Oak Ridge Wildlife Management Area
	OST	Office of Secure Transportation
	OTC	once-through cooling
P	P2	pollution prevention
	P2/WMin	pollution prevention/waste minimization
	PAM	perimeter air monitoring (station)
	PCB	polychlorinated biphenyl
	PCE	tetrachloroethene
	PEMS	Predictive Emissions Monitoring System
	PFAS	per- and polyfluoroalkyl substances
	PFOA	perfluorooctanoic acid
	PFOS	perfluorooctane sulfonate
	PFP	pre-fire plan
	PM	particulate matter
	PM ₁₀	particulate matter with an aerodynamic diameter $\leq 10 \mu\text{m}$
	PM _{2.5}	fine particulate matter with an aerodynamic diameter $\leq 2.5 \mu\text{m}$
	PWTC	Process Waste Treatment Complex
Q	QA	quality assurance
	QC	quality control
	QMS	quality management system
R	R&D	research and development
	RA	remedial action
	Rad-NESHAPs	National Emission Standards for Hazardous Air Pollutants for Radionuclides
	RATA	relative accuracy test audit
	RCRA	Resource Conservation and Recovery Act
	RH	remote-handled
	RICE	reciprocating internal combustion engine
	ROD	record of decision
	RSI	Restoration Services, Inc.
	S	SARA
SBMS		Standards-Based Management System (UT-Battelle)
SC		DOE Office of Science
SD		storm water outfall/storm drain
SDWA		Safe Drinking Water Act
SNS		Spallation Neutron Source
SODAR		sonic detection and ranging

	SOF	sum of fractions
	SOP	state operating permit
	SPCC	spill prevention, control, and countermeasures
	SPMD	semipermeable membrane device
	STP	sewage treatment plant
	SWMU	solid waste management unit
	SWPP	storm water pollution prevention
	SWPPP	storm water pollution prevention plan
	SWSA	solid waste storage area
T	TCE	trichloroethene/trichloroethylene
	TDEC	Tennessee Department of Environment and Conservation
	TM	technical memorandum
	TMDL	total maximum daily load
	TMI	Tennessee Macroinvertebrate Index
	TRI	toxic (chemical) release inventory
	TRO	total residual oxidant
	TRU	transuranic
	TSCA	Toxic Substances Control Act
	TSS	total suspended solids
	TVA	Tennessee Valley Authority
	TWPC	Transuranic Waste Processing Center
	TWRA	Tennessee Wildlife Resources Agency
U	UMC	unneded materials and chemicals
	USDA	US Department of Agriculture
	USGBC	US Green Building Council
	UST	underground storage tank
	UT	University of Tennessee
	UT-Battelle	UT-Battelle, LLC
	UT-Dallas	University of Texas at Dallas
V	VOC	volatile organic compound
W	WBK	Walker Branch kilometer
	WCK	White Oak Creek kilometer
	WIPP	Waste Isolation Pilot Plant
	WOC	White Oak Creek
	WOD	White Oak Dam
	WQC	water quality criterion
	WQPP	water quality protection plan
	WRRP	Water Resources Restoration Program
	WSR	waste services representatives

Y Y-12 or
 Y-12 Complex Y-12 National Security Complex

Z ZPR Zero-power Reactor

Units of Measure and Conversion Factors*

Units of measure and their abbreviations

acre	acre	micrometer	μm
becquerel	Bq	millicurie	mCi
British thermal unit	Btu	milligram	mg
centimeter	cm	milliliter	mL
curie	Ci	millimeter	mm
day	d	million	M
degrees Celsius	°C	million gallons per day	MGD
degrees Fahrenheit	°F	millirad	mrad
disintegrations per minute	dpm	millirem	mrem
foot	ft	milliroentgen	mR
gallon	gal	millisievert	mSv
gallons per minute	gal/min	minute	min
gram	g	nanogram	ng
gray	Gy	nephelometric turbidity unit	NTU
gross square feet	gsf	parts per billion	ppb
hectare	ha	parts per million	ppm
hour	h	parts per trillion	ppt
inch	in.	picocurie	pCi
joule	J	pound	lb
kilocurie	kCi	pound mass	lbm
kilogram	kg	pounds per square inch	psi
kilometer	km	pounds per square inch gauge	psig
kilowatt	kW	quart	qt
linear feet	LF	rad	rad
liter	L	roentgen	R
megajoule	MJ	roentgen equivalent man	rem
megawatt	MW	second	s
megawatt-hour	MWh	sievert	Sv
meter	m	standard unit (pH)	SU
metric tons	MT	ton, short (2,000 lb)	ton
microcurie	μCi	yard	yd
microgram	μg	year	yr

Quantitative prefixes

exa	× 10 ¹⁸	atto	× 10 ⁻¹⁸
peta	× 10 ¹⁵	femto	× 10 ⁻¹⁵
tera	× 10 ¹²	pico	× 10 ⁻¹²
giga	× 10 ⁹	nano	× 10 ⁻⁹
mega	× 10 ⁶	micro	× 10 ⁻⁶
kilo	× 10 ³	milli	× 10 ⁻³
hecto	× 10 ²	center	× 10 ⁻²
deka	× 10 ¹	decic	× 10 ⁻¹

*Due to differing permit reporting requirements and instrument capabilities, various units of measurement are used in this report. The provided list of units of measure and conversion factors is intended to help readers make approximate conversions to other units as needed for specific calculations and comparisons.

Unit conversions

Unit	Conversion	Equivalent	Unit	Conversion	Equivalent
Length					
in.	× 2.54	cm	cm	× 0.394	in.
ft	× 0.305	m	m	× 3.28	ft
mile	× 1.61	km	km	× 0.621	mile
Area					
acre	× 0.405	ha	ha	× 2.47	acre
ft ²	× 0.093	m ²	m ²	× 10.764	ft ²
mile ²	× 2.59	km ²	km ²	× 0.386	mile ²
Volume					
ft ³	× 0.028	m ³	m ³	× 35.31	ft ³
qt (US liquid)	× 0.946	L	L	× 1.057	qt (US liquid)
gal	× 3.7854118	L	L	× 0.264172051	gal
Concentration					
ppb	× 1	µg/kg	µg/kg	× 1	ppb
ppm	× 1	mg/kg	mg/kg	× 1	ppm
ppb	× 1	µg/L	µg/L	× 1	ppb
ppm	× 1	mg/L	mg/L	× 1	ppm
Weight					
lb	× 0.4536	kg	kg	× 2.205	lb
lbm	× 0.45356	kg	kg	× 2.2046226	lbm
ton, short	× 907.1847	kg	kg	× 0.00110231131	ton, short
Temperature					
°C	°F = (9/5)°C + 32	°F	°F	°C = (5/9)(F-32)	°C
Activity					
Bq	× 2.7 × 10 ⁻¹¹	Ci	Ci	× 3.7 × 10 ¹⁰	Bq
Bq	× 27	pCi	pCi	× 0.037	Bq
mSv	× 100	mrem	mrem	× 0.01	mSv
Sv	× 100	rem	rem	× 0.01	Sv
nCi	× 1,000	pCi	pCi	× 0.001	nCi
mCi/km ²	× 1	nCi/m ²	nCi/m ²	× 1	mCi/km ²
dpm/L	× 0.45 × 10 ⁹	µCi/cm ³	µCi/cm ³	× 2.22 × 10 ⁹	dpm/L
pCi/L	× 10 ⁻⁹	µCi/mL	µCi/mL	× 10 ⁹	pCi/L
pCi/m ³	× 10 ¹²	µCi/cm ³	µCi/cm ³	× 10 ¹²	pCi/m ³

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