

Oak Ridge Reservation

Annual Site Environmental Report 2018

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Oak Ridge Reservation Annual Site Environmental Report 2018

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Acronyms and Abbreviations

A	ACHP	Advisory Council on Historic Preservation
	ACM	asbestos-containing material
	AFV	alternative fuel vehicle
	ALARA	as low as reasonably achievable
	aMSL	above mean sea level
	ANSI	American National Standards Institute
	ANSI/HPS	ANSI Health Physics Society (standard)
	AOC	area of concern
	AOEC	Agent Operations Eastern Command (NNSA OST)
	ARAP	aquatic resource alteration permit
	ASER	<i>Oak Ridge Reservation Annual Site Environmental Report</i>
	AWQC	ambient water quality criterion
	B	BCG
BCK		Bear Creek kilometer
BFK		Brushy Fork kilometer
BMAP		Biological Monitoring and Abatement Program
BRW		bedrock well
C	C&D	construction and demolition
	CAA	Clean Air Act
	CAP-88	Clean Air Act Assessment Package (software)
	CCR	climate change resiliency
	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
	CNF	Central Neutralization Facility
	COC	contaminant of concern
	CPU	central processing unit
	CRK	Clinch River kilometer
	CROET	Community Reuse Organization of East Tennessee
	CWA	Clean Water Act
	CWTS	Chromium Water Treatment System (ETTP)
	CX	categorical exclusion
	CY	calendar year

D	D&D	decontamination and decommissioning	
	DCA	dichloroethane	
	DCE	dichloroethene/dichloroethylene	
	DCS	derived concentration standard	
	DNAPL	dense nonaqueous phase liquid	
	DOE	US Department of Energy	
	DOE ORO	DOE Oak Ridge Office	
	DOI	US Department of Interior	
	DOT	US Department of Transportation	
	DPT	direct push technology	
E	EC&P	environmental compliance and protection	
	ED	effective dose	
	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	
	E-Plan	Emergency response information system	
	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	
	FWS	US Fish and Wildlife Service	
		FY	fiscal year
G	GHG	greenhouse gas	
	GI	green infrastructure	
	GI/LID	green infrastructure/low impact development	
	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)
	ISMS	Integrated Safety Management System
	ISO	International Organization for Standardization
	Isotek	Isotek Systems LLC
L	LCD	liquid crystal display
	LEED	Leadership in Energy and Environmental Design
	LID	low impact development
	LLW	low-level 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
	MT	meteorological tower (when followed by a numeral as in “MT2”)
	N	NAAQS
NCRP		National Council on Radiation Protection and Measurement
NEPA		National Environmental Policy Act
NESHAPs		National Emission Standards for Hazardous Air Pollutants
NHPA		National Historic Preservation Act
NNSA		National Nuclear Security Administration
NPDES		National Pollutant Discharge Elimination System
NPL		National Priorities List (EPA)
NPS		US National Park Service
NRC		US Nuclear Regulatory Commission
NRCS		Natural Resources Conservation Service
NRHP		National Register of Historic Places
NSF-ISR		NSF International Strategic Registrations, Ltd.

	NTRC	National Transportation Research Center
	NWSol	North Wind Solutions, LLC
O	ODS	ozone-depleting substance
	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	Oak Ridge Office (DOE)
	ORR	Oak Ridge Reservation
	ORR-PCB-FFCA	Oak Ridge Reservation Polychlorinated Biphenyl Federal Facilities Compliance Agreement
	ORSSAB	Oak Ridge Site Specific Advisory Board
	ORWMA	Oak Ridge Wildlife Management Area
	OS	DOE Office of Science
	OST	Office of Secure Transportation
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
	PHEV	plug-in hybrid electric vehicle
	PM	particulate matter
	PM10	particulate matter with an aerodynamic diameter $\leq 10 \mu\text{m}$
	PM2.5	fine particulate matter with an aerodynamic diameter $\leq 2.5 \mu\text{m}$
	PS	performance specification
	PWTC	Process Waste Treatment Complex
Q	QA	quality assurance
	QAS	quality assurance system
	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
	RCW	recirculating cooling water
	RH	remote-handled
	RI	remedial investigation

	RI/FS	remedial investigation/feasibility study	
	RICE	reciprocating internal combustion engine	
	RMP	risk management plan	
	ROD	record of decision	
	RSI	Restoration Services, Inc.	
S	S&M	surveillance and maintenance	
	SAP	sampling and analysis plan	
	SARA	Superfund Amendments and Reauthorization Act	
	SBMS	Standards-Based Management System (UT-Battelle)	
	SC	DOE Office of Science	
	SCI	sustainable campus initiative	
	SCS	Soil Conservation Service	
	SD	storm water outfall/storm drain	
	SDWA	Safe Drinking Water Act	
	SHPO	State Historic Preservation Office (Tennessee)	
	SNS	Spallation Neutron Source	
	SODAR	sonic detection and ranging	
	SOF	sum of fractions	
	SOP	state operating permit	
	SPCC	spill prevention, control, and countermeasures (plan)	
	SPMD	semipermeable membrane device	
	STP	sewage treatment plant	
	SVOC	semivolatile organic compound	
	SWMU	solid waste management unit	
	SWPP	storm water pollution prevention	
SWPPP	Storm Water Pollution Prevention Plan		
	SWSA	solid waste storage area	
T	TCA	trichloroethane	
	TCE	trichloroethene/trichloroethylene	
	TDEC	Tennessee Department of Environment and Conservation	
	TMDL	total maximum daily load	
	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	unneeded materials and chemicals
		UNW	unconsolidated well
USC		United States Code	

	USDA	US Department of Agriculture
	UST	underground storage tank
	UT	University of Tennessee
	UT-Dallas	University of Texas at Dallas
V	VC	vinyl chloride
	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	Y-12 National Security Complex
	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	day	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 gage	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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