

Annual Site Environmental Report



2017

Oak Ridge Reservation

Annual Site Environmental Report 2017

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Acronyms and Abbreviations

A	AAS	ambient air (monitoring) station
	ABC	aluminum beverage can (recycling)
	AC	administrative control
	ACHP	Advisory Council on Historic Preservation
	ACM	asbestos-containing material
	ACO	Analytical Chemistry Organization (Y-12 Complex)
	AFV	alternative fuel vehicle
	AGL	above ground level
	ALARA	as low as reasonably achievable
	AMP	asset management program
	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
	ARAR	applicable or relevant and appropriate requirement
ASER	<i>Oak Ridge Reservation Annual Site Environmental Report</i>	
ATSDR	Agency for Toxic Substances and Disease Registry	
AWQC	ambient water quality criterion	
B	BCG	biota concentration guide
	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)
	CAS	condition assessment survey
	CCA	chromated copper arsenate (as in CCA Type C pressure-treated wood)
	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
	CFL	Computers for Learning
	CFR	<i>Code of Federal Regulations</i>
	CFTF	Carbon Fiber Technology Facility

	CH	contact-handled
	CIP	capacity increase project
	CNF	Central Neutralization Facility
	CNS	Consolidated Nuclear Security, LLC
	CO ₂ e	CO ₂ equivalent
	COC	contaminant of concern
	COR	City of Oak Ridge
	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
	DAC	derived air concentration
	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	EA	environmental assessment
	EC&P	environmental compliance and protection
	ECD	Environmental Compliance Department (Y-12)
	ECM	energy conservation measure
	ED	effective dose
	EDTA	ethylenediaminetetraacetic acid
	EFK	East Fork Poplar Creek kilometer
	EFPC	East Fork Poplar Creek
	EHD	epizootic hemorrhagic disease
	EISA	Energy Independence and Security Act
	EM	environmental management
	EMMIS	Environmental Monitoring Management Information System (Y-12)
	EMS	environmental management system
	EMWMF	Environmental Management Waste Management Facility
	ENIGMA	Ecosystems and Networks Integrated with Genes and Molecular Assemblies
	EO	executive order
	EOC	emergency operations center

	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
	ESPC	Energy Savings Performance Contract
	ESS	Environmental Surveillance System (ORNL)
	ETTP	East Tennessee Technology Park
	EU	exposure unit
	EUI	energy use intensity
	EV	electric vehicle
F	FAR	Federal Acquisition Regulation
	FCK	First Creek kilometer
	FEMP	Federal Energy Management Program
	FFA	Federal Facility Agreement (for the Oak Ridge Reservation)
	FFCA	Federal Facilities Compliance Agreement
	FFK	Fifth Creek kilometer
	FONSI	finding of no significant impact
	FWS	US Fish and Wildlife Service
	FY	fiscal year
	FYNSP	Future Years Nuclear Security Plan
G	GET	general employee training
	GHG	greenhouse gas
	GI	green infrastructure
	GI/LID	green infrastructure/low impact development
	GM	Geiger–Müller tube for detection of ionizing radiation
	GP	guiding principle
	GSA	General Services Administration
	GSF	gross square feet
H	HAP	hazardous air pollutant
	HCN	hydrogen cyanide
	HEMSF	high-energy mission-specific facility
	HEPA	high-efficiency particulate air
	HEU	highly enriched uranium
	HFIR	High Flux Isotope Reactor
	HPSB	high-performance sustainable building
	HQ	hazard quotient
	HVAC	heating, ventilation, and air conditioning
	HVC	Hardin Valley Campus

I	IC ₂₅	inhibition concentration (the concentration of effluent that causes a 25% reduction in survival, reproduction, and/or growth of monitored species)
	ID	identification (number)
	IDMS	Integrated Document Management System (UT-Battelle)
	ILA	industrial, landscaping, and agricultural
	ISMS	Integrated Safety Management System
	ISO	International Organization for Standardization
	Isotek	Isotek Systems LLC
J	JCI	Johnson Controls, Inc.
L	LC ₅₀	a concentration lethal to 50% of a test species
	LCD	liquid crystal display
	LEDP	Laboratory Equipment Donation Program
	LEED	Leadership in Energy and Environmental Design
	LEP	life extension program
	LID	low impact development
	LIMS	Laboratory Information Management System (Y-12 Complex)
LLW	low-level waste	
M	M&E	material and equipment
	M&TE	measurement and test equipment
	MACT	maximum achievable control technology
	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
	MDA	minimum detectable activity
	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”)
	MTF	Mercury Treatment Facility
N	NAAQS	National Ambient Air Quality Standards
	NEPA	National Environmental Policy Act
	NESHAPs	National Emission Standards for Hazardous Air Pollutants
	NHPA	National Historic Preservation Act

NIST	National Institute of Standards and Technology
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NOV	notice of violation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List (EPA)
NPO	NNSA Production Office
NPS	US National Park Service
NRC	US Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSC	National Security Complex
NSF-ISR	NSF International Strategic Registrations, Ltd.
NTRC	National Transportation Research Center
NWSol	North Wind Solutions, LLC

O

O&M	operations and maintenance
ODS	ozone-depleting substance
OF	outfall
OMP	operational monitoring plan
ORAU	Oak Ridge Associated Universities
OREIS	Oak Ridge Environmental Information System
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)
ORPS	Occurrence Reporting and Processing System
ORR	Oak Ridge Reservation
ORR-PCB-FFCA	Oak Ridge Reservation Polychlorinated Biphenyl Federal Facilities Compliance Agreement 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/WMin	pollution prevention/waste minimization
PAM	perimeter air monitoring (station)
Pantex	Pantex Plant
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	
	PSS	plant shift superintendent	
	PUE	power usage effectiveness	
	PWTC	Process Waste Treatment Complex	
Q	QA	quality assurance	
	QAS	quality assurance system	
	QC	quality control	
	QMS	quality management system	
R	R2	responsible recycling	
	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	
	REC	renewable energy credit (also renewable energy certificate)	
	REDC	Radiochemical Engineering Development Center	
	RESRAD	residual radioactivity	
	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	
	RQ	reportable quantity (CERCLA)	
	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	
SCP		standards and calibration program	
SD		storm water outfall/storm drain	
SDWA		Safe Drinking Water Act	
SHPO		State Historic Preservation Office (Tennessee)	
SIC		Standard Industrial Classification (code)	
SNAP		Significant New Alternatives Program (EPA)	

	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	
	SPO	Sustainability Performance Office	
	SSP	site sustainability plan	
	SSPP	Strategic Sustainability Performance Plan (DOE)	
	STP	sewage treatment plant	
	SVOC	semivolatile organic compound	
	SWEIS	sitewide environmental impact statement	
	SWHISS	Surface Water Hydrological Information Support System (Y-12 Complex)	
	SWMU	solid waste management unit	
	SWPP	storm water pollution prevention	
	SWPPP	Storm Water Pollution Prevention Plan	
	SWSA	solid waste storage area	
T	T&D	transmission and distribution	
	TCA	trichloroethane	
	TCE	trichloroethene/trichloroethylene	
	TDEC	Tennessee Department of Environment and Conservation	
	TEMA	Tennessee Emergency Management Agency	
	TMDL	total maximum daily load	
	TMSP	Tennessee Stormwater Multi-Sector General Permit	
	TOA	Tennessee Oversight Agreement	
	TRI	toxic (chemical) release inventory	
	TRO	total residual oxidant	
	TRU	transuranic	
	TSC	Technical Support Center	
	TSCA	Toxic Substances Control Act	
	TSS	total suspended solids	
	TVA	Tennessee Valley Authority	
	TWA	time-weighted average	
	TWPC	Transuranic Waste Processing Center	
	TWRA	Tennessee Wildlife Resources Agency	
	U	UCOR	URS CH2M Oak Ridge LLC
		UMC	unnneeded materials and chemicals
UMS		Utilities Management System (Y-12 Complex)	
UNW		unconsolidated well	
UPF		Uranium Processing Facility (Y-12 Complex)	
USDA		US Department of Agriculture	
UST		underground storage tank	
UT		University of Tennessee	

	UT-Dallas	University of Texas at Dallas
	UT-B	UT-Battelle, LLC
V	VC	vinyl chloride
	VOC	volatile organic compound
W	WBK	Walker Branch kilometer
	WCK	White Oak Creek kilometer
	WEMA	west end mercury-use area (Y-12)
	WET	whole effluent toxicity
	WOC	White Oak Creek
	WOD	White Oak Dam
	WPB	waste-processing building
	WQC	water quality criterion
	WQPP	water quality protection plan
	WRRP	Water Resources Restoration Program
	WSR	waste services representatives
	WUI	water use intensity
Y	Y-12	Y-12 National Security Complex
	Y-12 Complex	Y-12 National Security Complex
	YEOC	Y-12 Complex Emergency Operations Center
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	kW	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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