
Oak Ridge Reservation

Annual Site Environmental Report **2023**

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Professional Project Services, Inc.

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**US Department of Energy
project manager and Oak Ridge Reservation
coordinator:**

Katatra Vasquez

Technical coordinators:

Y-12 National Security Complex:

Paula Roddy
Chloe Ashley

Oak Ridge National Laboratory:

Joan Hughes
Walt Doty

East Tennessee Technology Park:

Kimberly L. Davis, PhD
Roger Petrie

Project director:

James J. Rochelle

Project coordinator:

Kimberly L. Davis, PhD

Integrating editor:

Teresa J. Thompson

Technical support:

Ellen J. Wald

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Acronyms and Abbreviations

A	ACM	asbestos-containing material
	AFFF	aqueous film-forming foams
	AFV	alternative fuel vehicle
	ANSI	American National Standards Institute
	AOEC	Agent Operations Eastern Command
	ARAP	Aquatic Resources Alteration Permit
	AROD	amended record of decision
	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
	BMP	best management practice
C	CAA	Clean Air Act
	CAP-88 PC	Clean Air Act Assessment Package-1988 (software)
	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
	CFE	carbon platform-free electricity
	CFR	<i>Code of Federal Regulations</i>
	CFTF	Carbon Fiber Technology Facility
	CNS	Consolidated Nuclear Security, LLC
	COLEX	column exchange
	COVID-19	Coronavirus Disease 2019
	CRD	contractor requirements document
	CRK	Clinch River kilometer
	CROET	Community Reuse Organization of East Tennessee
	CWA	Clean Water Act
	CWTS	Chromium Water Treatment System
	CX	categorical exclusion
	CY	calendar year
	D	D&D
DCE		dichloroethene/dichloroethylene
DCS		derived concentration standard
DMRQA		Discharge Monitoring Report Quality Assurance Study
DOD-ELAP		US Department of Defense Environmental Laboratory Accreditation Program
DOE		US Department of Energy

	DOECAP	DOE Consolidated Audit Program
	DU	depleted uranium
E	EA	environmental assessment
	EC	environmental compliance
	EC&P	environmental compliance and protection
	ECD	Y-12 Environmental Compliance Department
	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 of 2007
	EJ	environmental justice
	EM	DOE Office of Environmental Management
	EMDF	Environmental Disposal Facility
	EMP	Environmental Monitoring Program
	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	UT-Battelle Environmental Protection Services Division
	EPT	ephemeroptera, plecoptera, and trichoptera (taxa)
	e-RICE	emergency reciprocating internal combustion engine
	ES&H	environment, safety, and health
	ESH&Q	environment, safety, health, and quality
	ESPC	Energy Savings and Performance Contract
	ESS	ORNL Environmental Surveillance System
	ETTP	East Tennessee Technology Park
	EU	exposure unit
F	FCK	First Creek kilometer
	FFK	Fifth Creek kilometer
	FFS	focused feasibility study
	FLC	Federal Laboratory Consortium
	FMD	ORNL Facilities Management Division
	FONSI	Finding of No Significant Impact
	FWS	US Fish and Wildlife Service
	FY	fiscal year
G	GHG	greenhouse gas
	GP	guiding principle
	GSA	General Services Administration

H	HBCU	Historically Black Colleges and Universities
	HFIR	High Flux Isotope Reactor
	HPSB	high-performance sustainable building
	HQ	hazard quotient
	HVC	ORNL Hardin Valley Campus
I	IC	inhibition concentration
	ISMS	integrated safety management system
	ISO	International Organization for Standardization
	Isotek	Isotek Systems, LLC
L	LEED	Leadership in Energy and Environmental Design
	LLW	low-level radioactive waste
	LPF	Lithium Processing Facility
M	M&E	material and equipment
	MAPEP	Mixed Analyte Performance Evaluation Program
	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
	MCL-DCs	maximum contaminant level-derived concentrations
	MEI	maximally exposed individual
	MEK	Melton Branch kilometer
	MAPEP	Mixed Analyte Performance Evaluation Program
	MIK	Mitchell Branch kilometer
	MLLW	mixed low-level waste
	MOA	memorandum of agreement
	MSRE	Molten Salt Reactor Experiment
	MT	meteorological tower
	N	NAAQS
NELAP		National Environmental Laboratory Accreditation Program
NEPA		National Environmental Policy Act
NESHAPs		National Emission Standards for Hazardous Air Pollutants
NFPA		National Fire Protection Association
NHPA		National Historic Preservation Act
NNSA		National Nuclear Security Administration
NPDES		National Pollutant Discharge Elimination System
NPO		NNSA Production Office
NRC		US Nuclear Regulatory Commission
NRHP		National Register of Historic Places

	NTRC	National Transportation Research Center
	NWSol	North Wind Solutions, LLC
O	ODS	ozone-depleting substance
	OREM	DOE Oak Ridge Office of Environmental Management
	ORETTC	Oak Ridge Enhanced Technology and Training Center
	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
	ORRL	Oak Ridge Reservation Landfills
	ORSSAB	Oak Ridge Site Specific Advisory Board
	OST	Office of Secure Transportation
P	P2	pollution prevention
	PCB	polychlorinated biphenyl
	PCBADL	Polychlorinated Biphenyl Annual Document Log
	PCCR	phased construction completion report
	PCE	tetrachloroethene
	PFAS	per- and polyfluoroalkyl substances
	PFOA	perfluorooctanoic acid
	PFOS	perfluorooctane sulfonate
	PM ₁₀	particulate matter with an aerodynamic diameter ≤ 10 μm
	PM _{2.5}	fine particulate matter with an aerodynamic diameter ≤ 2.5 μm
	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
	RCRA	Resource Conservation and Recovery Act
	RECs	renewable energy credits
	RMAL	Radiochemical Materials Analytical Laboratory
	ROD	record of decision
	RSI	Restoration Services, Inc.
	RTR	real-time radiography
S	SA	supplement analysis
	SARA	Superfund Amendments and Reauthorization Act

	SBMS	UT-Battelle Standards-Based Management System
	SC	DOE Office of Science
	SD	storm water outfall/storm drain
	SHPO	State Historic Preservation Office
	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 devices
	SSP	site sustainability plan
	STP	sewage treatment plant
	SWEIS	sitewide environmental impact statement
	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
	TEMA	Tennessee Emergency Management Agency
	TMDL	total maximum daily load
	TMI	Tennessee Macroinvertebrate Index
	TRI	toxic chemical release inventory
	TRN	Technical Resilience Navigator
	TRO	total residue 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	UCOR	United Cleanup Oak Ridge LLC
	UPF	Uranium Processing Facility
	USDA	US Department of Agriculture
	UST	underground storage tank
	UT	University of Tennessee
	UT-Battelle	UT-Battelle, LLC
V	VARP	Vulnerability Assessment and Resilience Planning
	VC	vinyl chloride
	VOC	volatile organic compound
	WBK	Walker Branch kilometer

W	WCK	White Oak Creek kilometer
	WEPAR	West End Protected Area Reduction
	WFMP	<i>Oak Ridge Reservation Wildland Fire Management Plan</i>
	WM/WRM	weapon material/weapon-related material
	WOC	White Oak Creek
	WOD	White Oak Dam
	WQC	water quality criterion
	WQPP	water quality protection plan
	WRRP	Water Resources Restoration Program
Y	Y-12 or Y-12 Complex	Y-12 National Security Complex

Units of Measure and Conversion Factors*

Units of measure and their abbreviations

acre	acre	micrometer	μm
becquerel	Bq	miles per hour	mph
British thermal unit	Btu	millicurie	mCi
centimeter	cm	milligram	mg
curie	Ci	milliliter	mL
day	d	millimeter	mm
degrees Celsius	°C	million	M
degrees Fahrenheit	°F	million gallons per day	MGD
disintegrations per minute	dpm	millirad	mrad
foot	ft	millirem	mrem
gallon	gal	milliroentgen	mR
gallons per minute	gpm	millisievert	mSv
gram	g	minute	min
gray	Gy	nanogram	ng
gross square feet	gsf	nephelometric turbidity unit	NTU
hectare	ha	parts per billion	ppb
hour	h	parts per million	ppm
inch	in.	parts per trillion	ppt
joule	J	picocurie	pCi
kilocurie	kCi	pound	lb
kilogram	kg	pound mass	lbm
kilometer	km	pounds per square inch	psi
kilowatt	kW	pounds per square inch gauge	psig
linear feet	LF	quart	qt
liter	L	rad	rad
millibar	mb	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
metric tons of carbon	MTCO _{2e}	wet weight	ww
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	centi	× 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. This 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.

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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	× 0.946	L	L	× 1.057	qt
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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Y-12 COMPLEX

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Amber Harshman
Jamie Herald
Catlin Hoch-Nussbaum
William Hurst
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Kevin Jones
Kris Kinder
Michelle Kunz
Daniel Lawson
Jennifer Linton
Stacey Loveless
Gerald Lowe
Kenneth Lowe
Dr. Teresa Mathews
Brian McDaniel
Lori Muhs
Mary Murray
Jane Nations
C. Scott Nelson
Catlin Newman
Aprell Patterson
Jonathan Phillips
Tony Poole
Annette Primrose
Jeremy Price
Paula Roddy
Stephen Shults
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Terry Slack
Adam Smith
Rae Spencer
Steve Trotter
Larissa Welch
Christian Wenzel
Eve Whittenburg
Jeannette Widman

In Memoriam



Photo courtesy of Y-12

Mick Wiest was raised in Oak Ridge, Tennessee, by parents who worked on the Manhattan Project. Mick’s strong interest in history has helped Y-12 comply with the National Historic Preservation Act, while also performing his primary duties related to the Clean Water Act. While at Y-12, he championed the preservation of the approximately 160-year-old, 100-foot-tall, Eastern Hemlock tree that is now part of a dedicated green space at the site. After 30 years of service, Mick retired from his environmental duties in 2017, after which he continued to be involved in many historical projects related to the city’s history. He was instrumental in the formation of the Manhattan National Historical Park of Oak Ridge, helped to form the Oak Ridge Heritage and Preservation Association, and worked with the K-25 Preservation committee. He was remembered for his kindness, friendly demeanor, and ensuring environmental and cultural concerns were considered in project planning.

Merritt (Mick) Wiest

1951 – 2024
