

## INDEX

- $\alpha$**   
*see Type I decision error*
- $\beta$**   
*see Type II decision error*
- 91b material** 3-5
- $A_{\min}$**   
 area of elevated activity D-23
- action level** 2-14, 27; 4-34, 35; 7-3; D-6, 8, 9, 15, 16
- activity** 2-3; 3-11  
 activity concentration 4-1, 6  
 distribution 2-29, 30; 6-33, 34  
 ratios 4-4, 5  
 gross activity 4-8  
 units of activity 2-14; 4-1  
*see elevated activity*
- air** 3-19; 5-10, 14, 18; 6-11, 13, 55 to 60; 7-13, 16, 27; App. M
- ALARA** 2-5; 5-52; 8-21, 27; C-8 to 10
- alpha ( $\alpha$ ) radiation** 4-6, 7; 7-15  
 analysis 7-22  
 detection sensitivity  
   direct measurement 6-32 to 37  
   scanning 2-14; 5-48; 6-47 to 49  
 detectors 6-15 to 17, 20  
 attenuation 4-23, 25  
 measurement 5-12, 13; 6-13, 14  
 radon 6-55 to 59
- alternative hypothesis** 2-39; 5-25; 8-11, 17
- area**  
 evaluation & HSA 3-11  
 classification 2-4, 5, 17, 28; 4-11  
 contaminated 2-3  
 land 4-26  
 reference coordinate system 4-27  
 scanning 2-31; 5-46 to 48  
 site 4-17  
 site diagram 3-21  
 structures 4-23, 25  
 survey unit 2-4; 4-15
- area of elevated activity** 2-3, 4, 27, 28, 30; 5-35 to 39; 6-42 to 45; 8-22, 23, 27  
 demonstrating compliance 2-27  
 determining data points 5-35  
 flagging 5-44  
 investigation level 5-44 to 46  
 final status survey design 2-29, 32; 5-46 to 52
- area factor** 2-27; 5-36 to 39; 8-16, 22, 24
- arithmetic mean**  
*see mean*
- arithmetic standard deviation**  
*see standard deviation*
- background (radiation)**  
 activity 5-10, 11  
 decommissioning 4-13  
 detection sensitivity 6-37, 39 to 49  
 ground water 5-13  
 indistinguishable from 2-39  
 samples 5-10, 11; 7-2, 5  
 statistical tests 2-26; 4-9; 5-28  
*see background reference area*
- background reference area** 2-6, 28; 4-13 to 16; 7-5; 8-3 to 11, 17 to 21; A-5  
 background radiation 4-13  
 data points 5-25 to 31  
 $P_r$  5-27  
 relative shift  
   WRS test 5-26  
 survey 5-1, 2, 10
- Becquerel (Bq)**  
*see conversion table*
- beta ( $\beta$ ) radiation** 4-6  
 analysis 7-21, 22  
 detection sensitivity  
   direct measurement 6-32 to 37  
   scanning 2-14; 5-48; 6-37 to 47  
 detectors 6-15 to 17, 21  
 attenuation 4-23, 25  
 measurement 5-12, 13  
 radon 6-55, 58, 59
- bias** 2-11; 4-32 to 38  
 field measurements 6-4 to 6  
 laboratory measurements 7-4, 5

<b>biased sample measurement</b>			
<i>see judgement measurement</i>			
<b>byproduct material</b>	C-15, 16		
byproducts	3-5		
<b>calibration</b>	4-17; 6-20 to 28; 7-4, 13; 9-5, 6		
<b>CEDE (committed effective dose equivalent)</b>	2-2		
<b>CERCLA</b>	2-22, 39; 3-1, 2; 5-1, 7		
compared to MARSSIM	App. F		
<b>Chain of Custody</b>	5-3, 17; 7-23 to 25; 9-8		
<b>characterization survey</b>	2-15, 16, 22, 23; 3-24; 4-21; 5-7 to 17; A-17		
checklist	5-16, 17		
DCGLs	4-4		
<b>checklist(s)</b>			
<i>see survey checklist</i>			
<b>Class 1 area</b>	2-5; 4-11; 5-48; 8-24, 25		
investigation level	5-45		
scanning	2-32; 5-46		
<b>Class 2 area</b>	2-5; 4-12; 5-49; 8-24		
investigation level	5-45		
scanning	2-32; 5-47		
<b>Class 3 area</b>	2-5; 4-12; 5-49		
investigation level	5-45		
scanning	2-33; 5-48		
<b>classification</b>	2-4, 10, 17, 28; 3-1, 12, 22; 4-11; 5-46 to 51; 7-7; 8-1, 2, 15, 16, 22, 24, 27; A-5; N-16		
areas	2-5		
HSA/scoping	2-23		
<i>see Class 1, 2, and 3 area</i>			
<b>cleanup</b>	1-1, 4; 5-18, 19		
regulations	1-3		
release criterion	2-2		
<b>cleanup standard</b>	2-2		
<b>cleanup (survey) unit</b>			
<i>see survey unit</i>			
<b>coefficient of variation</b>	5-26		
<b>comparability</b>		2-11; 6-6; 7-6, 12; N-12 to 15	
<b>completeness</b>		2-11; 6-6, 7; 7-6, 7; N-14 to 16	
<b>computer code</b>			
DEFT		D-20, 21	
ELIPGRID		D-23	
RESRAD		5-36	
RESRAD-BUILD		5-36	
<b>conceptual site model</b>		3-21, 22; 4-21; 5-8, 47; 7-11, 13, 15; A-10	
<b>confidence interval</b>		6-53 to 55	
alternate null hypothesis		2-36	
<b>confirmatory survey</b>			
survey design		5-21	
<i>see final status survey</i>			
<b>contamination</b>		1-1, 2, 3, 6	
characterization survey		5-7 to 15	
classification		2-4, 5, 28; 3-3; 4-11	
DCGLs		2-2, 3; 4-3	
decommissioning criteria		5-25	
field measurements		6-5, 6	
final status survey		5-25 to 52	
HSA		2-22	
historical data		3-7, 10	
reconnaissance		3-9	
identifying		3-11	
in soil		3-13, 14	
in water		3-15, 17	
in structures		3-20	
in air		3-19	
remedial action		2-23; 5-18, 19	
sampling		7-11 to 16; App. M	
surrogate measurements		4-4	
<i>see area of elevated activity</i>			
<i>see impacted area</i>			
<b>control chart</b>		4-33, 37; 6-5, 7, 8	
<b>corrective action</b>		2-23; 6-28; 7-11; 9-8, 9	
bias		N-10	
comparability		N-15	
completeness		N-16	
precision		N-9	
representativeness		N-13	

**criterion**

alternate hypothesis	2-39
compliance	2-25
DCGLs	4-3
FSS	2-24
measurement	6-1
QC	4-32 to 38
release criterion	1-1 to 3; 3-24
statistical tests	2-22, 34
null hypothesis	2-9

**critical level ( $L_c$ )**

6-32 to 37

**critical value**8-12, 13, 15, 18,  
21; A-18;  
D-16, 17**curie ( $C_i$ )***see conversion table***data**

conversion	6-28 to 31
data interpretation checklist	8-27
distribution	8-4, 5
number of points needed	2-10
EMC	5-35 to 39
Sign test	5-31 to 35
WRS test	5-25 to 31
preliminary review (DQA)	E-3
review	N-5
skewness	8-5
spatial dependency	8-4

*see mean, median, standard deviation**see posting plot**see ranked data**see stem and leaf display***Data Life Cycle**2-6 to 12; 4-35;  
5-46; 9-2, 3, 5  
2-7

figure

steps:

1. planning 2-8; App. D
2. implementation 2-11
3. assessment 2-11; App. E
4. decision making 2-7

table

2-16

**Data Quality Assessment (DQA)**1-4; 2-6; 5-46;  
8-1, 2; 9-2, 5;  
App. E

assessment phase

2-8, 11; App. E

historical data

3-7

**Data Quality Objectives (DQOs)**

	1-3, 4; 2-7, 9; 4-4, 19; 5-2, 8, 21, 52; 6-2; 7-1, 2; 8-1, 2; 9-2, 7, 8; App.D
DQO Process	2-10; App. D
iterations (figure)	D-3
state problem	D-4
identify decision	D-5
inputs	D-5, 6
study boundaries	D-6 to 8
develop decision rule	D-8 to 13
decision errors	D-13 to 28
optimize design	D-28, 29
HSA	3-2
Planning	2-9
preliminary review (DQA)	E-1
measurement uncertainty	6-50
QAPP	9-2, 3

**data quality indicators**2-11; 6-3, 7; 7-2,  
7; 9-9; N-6 to 18**Derived Concentration Guideline Level (DCGL)**

	2-2, 11, 33; 4-3 to 11; 6-1, 2, 7, 19, 32, 50; 7-2, 7, 9; 8-2, 6, 11, 22, 26; 9-5
DCGL <sub>w</sub>	2-3; A-2; D-9
DCGL <sub>EMC</sub>	2-3
HSA	3-1, 12
gross activity	4-8
sampling	7-2, 7, 9
surveys	5-1

**decay***see radioactive decay***decision error**

	D-13 to 17, 20 to 22, 26 to 29; N-17
error chart	D-27
false positive	D-14, 21, 26
<i>see Type I error</i>	
false negative	D-15, 20
<i>see Type II error</i>	
feasibility trials	
DEFT	D-20, 21
specifying limits	D-15
table	D-15

- decision maker** 2-6; 4-14; 5-46;  
6-27; 7-2, 18; 9-8
- alternate methods 2-32
  - estimating uncertainty 2-11
  - DQOs 3-2; 6-2
- decision rule** 1-2; 8-24
- one-sample case D-11
  - power chart (example) D-25
  - two-sample case D-12
- decision statement** 8-24; D-2, 5, 6
- decommissioning** 1-1; 2-3; 3-1
- Characterization Survey 2-23; 5-7, 8
  - criteria 4-1
  - documentation 5-52
  - simplified procedure App. B
  - site identification 2-16
  - site investigation 4-1
- delta ( $\delta$ )** 5-26 to 35;  
8-12 to 15, 19,  
23; A-11, 19;  
D-10, 13, 16, 17,  
20, 21
- delta ( $\Delta$ )** 2-9, 10, 31  
*see relative shift*
- detection limit**  
*see minimum detectable concentration*
- detector(s)** Chap. 6; 9-6;  
App. H
- alpha
    - field survey 6-15 to 18, 20;  
H-5 to 10
    - laboratory 7-20, 22;  
H-38 to 42
  - beta
    - field survey 6-15 to 18, 21;  
H-11 to 14
    - laboratory 7-20, 21;  
H-43 to 45
  - calibration 6-20 to 28
  - in situ* spectrometry 6-11, 12
  - gamma
    - field survey 6-15 to 18, 22;  
H-15 to 24
    - laboratory 7-20, 21;  
H-46 to 48
    - low energy H-31 to 33
    - radon 6-57; H-25 to 30
    - sensitivity 6-31 to 49
    - X-ray H-31 to 33
- direct measurement** 2-4; 4-17;  
Chap. 6
- background 6-7, 35
  - description 6-10 to 13
  - detectors 6-15 to 22;  
App. H
  - instruments 4-16, 6-15 to 28
  - methods 4-17
  - QC 4-32 to 38
  - radon 6-55 to 60
  - replicates 6-3
  - sensitivity 6-31 to 49
  - surveys 5-45 to 51
- distribution coefficient ( $K_d$ )** 3-19
- documentation** N-2 to 4
- dose equivalent (dose)** 1-1, 3; 2-1, 2
- DCGL 2-3; 5-36 to 38
  - release criterion 2-2
- effective probe area** 6-29, 37
- elevated area**  
*see area of elevated activity*
- elevated measurement**  
*see area of elevated activity*
- Elevated Measurement Comparison (EMC)** 2-3, 27, 32;  
8-5, 9, 17, 18,  
21 to 23
- DCGL<sub>EMC</sub> 2-3, 27
  - number of data points 5-35 to 39
  - example 5-39; A-16
  - see area of elevated activity*
- exposure pathway model** 2-2, 15, 27;  
5-38, 44; 8-9, 23
- exposure rate** 4-20; 5-9 to 11,  
17, 51
- field sampling plan** 2-6; 9-3
- field survey equipment** H-5 to 37
- final status survey** 2-4, 24, 32; 3-24;  
5-21 to 55; 8-1,  
6, 10, 23 to 25;  
9-5
- checklist 5-53 to 55
  - classification 2-28; 4-11
  - compliance 2-25
  - DCGL 4-3
  - example App. A
  - figure 2-21

- final status survey (continued)**
- health and safety 4-38
  - integrated design 2-32
  - investigation process 2-16
  - planning 2-9; 5-21 to 55
  - sampling 7-7 to 16; App. M 4-14
  - survey units 4-14
- fluence rate** 6-11, 12, 44
- frequency plot** 8-4, 5
- gamma ( $\gamma$ ) radiation**
- analysis 7-21
  - detection sensitivity 6-31
    - direct measurement 6-32 to 37
    - scanning 6-37 to 47
  - detectors 6-15 to 18, 22; 7-20, 21; H-15 to 24, 46 to 48
  - measurement 4-16
  - radon 6-55, 57, 60
  - scanning 6-14
  - spectrometry 4-16
  - surface measurement 6-11, 12
- graded approach** 1-5; 2-4, 5, 8; 3-1; 6-8; 8-1; 9-2, 3, 5
- graphical data review** 8-4; E-3
- see frequency plot*
  - see posting plot*
  - see stem and leaf display*
- gray region** 2-9, 31; 5-25 to 27, 32, 33; 6-7; 7-7, 8 to 12, 14, 19; D-16, 17, 20 to 22, 26, 28
- example A-7, 11
  - see decision error*
  - see lower bound (LBGR)*
- grid** 2-31; 4-27 to 31; 5-3, 16, 40 to 43; 7-7
- example A-7, 13, 14, 15
  - positioning systems 6-61, 62
  - random start example 5-40, 41; A-14
  - reference coordinate system 2-23; 4-27; 6-61, 66
  - example(s) 4-28, 29, 30
- grid (continued)**
- sample/scan 2-32; 5-40
  - spacing 5-42
  - triangular grid 5-40 to 43
    - figure 5-43
- half-life ( $t_{1/2}$ )** 1-5; 4-6; 6-55; A-1; B-1
- histogram**
- see frequency plot*
  - see stem and leaf display*
- Historical Site Assessment (HSA)** 1-3, 4; 2-16, 22; Chap. 3; 5-1, 16, 39; 6-14; 7-12; 8-9; A-1
- data sources App. G
  - figure 2-18
  - information sources App. G
  - survey planning 4-11
- hot measurement**
- see area of elevated activity*
- hot spot**
- see area of elevated activity*
- hypothesis** 2-26; 8-8, 12, 18
- alternative hypothesis 2-39; D-14, 15
  - null hypothesis 2-9, 26; 8-11, 15, 17, 23; D-14, 15
  - statistical testing 1-3; 2-13, 26
    - approach explained 2-26
    - Sign test 2-28; 8-11
    - WRS test 2-28; 8-17
- impacted area** 2-4
- classification 4-11
  - DQO 3-2
  - HSA 2-23; Chap. 3
  - non-impacted 2-4
  - Scoping Survey 2-23
  - site diagram 3-23
  - survey design 2-25
  - see residual radioactivity*
- indistinguishable from background** 2-39; D-19
- infiltration rate** 3-14, 16, 18
- inventory** 3-8; 4-26

- investigation level** 2-2, 32; 4-1;  
5-18, 44 to 46;  
6-14, 15;  
8-9, 17, 21  
    example (table) 5-45  
    scanning 6-3  
    survey strategy 5-46  
    *see release criterion*  
    *see action level*
- judgment measurement** 2-22, 23, 30, 33;  
5-2, 3, 44, 48,  
51, 55
- karst terrain** 3-19
- laboratory equipment** 4-16; H-38 to 48
- less-than data** 2-13
- license** 2-16; 3-4, 5, 7, 8;  
7-11
- license termination**  
    *see decommissioning*
- lower bound of the gray region (LBGR)**  
2-9, 31; 5-25 to  
27, 31 to 33; 6-7;  
7-7; 8-12, 13, 15,  
19; D-17, 20,  
21, 28; N-18  
    example A-11  
    *see gray region*
- m (number of data points in the reference area)** 5-29, 39, 42;  
8-18, 21
- mean** 2-27, 28; 4-33;  
5-49, 50; 8-2, 3,  
5 to 7, 12, 13, 15;  
D-9  
    of data (example) 8-3
- measurement techniques** 1-2, 4; 2-4; 3-7;  
4-16, 17;  
7-20 to 22
- median** 2-28; 5-27, 32,  
45; 8-2, 3, 5 to 7,  
12, 13, 15; D-9
- minimum detectable concentration (MDC)** 2-10, 34; 4-16,  
17, 34, 35;  
5-36, 37, 48;  
6-31 to 49;  
8-15, 18, 22;  
9-7 to 9  
    direct measurement 6-32 to 37  
    elevated activity 5-39  
    reporting 2-13  
    scan 6-37 to 49
- minimum detectable count rate (MDCR)** 6-40 to 45
- missing or unusable data** 5-29, 31, 33, 35
- model(s)**  
    conceptual site model 3-3, 22; 5-8, 47  
    defining study boundaries D-6, 7  
    exposure pathway 1-4; 2-2, 15, 27;  
    6-10, 28  
        area factor (example) 5-36  
        determining DCGLs 4-3, 6
- N (number of data points)** 2-10; 5-25 to 39;  
8-12, 13, 15, 18  
    QC measurements 4-32 to 38  
    Sign test 5-31 to 35  
        example 5-33, 35; B-2  
        table 5-34  
    WRS test 5-25 to 31  
        example 5-29, 31;  
        A-11; B-2  
        table 5-30
- n (number of data points in survey unit)** 5-29, 38, 42;  
8-18, 21
- NARM** 3-4
- naturally occurring radionuclides** 1-4; 3-3; 6-5; 7-5
- non-impacted area** 2-4  
    background (reference area) 4-13  
    classification 2-28; 4-11  
    DQO 3-2  
    HSA 2-17;  
    3-10 to 12  
    survey design 2-31

- nonparametric test** 2-26; 4-10, 11;  
5-25; 8-6, 7, 22,  
24, 25
- alternate methods 2-34 to 38
  - one-sample test 2-28; 5-31;  
8-11 to 16; D-10
  - two-sample test 2-28; 5-25;  
8-17 to 21; D-10
- see Sign test*  
*see Wilcoxon Rank Sum test*  
*see Wilcoxon Signed Rank test*
- normal (gaussian) distribution** 2-28; 5-45;  
6-54, 55; 8-6; I-1
- one-sample test** 2-28; 5-25,  
31 to 35
- see Sign test*
- outlier** 9-7
- P<sub>r</sub>** 5-27, 28; I-27, 28
- performance evaluation** 4-35, 37; 6-4, 9;  
7-4, 10
- physical probe area** 6-29, 30, 38, 48
- posting plot** 2-27; 8-4, 8, 13
- power (1-β)** 2-31, 34; 4-26;  
5-27, 29, 33, 54;  
6-15, 17; 8-2, 3,  
5, 6, 8, 12, 15,  
23, 27; D-15,  
17 to 19, 25, 26
- Sign test I-25, 26
  - WRS test I-27 to 29
  - chart D-25
  - power curve I-26, 29
  - example A-7, 9, 11, 12
- precision** 2-11; 4-32 to 38;  
9-9; N-6 to 8
- global positioning system 6-61, 62
  - QC measurements 4-35, 37; 6-3, 4;  
7-3, 4
- probe area** 6-20, 21, 24, 29,  
30, 36, 37, 38,  
43, 48
- quality** 2-6, 8, 9
- assessment data 2-11
  - data quality needs 2-8
  - HSA data 3-10
  - professional judgment 3-22
- quality assurance (QA)** 2-6; 4-32; 8-1, 2,  
4, 7; 9-1 to 4
- review of HSA 3-25
  - document comparison tables App. K
- Quality Assurance Project Plan (QAPP)** 2-6; 4-31, 32;  
5-5, 54, 55; 7-9;  
9-2, 3, 6
- quality control (QC)** 2-6; 8-2; 9-1, 5, 7
- field measurement control 6-3 to 8
  - laboratory control 7-2 to 7
  - number of measurements 4-32 to 38
- quality system** 9-1 to 4
- Quantile plot** 8-4, 7, 8, 13;  
I-18 to 21
- Quantile-Quantile plot** A-16, 17;  
I-22 to 24
- R** 5-29, 31, 33, 35
- R<sub>A</sub>** D-23
- radiation program managers**  
list by region App. L
- radiation survey** 1-1, 4; 4-4, 21
- data life cycle 2-16
  - HSA 2-22; 3-1, 8
  - scoping survey 2-22; 5-1 to 6
  - characterization survey 2-23; 5-7 to 17
  - remedial action support survey 2-23; 5-18 to 20
  - final status survey 2-24; 5-21 to 55
  - planning 2-8 to 11;  
Chap. 4; Chap. 5
  - process 2-14, 17 to 21
- radioactive decay** 3-12; 7-18, 20
- decay chain 4-6, 7
  - half-life 4-5
  - radon 6-55, 58, 59
  - scan MDC 6-44 to 46
  - survey design 5-5, 8, 16
- radioactivity**  
*see residual radioactivity*
- radiological survey**  
*see radiation survey*
- radionuclide** 2-2, 5
- compliance/dose 2-25
  - see unity rule*

<b>radon</b>	3-20; 5-14; 6-55 to 60	<b>remediation</b>	1-1, 3, 4; 8-9, 11 <i>see remedial action support survey</i>
<b>random uncertainty</b>	2-14; 6-50 to 52	<b>removable activity</b>	5-17, 52; 6-20, 21 <i>see surface contamination</i>
<b>ranked data</b>	I-22	<b>removal</b>	2-5; 5-2 criteria 2-23; App. F of structures/equipment 4-24 to 26 Superfund App. F HSA 3-1 scoping survey 5-2
interpolated ranks	I-23	<b>replicate</b>	4-35, 37 sample 7-3 measurement 6-3
<b>RCRA</b>	2-22, 23, 39; 3-1; 5-1, 7	<b>representativeness</b>	2-11, 24; 4-34; 6-6; 7-3; N-12, 13
compared to MARSSIM	App. F	<b>reproducibility</b>	4-27; 6-61
<b>reference coordinate system</b>		<b>residual radioactivity</b>	2-3, 26; 3-24; 4-1, 24 analytical procedures 7-17 to 23 characterization surveys land areas 5-11 structures 5-10 final status survey land areas 5-40, 50, 51 structures 5-44, 48 to 50 remedial action design 5-18 <i>see surface contamination</i>
<i>see grid</i>		<b>restricted use</b>	1-1; 5-7 <i>see unrestricted release</i>
<b>regulations &amp; requirements</b>	App. C	<b>robust</b>	2-35, 37; 8-6
DOD	C-15 to 20	<b>s</b>	5-45, 49; 8-2
DOE	C-4 to 12	<b>S+</b>	8-12 to 16 <i>see test statistic</i>
EPA	C-1 to 4	<b>sample(s)</b>	2-4 alternate survey design 2-33 background 4-13 blanks 7-5 Chain of Custody 7-23 to 25 characterization land 5-11 structures 5-10 confirmation/verification 2-25 criteria 4-19, 21 DCGLs 4-4
NRC	C-12 to 15		
States	C-20, 21		
<b>relative shift (<math>\Delta/\sigma</math>)</b>	5-26 to 35, 40, 42; 8-12 to 15, 19; D-17, 20		
calculate	5-26, 5-32		
example	5-29, 5-33; A-11, 19		
DQO process	2-9, 10, 31		
number of data points	5-28, 33		
$P_r$	5-27		
Sign p	5-32		
tables			
N (Sign test)	5-34		
N/2 (WRS test)	5-30		
$P_r$	5-28		
Sign p	5-32		
<b>release criterion</b>	1-1, 2, 5; 2-2		
alternate null hypothesis	2-39		
compliance	2-25		
DCGLs	4-3		
final status survey	2-24		
null hypothesis	2-9, 26		
statistical tests	2-25		
survey planning	5-1		
<b>rem (radiation equivalent man)</b>			
<i>see conversion table</i>			
<b>remedial action support survey</b>	2-15, 23; 5-18 to 20; 6-12; 8-25		
checklist	5-20		
figure	2-20		
table	2-16		

- sample(s) (continued)**
- documentation 5-52
  - final status survey
    - locations 5-40 to 44
    - number of data points 5-25 to 39
  - matrix spikes 7-4
  - packing/transport 7-25 to 28
  - preservation of 7-16, 17
  - QC 4-32 to 38
  - remedial action 5-19
  - sampling 2-4
  - scoping 5-2, 3
  - soil 7-11 to 14
  - surrogate 4-4
  - water & sediments 5-12, 13
- Sampling and Analysis Plan** 2-6; 9-3
- scanning** 2-4; 4-17
- alpha 6-14
  - alpha scanning sensitivity
    - equations - derivations App. J
  - beta 6-15
  - demonstrating compliance 2-31
  - detectors 6-15 to 18, 20 to 22, 57; App. H
  - elevated activity 2-29
  - gamma 6-14
  - MDCs 6-37 to 49
  - pattern (example) A-6
  - sensitivity 6-37 to 49
  - survey techniques 4-17; 6-13 to 15
  - scanning surveys
    - scoping 5-3, 6
    - characterization
      - land areas 5-11
      - structures 5-10
      - remedial action 5-19
      - final status
        - Class 1 areas 2-32; 5-46
        - Class 2 areas 2-32; 5-47
        - Class 3 areas 2-33; 5-48
- scoping survey** 2-15, 22; 5-1 to 6
- area classification 4-11
  - checklist 5-5, 6
  - figure 2-19
  - HSA & planning 3-1, 2
  - table 2-16
- sealed source**
- final status survey example App. B
- sigma ( $\sigma$ )**  
*see standard deviation*
- Sievert (Sv)**  
*see conversion table*
- Sign test** 2-3, 27, 28; 5-25; 8-11 to 16
- applying test 8-12
  - example(s) 8-12, 14
  - hypothesis 8-11
  - number of data points
    - example 5-31 to 35
    - 5-33, 35
  - power I-25, 26
  - Sign p 5-32
- site(s)** Chap. 1
- clearing for access 4-24
  - decommissioning 4-1
  - definition 2-3
  - historical assessment Chap. 3
  - identification 2-16; 3-4
  - investigation process 2-14
  - site preparation 4-22
- site reconnaissance** 3-9
- identify contamination 3-13
  - site model 3-22
- smear (swipe)**  
*see removable activity*
- soil** 3-13 to 15
- analysis 7-17 to 23
  - background 4-13
  - sampling 7-11 to 14
  - surveys 5-33, 9 to 11, 19, 33, 47, 50, 51
  - survey coverage 2-32; 5-47
- source term** 4-21
- split**
- regulatory verification 2-25
  - sample 4-35; 7-3, 14
- standard deviation** 2-9, 31; 4-16; 5-26, 29, 31, 32, 45, 49; 8-2, 10, 12 to 15, 19, 23; A-11, 19; N-17
- standard operating procedure (SOP)** 6-3, 51; 7-9, 19, 25

- statistical tests** 2-25; 4-11; 5-25; Chap. 8; App. I
- alternate methods 2-34 to 38
  - documenting 8-25, 26
  - interpreting results 8-21 to 25
  - selecting a test 8-6, 7; E-4
  - summary (table) 8-9
  - verify assumptions 8-7, 8; E-4
- stem & leaf display** 8-5, 7; I-17, 18
- structures** 3-20
- access 4-25
  - HSA site plots 3-8
  - measurements 4-20
  - reference coordinate system 4-27 to 31
  - surface activity 5-10
  - surveys 5-7 to 10, 46, 47
  - survey coverage 5-47
  - survey example App. A
  - survey unit 2-4; 4-14, 15
  - WRS test (example)
    - Class 1 8-21, App. A
    - Class 2 8-19
- Student's t test** 2-35, 37
- subsurface soil (sample)** 1-9; 4-24
- characterization survey 5-9, 5, 11
  - HSA 3-11, 13, 14
  - sampling 7-16; App. M
- surface contamination** 1-3, 4
- detectors
    - alpha 6-20
    - beta 6-21
    - gamma 6-22
  - direct measurements 6-10 to 13
  - identification 3-12
  - in situ* spectrometry 6-11, 12
  - land areas 4-24
  - scanning 6-13 to 15
  - soil 3-14
  - structures 4-23; 5-10
  - surface activity DCGLs 4-4
  - surrogates/DCGLs 4-4
- surface soil** 1-3, 1-4; 3-13
- background 4-13
  - sampling 7-9, 12 to 14, 16, 17, 21; App. M
- surrogate measurements** 4-4 to 7; 5-12; 6-14; 9-7
- survey**
- approach Chap. 1
  - DCGLs 4-3
  - decommissioning criteria 4-1
  - DQOs 2-9 to 11
  - field measurements Chap. 6
  - instruments/technique 4-16; App. H
  - overview Chap. 2
  - planning 2-8 to 11; Chap. 5
- QAPP** 2-6
- sampling/preparation Chap. 7, App. M
  - simplified procedure App. B
  - site investigation process 2-14
  - statistical tests 2-25; Chap. 8; App. I
- survey considerations** Chap. 4
- using MARSSIM 1-6; Roadmap
  - see characterization* 5-7 to 16
  - see final status* 5-20 to 53
  - see HSA* Chapter 3
  - see remedial action* 5-17 to 19
  - see scoping* 5-1 to 6
  - see Data Life Cycle*
  - see survey unit*
- survey checklist**
- characterization 5-16, 17
  - final status 5-53 to 55
  - remedial action 5-20
  - scoping 5-5, 6
  - statistical tests 8-27
- survey plan** 1-5; 2-6; 5-54; 7-8, 18
- alternate designs 2-33 to 40
  - design Chap. 4; Chap. 5
  - DQOs 2-9; 3-3
  - optimizing survey 2-30
- survey unit** 2-4; 4-14; 7-5; 9-6, 8; N-16
- area 4-15
  - characterization 5-9 to 5-11
  - characterize/DQOs 2-9
  - classification 2-28; 4-11, 12
  - classify/flowchart 2-17
  - elevated activity 2-27
  - HSA 3-1, 2, 4
  - identifying 4-14
  - investigation level 5-44 to 46
  - statistics & final status survey 5-21 to 55
  - uniform contamination 2-28

- surveyor(s)** 4-22, 31; 6-24, 37, 38, 40 to 48  
     selecting 6-8, 9
- systematic uncertainty** 6-50 to 52
- systematic grid** 2-31, 32; 5-46; 6-7, 12; 8-19, 22
- test statistic** 8-12, 13, 15; D-16 to 19  
     example (S+) 8-12 to 16  
     example ( $W_r$ ,  $W_s$ ) 8-18  
     see *critical level*
- total effective dose equivalent (TEDE)** 2-2
- triangular sampling grid** 5-35, 36, 42 to 44; 8-4, 13, 16, 19  
     see *systematic grid*
- two-sample test** 2-28; 5-25 to 31; D-10  
     alternate methods 2-37, 38  
     nonparametric test 4-9 to 11  
     see *Wilcoxon Ranked Sign test*
- Type I decision error** 5-25 to 35; 6-33, 34; 8-8, 10, 13 to 15, 18, 19, 21; 9-8, 9; D-14 to 17, 21, 26, 28  
     DQOs 2-9, 10, 31  
     examples 8-10; A-7, 11, 18; B-2
- Type II decision error** 5-25 to 35; 6-33, 34; 8-8, 10, 12 to 15, 19; 9-8, 9; D-14 to 18, 20, 21, 26, 28  
     DQOs 2-9, 10, 31  
     examples 8-10; A-7, 11; B-2
- uncertainty** 1-2; 2-25; 5-11, 14, 26, 29, 33, 35, 45, 46; 6-49 to 55; 7-3, 4, 8, 21; 8-17, 18; 9-7, 9
- uncertainty (continued)**  
     confidence intervals 6-53 to 55  
     decision making 2-7  
     DCGL 2-33  
     estimating 2-11  
     measurement 6-49 to 55  
     MDC 4-17  
     propagation 6-52, 53  
     QC 4-32 to 38  
     reporting 2-14  
     statistical counting 6-52  
     systematic/random 6-50 to 52
- unity rule (mixture rule)** 2-27; 4-8; 5-38; 8-21, 23  
     adjusting DCGLs 4-8 to 4-10
- unrestricted release** 3-22
- validation** 2-8, 11; 7-9; 9-2, 5, 7, 8; App. N
- verification** 2-15, 25; 5-21; 6-32; 7-9; 8-8; 9-2, 4 to 7
- $W_r$  8-18  
     see *test statistic*
- $W_s$  8-18  
     see *test statistic*
- Wilcoxon Rank Sum (WRS) test** 2-28; 5-25 to 31; 8-17 to 21  
     adjusted data 8-20  
     example 8-19, 21; A-10, 11, 18, 19  
     applying the test 8-18  
     Class 1 example 8-21  
     Class 2 example 8-19  
     power I-27 to 29  
     spreadsheet formulas I-30  
     see *two-sample test*
- working level** 6-56