

## Appendix B. Key to Selected Field Codes Used in the Radiation Exposure (REX) Database

This appendix provides an explanation of selected data field codes used in the Radiation Exposure (REX) database that are pertinent to the Hanford Internal Dosimetry Program. The REX database includes online helps which provide an interpretive key to the fields. The listings in this appendix are not necessarily complete or current; they are provided for use when computer access may not be readily available, such as when reviewing hardcopy printouts or reports. The most current listings can be obtained directly from REX, or by contacting the Hanford Radiation Records Program database administrator.

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**Table B.1.** Contractor Codes

<b>Code</b>	<b>Contractor</b>
AA	DuPont, General Electric, ITT Support Services
BB	Isochem, Atlantic Richfield, and Rockwell Hanford Operations
BE	Bechtel Hanford
<u>BN</u>	<u>Bechtel National Corporation</u>
BP	Babcock and Wilcox Protec, Inc.
BW	Babcock and Wilcox Hanford Company
CH	CH2M-Hill Hanford Group
CM	Environmental Management Operation (PNL)
CO	Corps of Engineers
DE	DOE (Early service crew, FBI, Army, BPA, AEC, ERDA, etc.)
DN	Duke Engineering & Services Northwest
DS	Duke Engineering & Services Hanford
DY	Dyncorp Hanford
FD	Fluor Hanford
<u>FH</u>	<u>DuPont, General Electric, ITT Support Services</u>
FL	Fluor Daniel Northwest Services
FN	Fluor Federal Services
HF	Hanford Environmental Health Foundation
HH	Douglas United Nuclear, United Nuclear Industries, UNC Nuclear Industries
KE	Kaiser Engineers Hanford
KK	AII-Vitro Engineering Division, Braun Hanford Company
LM	Lockheed Martin Hanford Company
LS	Lockheed Martin Services, Inc.
NH	Numatec Hanford, Inc.
PN	Battelle - PNNL
PP	Energy Northwest
<u>PS</u>	<u>Protection Technology Hanford</u>
QC	Quality Control
RF	<u>Duratek</u> Federal Services Northwest
RR	Kaiser
RS	<u>Duratek</u> Federal Services of Hanford
<u>SU</u>	<u>Cogema Engineering Corporation</u>
TT	JA Jones Construction, George A. Grant, Combustion Engineering, subcontractors
US	US West
VV	Westinghouse Hanford Company (WADCO/HEDL)
W	Multiple Hanford Contractors

**Table B.2.** Sample Type Codes

<b>Code</b>	<b>Type of Sample</b>
B	Blood
F	Feces
S	Sputum
T	Tissue
U	Urine

**Table B.3.** Bioassay Measurement Reason Codes for the REX System

Code	Name	Description
BL	Baseline	Measurement is performed to establish a reference level against which subsequent measurements will be compared. Generally, this may be for new employees, or for established employees, prior to commencing work with radioactive materials, beginning a specific type of radiation zone work, or making an offsite trip where potential intakes could occur.
PR	Periodic	Measurement is performed at a regularly scheduled interval.
EA	End of Assignment	Measurement is performed following completion of specific work assignment, but not end of employment.
SP	Special	Measurement is performed as part of a specific investigation of potential internal dose. May include response to off-normal work conditions, or follow-up of abnormal periodic measurements.
CR	Contractor Request	Measurement requested by employer for reasons other than periodic, baseline, end of assignment, or special investigation.
RA	Reanalysis A	First repeat in vivo measurement or second aliquot analysis of <u>an excreta</u> sample.
RB	Reanalysis B	Second repeat in vivo measurement or third aliquot analysis of <u>an excreta</u> sample.
RC	Reanalysis C	<u>Third repeat</u> aliquot analysis of <u>an excreta</u> sample.
R1	Recount 1	First recount of original excreta sample or repeat in vivo exam.
R2	Recount 2	Second recount of original excreta sample or repeat in vivo exam.
QR	Quality and Research	Measurement performed as part of quality control, quality assurance, or research work.
TM	Termination	Final bioassay at termination of employment.
12	Contract Work	In vivo measurement performed under contract to customers rather than for Hanford employees.
20	Source Count	In vivo source count made for system calibration or as a function check, usually using a known check source.
30	Background Count	In vivo system background measurement performed for system calibration or as a functional check.

**Table B.4. Excreta Sample Kit Codes**

Kit Code*		Media	Sample Description
D/R	P/U		
1	P	Urine	Approximate 24-hour urine collection. Collected at home over a 2-day period. Used for routine sampling and when a larger volume sample is desired. Designated sample date is the day after kit delivery to the employee.
2	Q	Urine	Approximate 12-hour urine collection for termination sampling only. Collected at home overnight. Designated sample date is the day after the date of kit delivery to the employee.
3	R	Urine	Total 24-hour urine collection. Collected at home and at work (if necessary) to collect all urine voided during a 24-hour period. Generally used for sampling immediately following an occurrence or for work restriction sampling. Designated sample date is the day after delivery or the date on which the sample collection began.
4	S	Urine	Single void (spot urine) collection. Collection in a single bottle, used for initial indications of an intake or when small sample volumes are adequate. Designated sample date is the date of voiding.
5	T	Feces	Collection of a single fecal voiding usually for investigation of a potential intake. Sample date is the day after kit delivery or date on which the sample was voided.
6	U	Urine	Partial day or approximate 12-hour collection. Usually collected at home overnight. Used for collection following an occurrence or when a large volume urine sample is <u>not</u> necessary. Designated sample date is the date of delivery to the employee.
7	V	Urine	Approximate 12-hour collection Sunday-Monday sample (Friday delivery only). Generally used for workers chronically exposed to soluble uranium. Designated sample date is the Sunday in the sampling period.
8	W	Feces	Collection of a single fecal voiding used for a special program for plutonium oxide workers. Designated sample date for shift workers is the Tuesday of long shift change, and for day workers is the appropriate Sunday.
9	X	Urine	Kit designed for collection of urine outside the local service area. Transportation is handled by private carrier. Generally used for termination samples not collected locally.
A	Y	Urine	Simulated 48-hour urine collection. Collected at home over a 4-day period. Used for IPUL sampling. Designated sample date is two days after kit delivery to the employee.
B	Not Applicable	Urine	12-hour urine collection for termination sampling only. Collected at home overnight. Kit delivered in normal manner, but brought to a designated on-site location by worker for pick-up by Contractor. Designated sample date is the day after the date of kit delivery to the employee. Delivery Only, no home pick-up required.
*D/R = Delivery and Retrieval *P/U = Pick-Up only			

**Table B.5.** Excreta Processing Codes and No-Sample Codes

Processing Code	No-Sample Code	Description
R		Routine processing
P		Priority processing
X		Expedite processing
E		Emergency processing
	CS	Cancelled sample/analysis
	CT	Sample lost due to bioassay analysis contract termination
	FA	Failed Analysis. A valid analytical result could not be obtained
	IS	Insufficient sample. Sample provided by worker but volume insufficient to meet contractual requirements
	LC	Lost container. Sample kit not retrieved
	ND	Not delivered. Sample scheduled but kit never delivered
	<u>NE</u>	<u>Not evaluated - Sample was collected but not analyzed. Typically used when a backup sample was obtained but analysis was determined to be unnecessary and the sample discarded.</u>
	NS	No sample. Kit retrieved but no sample provided by worker
	WW	Waived excreta exam

**Table B.6.** Codes for Units

Code	Description of Units
01	dpm/sample
02	dpm/volume analyzed
03	µg/l until 07-01-82 µg/sample after 07-01-82
04	µg/gram until 07-01-82 µg/sample after 07-01-82
05	µCi/l
06	µCi/l
07	nCi (nanocuries)
08	µCi (microcuries)
<u>09</u>	<u>dpm/ml</u>

**Table B.7.** Isotope Codes

Note: This listing is substantially abbreviated. Check the on-line REX help feature for a complete listing. List includes both request and result codes.

Isotope Code	Multiple Result Code	Isotope	Multiple Result Code
AM241		MN 54	
C 14		NP237	
CE144		PB210	
CM242		PM147	
CM244		PO210	
CS137		PU	Plutonium – Alpha
CO 60		PUMIX	Plutonium – Mixture
EU154		PU238	
EU155		PU239	
EU156		PU240	
GS		PU241	
H 3		PU242	
I 131		QUS	
IAM	A	RA224	
<u>IPIU</u>	B	RA226	
<u>ACS</u>	C	RA228	
ICM	D	RND	Radon & Daughters
<u>UMS</u>	E	RU106	
IEU	F	SR	
IPA	J	S 35	
IPS	P	SR 89	
IPSA	L	SR 90	
IPSR	M	TAC	
IPU	Q	TC 99	
IPUB	N	TH227	
IPUBA	Z	TH228	
IRA	R	TH230	
IR192		TH232	
ISCP	S	TH234	
ISPEC	W	U	
ISR	Y	<u>U DEP</u>	
ITH	T	U NAT	
ITPAC	K	U 233	
IU	U	U 235	
<u>IPUL</u>	G	U 238	
IUPU	O	U MIX	
K 40		US	
LEPD	*	ZN 65	
MFP		ZR95	

Note: This listing is substantially abbreviated. Check the on-line REX help feature for a complete listing. List includes both request and result codes.

**Table B.8** Excreta Analysis Type and Multiple Result Codes for Excreta Samples

Analysis Type	Multiple Result Code	Analysis Code	Results Reported
Pu isotopic	Q	IPU	<sup>238</sup> Pu, <sup>239,240</sup> Pu
Gamma Spectroscopy	W	ISPEC	<sup>40</sup> K, <sup>137</sup> Cs, and others
Gamma Spectroscopy	*	LEPD	<sup>241</sup> Am
Sequential Pu Isotopic, Am Isotopic, Cm	K	ITPAC	<sup>238</sup> Pu, <sup>239,240</sup> Pu, <sup>241</sup> Am, <sup>244</sup> Cm, <sup>242</sup> Cm
Sequential <sup>90</sup> Sr, Ce, Pm	S	ISCP	<sup>90</sup> Sr, <sup>144</sup> Ce, <sup>147</sup> Pm
Sequential Sr-Total, Ce, Pm	I	SCP	Sr, <sup>144</sup> C, <sup>147</sup> Pm
Cm Isotopic	D	ICM	<sup>244</sup> Cm, <sup>242</sup> Cm, and others
Eu Isotopic	F	IEU	<sup>152</sup> Eu, <sup>154</sup> Eu, <sup>155</sup> Eu
U Isotopic	U	IU	<sup>233,234</sup> U, <sup>235</sup> U, <sup>238</sup> U
Sequential Pu, <sup>90</sup> Sr	P	IPS	<sup>238</sup> Pu, <sup>239,240</sup> Pu, <sup>90</sup> Sr
Sequential Pu Isotopic, <sup>241</sup> Am	J	IPA	<sup>238</sup> Pu, <sup>239,240</sup> Pu, <sup>241</sup> Am
Sequential Pu Isotopic, Sr-Total	M	IPSR	<sup>238</sup> Pu, <sup>239,240</sup> Pu, Sr
Sequential Pu Isotopic, Sr-Total, <sup>241</sup> Am	L	IPSA	<sup>238</sup> Pu, <sup>239,240</sup> Pu, Sr, <sup>241</sup> Am
Sr Isotopic	Y	ISR	<sup>89</sup> Sr, <sup>90</sup> Sr
Pu Isotopic, <sup>241</sup> Pu	N	IPUB	<sup>238</sup> Pu, <sup>239,240</sup> Pu, <sup>241</sup> Pu
Pu Isotopic, <sup>241</sup> Pu, <sup>241</sup> Am	Z	IPUBA	<sup>238</sup> Pu, <sup>239,240</sup> Pu, <sup>241</sup> Pu, <sup>241</sup> Am
Pu Isotopic/U-Natural	<u>Q</u>	IUPU	<sup>238</sup> Pu, <sup>239,240</sup> Pu, U
Pu Isotopic/U-Isotopic	B	IPIU	<sup>238</sup> Pu, <sup>239,240</sup> Pu, <sup>234</sup> U, <sup>235</sup> U, <sup>238</sup> U
U-Natural (soluble)	H	QUS	U
Th Isotopic	T	ITH	<sup>228</sup> Th, <sup>230</sup> Th, <sup>232</sup> Th
Ra Isotopic	R	IRA	<sup>224</sup> Ra, <sup>226</sup> Ra
Sequential Am and Cm Isotopic		ACM	<sup>241</sup> Am, <sup>242</sup> Cm, <sup>243,244</sup> Cm
Low-level Isotopic Pu	<u>G</u>	IPUL	<sup>238</sup> Pu, <sup>239,240</sup> Pu
Sequential Ac and Th	C	ACS	<sup>227</sup> Ac, <sup>227</sup> Th

**Table B.9.** Bioassay Frequency Codes

Code	Frequency of Bioassay
A	Annual
B	Biennial (every 2 years)
D	Special Day
F	Five years
Q	Quarterly
S	Semiannual
M	Monthly
W	Weekly
X	Biweekly (every 2 weeks)

**Table B.10.** In Vivo Body Location Codes

Code	Body Location
ABD	Abdomen
<u>CA1</u>	<u>Chest - Am</u>
<u>CA2</u>	<u>Chest – Am corrected by ultrasound</u>
<u>CC1</u>	<u>Chest – combination (Am, Uranium)</u>
<u>CC2</u>	<u>Chest – combination (Am, Uranium) Corrected by ultrasound</u>
CHT	Chest result
CH1	Chest result
CH2	Chest result corrected by ultrasound measurement of chest wall thickness
<u>CU1</u>	<u>Chest - ultrasound</u>
<u>CU2</u>	<u>Chest – uranium corrected by ultrasound</u>
HND	Hand
KNE	Knee
LG1	Lung result. (Chest result corrected for skeleton burden interference)
LG2	Lung result. (Chest result corrected for skeleton and liver burden interference)
LV1	Liver
LV2	Liver result corrected for skeleton burden interference
LV3	Liver result corrected for skeleton and lung burden interference
LYM	Lymph nodes
SK1	Skeleton result based on a head count
SK2	Skeleton result based on something other than a head count
SPL	Special
THX	Thorax
THY	Thyroid
TRY	Throat
WBD	Whole body
WND	Wound

**Table B.11.** In Vivo Detector Codes<sup>(a)</sup>

<b>Code</b>	<b>Type of Detector or Counting Cell</b>
<b>Codes Typically in Use as of August 2003</b>	
<u>CC</u>	<u>Coax GE counter for high resolution whole body counts</u>
<u>DS</u>	<u>Stainless steel room with digital signal processing</u>
<u>LD</u>	<u>Lead Room for special counting geometry</u>
<u>CH</u>	<u>Lead Room special counts</u>
<u>SU</u>	<u>Stand-up whole body count for screening</u>
<u>SS</u>	<u>Stainless Steel Room Lung Count</u>
<u>IR</u>	<u>Iron Room Counter for Lung Count</u>
<p>(a) The current and historical listing of in vivo detector codes is maintained by the InVivo Monitoring Program. The listing provided in this manual is not necessarily current or complete. For the most current information, contact the InVivo Monitoring Program Manager.</p> <p>(b) IG = Intrinsic germanium.</p>	

**Table B.12.** In Vivo Schedule-Type Codes

<b>Code</b>	<b>Type of Measurement</b>
C	Chest count
C2	Extended chest count
HC	Head and chest count
HD	Head count
H2	Head and extended chest count
LC	Liver and chest count
LV	Liver count
LY	Lymph node count
TC	Thyroid and chest count
TH	Thyroid count
WB	Whole body count
WC	Coaxial germanium whole body count
WD	Wound count

**Table B.13** In Vivo Analysis Request Codes

<b>Code</b>	<b>Analysis Performed</b>
<u>CA</u>	<u>Chest count for <sup>241</sup>Am only</u>
<u>CC</u>	<u>Chest count for combination of <sup>241</sup>Am, <sup>235</sup>U, and <sup>234</sup>Th.</u>
<u>CU</u>	<u>Chest count for uranium <sup>235</sup>U and <sup>234</sup>Th</u>

**Table B.14.** In Vivo No-Result Codes

<b>Code</b>	<b>Reason For No Results</b>
C	External contamination other than radon detected on the subject. Measurement invalid; no results obtained.
F	Failure of equipment or faulty setup of equipment. Measurement invalid; no results obtained.
I	Interference from localized activity in another part of the subject's body. Measurement invalid; no results obtained.
L	Location of internal or external activity was qualitatively determined by mapping, masking, or collimating. May include one or more measurement counts. These measurements are qualitative for identifying location of activity and do not yield quantifiable estimates of activity.
M	Medically administered radioactivity interfered with measurement. Measurement invalid; no results obtained.
<u>N</u>	<u>No show. Worker did not meet appointment.</u>
P	Preliminary count, when followed by a more quantitative record count. Used to indicate measurement taken, but not a record count.
R	Radon interference from subject's clothing, hair, or skin. Measurement invalid; no results obtained.
S	The subject's actions interrupted completion of the count. Measurement invalid; no results obtained.
<u>W</u>	<u>Waived. Scheduled exam was waived based on needs review.</u>
X	Measurement invalid; no results obtained. Other no-result codes do not apply. See comment field for a brief description.
<u>Z</u>	<u>Test case.</u>
Notes: 1. The comment field may have a brief explanation in addition to the codes listed above.	

**Table B.15.** INTERTRAC Mode-of-Intake Codes

<b>Code</b>	<b>Mode of Intake</b>
ABS	Absorption
ING	Ingestion
INH	Inhalation
NON	None (no intake)
UNK	Unknown
WND	Wound

**Table B.16.** INTERTRAC Evaluation Reason Codes

<b>Code</b>	<b>Reason for Evaluation</b>
A	Annual chronic intake evaluation
C	Contractor requested evaluation
H	High routine bioassay evaluation
I	Incident evaluation
N	New hire measurement or previous employment record indicated exposure prior to Hanford employment
R	Reevaluation

**Table B.17.** INTERTRAC Source-of-Intake Codes

<b>Code</b>	<b>Source of Intake</b>
DHE	Intake at DOE site while employed at Hanford
HAN	Intake at Hanford
NHE	Intake at non-DOE site while employed at Hanford
NOC	Nonoccupational intake
PTH	Intake occurred prior to Hanford employment

**Table B.18.** INTERTRAC Miscellaneous Codes

<b>Code Type</b>	<b>Code</b>	<b>Description</b>
Intake Confirmed	Y	Yes (occupational intake)
	N	No
Nature of Intake	A	Acute
	C	Chronic
Recorded Dose	Y	Yes (occupational intake)
	N	No
	O	Undetermined - (old evaluation assessing body burden rather than dose, or an evaluation in process)
	Z	Recorded dose is zero mrem
Source Known	Y	Yes
	N	No
Type of Evaluation	P	Preliminary
	F	Final

**Table B.19.** Person Codes

<b>Code</b>	<b>Description</b>
E	Employee
F	Fetus
N	Non-resident
S	Subcontractor (inactive code)
V	Visitor

**Table B.20.** Excreta Laboratory Codes

<b>Code</b>	<b>Analytical Laboratory</b>
IT	IT Analytical Services - Richland
LA	Los Alamos National Laboratory
OR	Oak Ridge National Laboratory
PL	PNNL Analytical Chemistry Laboratory
QN	Quanterra
RE	REECO (Reynolds Electric Company, Nevada Test Site)
ST	Severn Trent Laboratories-Richland
TA	TMA/Norcal, Richmond, California
WH	Westinghouse Hanford Company, 222-S Lab