GUIDELINES FOR DECONTAMINATION

OF FACILITIES AND EQUIPMENT

PRIOR TO RELEASE FOR UNRESTRICTED USE

Unconditional release of radioactively contaminated facilities and equipment requires decontamination to prevent risk to the public health and safety with subsequent unrestricted use.

Section ~~30298~~ 30256 of the California Radiation Control Regulations specifies that the user is responsible for this decontamination. The Department will impose no conditions with respect to future use of equipment and facilities following decontamination consistent with the following guidelines:

(a) The user shall make every reasonable effort to eliminate residual contamination.

(b) No covering shall be applied to contaminated surfaces of equipment or structures by paint, plating or other means prior to release for unrestricted use. Equipment may be released and coated per paragraph (e) below if it is established by documented survey that concentrations are below the limits specified in 'Table I.

(c) The radioactivity on the interior surfaces of pipes, drainlines or duct work can be determined by making measurements of all traps and other appropriate access points, provided contamination at these locations is likely to be representative of contamination on the interior of the pipes, drainlines or duct work. Surfaces of premises, equipment or scrap which are likely to be contaminated but are of such size, construction or location as to make the surface inaccessible for purposes of measurement should be assumed to be contaminated in excess of permissible radiation limits.

(d) In the case of facilities to be released, Section 30298 requires 30 days prior notice of intent to vacate. This notice must be followed by a report summarizing the results of surveys following decontamination establishing that levels of radioactivity are within the limits specified in Table I.

The summary should be supported by sufficiently detailed survey records maintained available for inspection. The Department must have an opportunity to confirm by spot survey the summary report submitted prior to granting approval for release.

(e) In the case of equipment to be released, no request or report is required if guide limits are met. The licensee must, however, maintain detailed survey records sufficient to justify the release.

(f) If California guidelines are not satisfied in a particular instance, the Department must be consulted with respect to future use of the item in question, except where there will be a transfer to a specific license. The Department's determination as to whether the item may be released will involve such factors as the practicality of further decontamination, and the likely hazard considering possible future use of the item. Requests for review and variance should provide: (1) Detailed and specific information describing the item, radioactive contaminants and the nature, extent and degree of residual contamination. (2) A detailed health and safety analysis establishing that residual contamination is not of concern with respect to the health and safety of the public given the nature of the residue and the prospective use of the facilities or equipment.

TABLE 1
ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES[a]	AVERAGE[b,c,f]	MAXIMUM[b,d,f]	REMOVABLE[b,e,f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, ~~I-125~~, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-125, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (Nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5,000 dpm $\beta\gamma$/100 cm^2	15,000 dpm $\beta\gamma$/100 cm^2	1,000 dpm $\beta\gamma$/100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides shuld apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged ober more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h at 1 cm and 1.0 mrad/h at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

APPENDIX A

Facility Release Survey

A facility release survey is required to confirm that the users decontamination efforts and comprehensive survey are adequate with respect to future unrestricted use of the facility. Test procedures are designed to assure that Table I limits are satisfied at a spot frequency of 0.1/100 ft^2 and a consumer's risk of 10%[1].

1. Establish a 100 ft^2 unit grid divided into equal area quadrants. Repeat every 20,000 - 80,000 ft^2 as is necessary for coverage.

2 (a) Area ≤ 1700 ft^2

Survey the entire area for hot spots. Obtain readings from each 100 ft^2 unit per 3(b) below to establish the average activity.

(b) 1700 <area ≤ 5000 ft^2

Select one 100 ft^2 unit from areas where any residual contamination is likely to be maximum. This first unit may be a single contiguous area or a number of non-contiguous areas approximating 100 ft^2. Select 16 additional units at random, 4 from each quadrant. Obtain readings from each 100 ft^2 unit drawn per 3(b) below to establish the average activity.

(c) 5000 ft^2 ≤ area ≤ 80,000 ft^2

Select three 100 ft^2 units from areas where any residual contamination is likely to be maximum. These first units may be a single contiguous areas of 100 ft^2 or non-contiguous areas approximating 300 ft^2. Select twenty additional 100 ft^2 units at random, five from each quadrant. Obtain readings from each 100 ft^2 unit drawn per 3(b) below to establish the average activity.

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[1]USNRC Regulatory Guide 6.6 Acceptance Sampling Procedures for Exempted and Generally Licensed Items Containing Byproduct Material, Washington, D.C. (June 1974)

3. (a) Hot Spots (Maximums as specified in Table I)

Survey each unit selected for hot spots and record.

(b) Average (Average fixed and removable as specified in Table I)

(1) Fixed -- Obtain readings from five randomly selected points within each 100 ft^2 unit drawn and record. Increase readings from each unit to obtain at least 20 readings total.

(2) Removable -- Wipe at least 100 cm^2 within each 100 ft^2 unit drawn and record. Increase readings from each unit to obtain at least to wipes total.

TABLE A - I

Lot Size	Sample Size	Reject	Continue Testing	Accept	Consumer's Risk
			Hot Spots (Table I Maximum)		
1700 $ft^2 \geq$ A	< all	1	0	-	
	all	-	0		≤ 10%
1700 < A ≤ 5000ft^2	≤100 ft^2	1	0	-	
	< 400 ft^2 per quad. for 1600 ft^2 Total	1	0	-	
	400 ft^2 per quad for 1600 ft^2 Total	1	-	0	≤ 10%
5000 < A ≤ 80,000 ft^2	≤ 300 ft^2	1	0	-	
	< 500 ft^2 per quadrant for 2000 ft^2 Total	1	0	-	
	500 ft^2 per quadrant for 2000 ft^2 Total	1	-	0	≤ 10%
			Average $(\bar{x})$ *on n readings* *If* $X + 1.3\sigma/\sqrt{n}$		
Any -- fixed	5 per 100 ft^2 & 20 tital min.	> Table I		≤ Table 1	≤ 10%
Any -- Removable	≥ 1 per 100 ft^2 & 20 total min.	> Table I		≤ Table 1	≤ 10%