Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Clauberg	1	General	NA	NA	Both purpose and scope of the BPRG website are adequately discussed in the BPRG Homepage, as well as in the User's Guide and Frequently Asked Questions pages.		No response needed.
Clauberg	1	General	NA	NA	However, as to scope there is one issue needing to be addressed. Specific mention is made in the last paragraph of the BPRG Homepage (https://epa-bprg.ornl.gov/) that "…Non-carcinogenic effects are not considered for radionuclide analytes, except for uranium, for which carcinogenic and non-carcinogenic effects are considered….". This statement seems to imply that the non-carcinogenic health effects of uranium isotopes are also considered in the BPRG calculations. However, both the Disclaimer found in the User's Guide ("…It should also be noted that calculating human cancer risk from radiological contaminants does not address ecological risk or noncancer toxicity. Of the radionuclides generally found at CERCLA sites, only uranium has potentially significant noncancer toxicity. When assessing sites with radiological contaminants which include uranium, it may also be necessary to consider the noncancer toxicity of uranium, using other tools…"), nor any indication (alternate equations or footnotes) in the BPRG Equations section of the User's Guide nor the Equations webpage point towards the inclusion of uranium's non-carcinogenic health effects in the BPRG calculator.	The commenter recommends that regardless of whether an additional calculation module is to be included in the BPRG calculator in the future for addressing uranium (which this reviewer highly recommends as a very large portion of radioactively-contaminated buildings, e.g. practically all FUSRAP buildings, contain uranium), the different statements regarding the scope for addressing non-carcinogenic effects must be brought into alignment.	EPA agrees; we will use the disclaimer language twice; we will also add more text that points the user to the user to the World Trade Center risk assessment as a potential methodology for addressing non-carcinogenic effects of uranium. Also will add a hyperlink to "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments.
Clauberg	1	General	NA	NA	Existing guidance is accurately represented, albeit at times very much simplified to aid the end-user's ease of understanding. Explicit mention of existing guidance (RAGS, Part B) is made in the BPRG Homepage "…This calculator [typo: calculator] is based on Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals) (RAGs Part B). RAGs Part B provides guidance on using EPA toxicity values and exposure information to calculate risk-based BPRGs…", as well as addressing the guidance context in the Frequently Asked Questions. However, a succinct statement placing the BPRGs into the RAGS, Part B and other guidance context is missing from the User's Guide.	The commenter recommends that at the risk of being repetitive, this reviewer recommends that the quoted sentence above be copied and inserted into the third or fourth paragraph of the Introduction section of the User's Guide.	EPA will fix typo and does agree with the reviewers recommendation.
Clauberg	1	General	NA	NA	The correct abbreviation for Risk Assessment Guidance for Superfund is RAGS. In the Introduction section of the BPRG Homepage it is twice referred to as "RAGs"	The commenter recommends fixing typos on the BPRG Homepage	EPA agrees with the commenter's recommendation and will correct typos.
Clauberg	1	General	NA	NA	A detailed delineation of the purpose of the BPRG calculator is provided in the User's Guide as well as an overview in both the Homepage discussion and the Frequently Asked Questions.		No response needed.
Clauberg	2	Disclaimer /3.1	NA	NA	It should be noted that the comment to Question 1.a). as to "addressing non-carcinogenic health effects" may be applicable here. Also, there is an underlying implication in the BPRG Homepage discussion "…In addition, you are able to modify the input parameters to create site-specific BPRGs to meet the needs of your site… [and] …This calculation tool provides the ability to modify the standard default BPRG exposure parameters to calculate site-specific BPRGs…" that the tool can be adjusted to fit any site-specific conditions. This is in stark contrast to the Disclaimer statement of the User's Guide that states "…Alternative approaches for risk assessment may be found to be more appropriate at specific sites (e.g., where site circumstances do not match the underlying assumptions, conditions and models of the guidance)…", as well as the statement in Section 3.1 Developing a Conceptual Site Model "…When using BPRGs, the exposure pathways of concern and site conditions must match those taken into account by the screening levels…and additional tools or assessment methodologies may need to be considered…".	The commenter recommends that although it would be impractical to develop a tool that would handle any site-specific condition, but a more clearer mention that there are constraints on the ability to adjust to site-specific conditions should be mentioned in the BPRG Homepage discussion. For example, one could write "…In addition, you are able to modify the input parameters to create site-specific BPRGs to meet the needs of your site, within the limitations of the underlying exposure scenarios, pathways, and routes…" .	EPA believes this might be confusing as worded in the comment, but the concept seems ok. Will clarify text to say many but not all site specific scenarios can be addressed.
Clauberg	2	Disclaimer /3.1	NA	NA	The User's Guide would benefit from a description of what, if any, "alternative approaches for risk assessment" there are and when specifically they should be used. As it stands, the user wishing to adjust the BPRG calculator to site-specific needs can effectively and efficiently undertake this task as long as the site-specific conditions of exposure principally match those of the BPRG calculator. If, for example, another exposure route such as dermal uptake is to be calculated, then the user is not provided any specific guidance on how to approach this task. [The issue of dermal uptake will be addressed in later comments]. Consequently, users – even professional risk assessors – may be reluctant to deviate from the BPRG calculator exposure scenarios and this could lead to a misapplication of the BPRG calculator, albeit that the User's Guide explicitly addresses this potential in sections 3.1, 3.3, and in the Disclaimer.	The commenter recommends that an enhanced integration, or at least referential linkages, with other and "alternative approaches for risk assessment" of radioactively contaminated buildings could avoid this potential. Of course, this argument is for all intents and purposes moot if the overwhelming majority of radioactively contaminated buildings could be assessed using the BPRG calculator.	EPA will add language on why dermal is not discussed; and add sentence on how BPRG only has default scenarios where EPA has default scenarios. Some other scenarios may be determined by site-specifically altering more of the input parameters. Will add option to pick different room sizes and receptor location (e.g., corner and middle of room, in addition to averaged location).
Clauberg	2	Disclaimer /3.1	NA	NA	No information is provided whether a sampling of a larger number of sites has been performed and what percentage was shown to fall under the constraints of the BPRG calculator's CSM. From experience, this reviewer would judge that a significant portion of radioactively contaminated buildings would NOT fall under the constraints of the BPRG calculator, for one because of the lack of the dermal route being calculated and the lack of a trespasser/visitor scenario, and also because of non-conforming building geometries (mostly larger buildings such as manufacturing facilities, school gyms, etc.), which will be addressed in later comments.		EPA will add language on why dermal is not discussed; and add sentence on how BPRG only has default scenarios where EPA has default scenarios. Some other scenarios may be determined by site-specifically altering more of the input parameters. Will add option to pick different room sizes and receptor location (e.g., corner and middle of room, in addition to averaged location).
Clauberg	3	3.0	3.1	NA	Trespasser in section 3.1 should be trespasser.	The commenter recommends correcting the typo.	EPA agrees with commenter's recommendation and will correct the typo.
Clauberg	3	General	NA	NA	Yes the calculator can be effectively used as is currently presented for site-specific BPRG calculations, but with recognized limitations. For one, it is limited to the underlying default exposure scenario and exposure routes, as well as being limited in the underlying building geometry. A further caveat for the above affirmative response relates to an issue of the inherent applicability of the distinction between soft and hard surfaces for transference of dust particulate matter to hand surface areas in adults and will be addressed further in later comments.		EPA will add language discussing the limitations of the default exposure scenarios. EPA will conduct additional analysis on room dimensions and will add capability to allow the user to pick from several room sizes and receptor locations.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Clauberg	3	General	NA	NA	Explicit mention of the intended audience is made in the discussion of the BPRG Homepage ("…this BPRG calculation tool is to assist risk assessors, remedial project managers, and others involved with risk assessment and decision-making at sites with contaminated buildings….") as well as in the User's Guide ("…The policies set out in the Building Preliminary Remediation Goal Electronic Calculator (BPRG) User's Guide provide guidance to EPA staff. It also provides guidance to the public and regulated community.. [and] …This guidance provides a methodology for radiation professionals to calculate risk-based, site-specific, concentrations… [and] … WARNING: Using a dissipation rate constant or changing the value of t should only be done once a complete understanding of the mathematics involved in deriving the equation is gained and the site conditions have been fully investigated…"	It can be surmised that the BPRG Homepage discussion is more open to a broader intended audience, while the User's Guide specifically limits the actual execution of the BPRG calculator to "radiation professionals" and only provides guidance for the sake of transparency and informational value to the "public and regulated community". The commenter recommends that this seeming discrepancy should be addressed.	EPA disagrees, and does not think it a bad thing to have a plain English description in the front of a technical tool.
Clauberg	4	3.0	3.1	NA	A stem-and-leaf CSM diagram of the default BPRG CSM should be provided. Note that a stylized graphical presentation of the CSM is shown on the BPRG Homepage, but is not of appropriate level of detail for the intended audience ("radiation professionals"). The stylized cartoon-like graphics presented in Section 4. also are informative, but do not allow for a holistic picture of the CSM to be made.	The commenter recommends including a stem and lead CSM diagram to the guidance document.	EPA will add a stem and lead diagram to Section 3.1. of the User Guide and cite EPA guidance on CSM's.
Clauberg	4	3.0	3.1	NA	The phrase "…The final CSM diagram represents …" implies that CSMs must be graphical in nature. Although there are generally 3 types of CSMs recognized – stylized cartoon-like graphics, stem-and-leaf diagrams, and tabular – by far the majority belong to the first two types. Nevertheless, tabular CSMs (e.g. CSMs of RAGS-D) are possible.		EPA will add text saying the other types are also usable.
Clauberg	4	3.0	3.2	NA	A link to a journal article on radioactive materials naturally present in building materials is provided. No doubt this reference is very helpful and appropriate to the topic, but it might be more appropriate to provide an external link rather than offer an "extracted" version of the referenced file (http://nvl.nist.gov/pub/nistpubs/jres/105/2/j52hob.pdf).		EPA disagrees as external links keep breaking.
Clauberg	4	4.0	NA	NA	The first sentence should read: "The BPRGs consider human exposure from direct contact with contaminated dust and air and external exposure to contaminated building materials.	The commenter recommends rewriting the first sentence of section 4.	EPA agrees.
Clauberg	4	4.0	4.1	NA	The first sentence should read: "The BPRG equations for the residential exposure scenario, presented here, contain the following exposure pathways and exposure routes:".	The commenter recommends this change since the equations presented are not only related to dust exposure.	EPA agrees.
Clauberg	4	4.0	4.1	NA	Reference should be made to Table 1 for identifying the factors presented in the equations .	The commenter recommends providing a reference to Table 1.	EPA disagrees since such a reference is already in Section 4 of the User Guide.
Clauberg	4	4.0	4.2	NA	The first sentence should read: "The BPRG equations for the indoor worker exposure scenario, presented here, contain the ….".	The commenter recommends rewriting this sentence.	EPA agrees.
Clauberg	4	4.0	4.2	NA	Reference should be made to Table 1 for identifying the factors presented in the equations .	The commenter recommends providing a reference to Table 1.	EPA disagrees since such a reference is already in Section 4 of the User Guide.
Clauberg	4	4.0	4.3.8	NA	The last paragraph of 4.3.8 (just before the Exhibit 1), it is stated that the "…dissipation term was modified from the original equation to reflect…". It is unclear which original equation is meant nor how and to what extent the equation was modified. The referenced Exhibit 1 shows the previously presented dissipation term (1-e(-kt))/(kt).		EPA will provide clarifying language. The sentence will be deleted.
Clauberg	4	4.0	4.3.9	NA	Calculation of the dermal route is lacking. There is a brief discussion of the dermal exposure in section 4.3.9, but the authors decided that the dermal route would be negligible in contrast to the other potential pathways already considered. However, this assessment by the authors is only valid if the currently presented assumptions for the dust transference and subsequent hand-to-mouth dust ingestion are considered. As this reviewer will discuss in the comment to Question 4.b)., the underlying assumptions for transference of dust from surfaces to hands and subsequent mouthing ingestion in adults are not believed to be realistic.		EPA disagrees and will retain the defaults on dust transference.
Clauberg	4	General	NA	NA	Yes, the supporting material provides the appropriate level of detail, technical content, and referencing for the intended audience, as long as the previously commented upon issues are resolved. Specifically, the following above mentioned issues should be resolved: The issue of "addressing non-carcinogenic health effects" mentioned in the comment to question 1.a). (see above); The issue of more clearly delineating the limitations of the BPRG calculator AND providing integration with or referential linkages to "alternative approaches for risk assessment" (see comment to question 1.c).); A clarification of the intended audience either in the BPRG Homepage discussion or in the User's Guide.	The commenter recommends that the issues mentioned should be resolved to ensure that the supporting material provide the appropriate level of detail, technical content, and referencing for the intended audience	For the Homepage, EPA disagrees; the intended audience for the BPRG is listed in the "Introduction" section of the Homepage. For the User Guide, EPA agrees and will add a sentence in the User Guide to address the intended audience.
Clauberg	5	4.0	4.3.9	NA	A trespasser/visitor scenario is lacking. Most of the heavily radioactively-contaminated buildings requiring cleanup are typically abandoned or at least temporarily unoccupied (e.g. most FUSRAP buildings). In fact, many of these are placed under strict institutional control until such time as they can be returned to beneficial use after intensive decontamination or – more likely – be decommissioned. During this time of institutional control, neither a residential nor an indoor worker exposure scenario would be appropriate. Maintaining long-term active institutional control of buildings is expensive, however, and might exceed the costs of a limited preliminary decontamination to reduce the radiological contamination to a level that would be protective of an occasional trespasser or visitor to the building.	To provide decision-makers with another action alternative (limited preliminary decontamination until a final D&D decision is made), the commenter recommends that a trespasser/visitor scenario should be included in the BPRG calculator.	EPA does not have a standard trespasser exposure scenarios. Will add language that standard scenarios in the BPRG calculator may be altered site-specifically to meet other exposure scenarios.
Clauberg	5	General	NA	NA	Yes, the approach reflected in the BPRG calculator is consistent with existing risk-based PRG guidance and practice. The Frequently Asked Questions section presents an accurate overview of the approach and how it is consistent with existing risk-based PRG guidance and practice.		No response needed.
Clauberg	5	General	NA	NA	Ad a) outdoor and indoor environments. The BPRG calculator is applicable only to indoor environments, as explicitly stated in the last paragraph of the BPRG Homepage discussion "…BPRGs are presented for residential and indoor worker exposure…". Admittedly, however, the distinction that only indoor environments are considered does not explicitly appear in the User's Guide until section 4.3.1, and then only as a corollary to the statement of the exposure times.		EPA will add language to the beginning of the Home page and User Guide making clearer that the BPRG applies to exposure to residents and workers inside a building from contamination that is inside the building.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Clauberg	5	General	NA	NA	Ad b) chemical and radiological contaminants. The BPRG calculator explicitly states that it only considers radionuclides (very first sentence of the BPRG Homepage "…Welcome to the EPA's Superfund radionuclide building preliminary remediation goal (BPRG) download and calculation website…" or the first sentence of the Introduction in the User's Guide "…Building Preliminary Remediation Goals (BPRGs) for Radionuclides are risk concentrations derived from standardized equations that combine exposure information and toxicity assessment as slope factors (SFs)…").		No response needed.
Clauberg	5	General	NA	NA	As stated above in the comment to Question 1. a)., the non-carcinogenic health effects of uranium should be considered in the BPRG equations.		EPA disagrees, but will add language on how non-carcinogenic effects of uranium could potentially be addressed by using the equations used for risk assessment of chemicals at the World Trade Center event. These equations formed the basis of much of the BPRG equations.
Clauberg	6	4.0	4.1	NA	The dissipation term is apparently missing from the equations for the 3-D Direct External Exposure, which also calculates a BPRG for contaminated dust on walls, floor, and ceiling. It is unclear whether the underlying equations (see Dose rate in contaminated rooms, by K. Eckerman) can be adjusted to a finite source with a dissipating source term over time. At present, the underlying assumption of a constant, infinite planar source for 3-D direct external exposure to contaminated dust on walls, floor and ceiling is perhaps overly conservative, especially in light of the discussion presented in section 4.3.8 of the User's Guide.		EPA will explain in Section 4.3.8 of the User Guide that we did not think that significant dissipation would occur for contamination that is sorbed or embedded into building material.
Clauberg	6	4.0	4.1;4.2;4.3.8	NA	The dissipation term, (1-e(-kt))/(kt), is provided in the denominator of the equations for exposure to settled dust on surfaces for both the residential and indoor worker exposure scenarios. Although there is a footnote that appears when site-specific BPRGs are calculated stating that "4. When k = 0.0, the dissipation term is not included in the calculation to prevent division by zero which would result a PRG of zero.", no mention of this "arbitrary dropping" of the dissipation term from the equation is provided in the sections 4.1 or 4.2 nor 4.3.8 of the User's Guide nor anywhere else in the User's Guide. Readers looking only at the equations for settled dust on surfaces without seeing the footnote in the site-specific input page would be puzzled how the dissipation term would be used since it would obviously "zero-out" the denominator.	The commenter recommends that a caveat should be placed underneath the equations stating , "For values of k > 0.0".	EPA will add text to Section 4.3.8. of the User Guide providing further explanation.
Clauberg	6	4.0	4.3.10	NA	Buildings with odd source geometries, finite sources, or unusual architecture should be accounted for through either a dynamic calculation of the Surfaces Factor, FSURF, or by allowing the selection of the type of building under investigation from a pre-calculated set of building room sizes and source geometries. Many manufacturing buildings – pretty much any building containing a production line – will not have rooms that conform to the underlying range of 10 by 10 by 10 feet to 20 by 20 by 10 feet. Also whether school gymnasiums, theaters, restaurants, university lecture halls, hotel lobbies or conference rooms or indeed any building where larger numbers of people come together could be assessed at present by the BPRG calculator, is not clear.	The supporting documentation (Dose rate in contaminated rooms, by K. Eckerman) discussed in Section 4.3.10 does claim that in regards to simple room size "…that only at very low photon levels is the size of the room relevant….". Underlying this last statement by the authors is the assumption that sources are uniformly distributed and that geometries and room architecture are standard. For rooms where the source material is not uniformly distributed and floor-to-wall and floor-to-ceiling relationships are unusual, this assumption may not hold.	EPA will include some additional large size room runs in its analysis, and will give users the option to site-specifically choose different room sizes and receptor locations to derive positioning factors for external exposure.
Clauberg	7	4.0	Table 1	NA	The conversion factors CF1 and CF2 are defined in Table 1, but do not appear in the equations as CF1 and CF2.		EPA will strike from table upon further review to ensure comment is valid.
Clauberg	7	4.0	Table 1	NA	The variable t for time, in years, (without subscript as defined in section 4.3.8 and again presented in the equation given in section 4.3.11) does not appear to be defined in Table 1.		EPA disagrees. t is defined in the nearby text and is meant for explanatory text only. Only varibles in exposure equations are defined in Table 1.
Clauberg	7	4.0	4.1	NA	The BPRG for exposure to settled dust on surfaces, PRGd-total, contains both contributions from ingestion of dust transferred to the skin of the hand and then ingested as a result of hand-to-mouth event, as well as external exposure to the settled dust. However, the BPRG for 3-D direct external exposure to settled dust on indoor surfaces, PRG3-D_dust, also addresses the external exposure to dust pathway. The part of the PRGd-total equation dealing with external exposure is essentially the same as the equation of the PRG3-D_dust, with the exception of the gamma shielding factor, GSF, and the surfaces factor, FSURF. This raises the question whether or not the PRGd-total is actually a total BPRG for settled dust on indoor surfaces. Furthermore, there is also no total BPRG that combines the ingestion and external exposure pathways with the inhalation and submersion pathways, although the source terms for both are linked.	***[Note to EPA: This is a continuation of the comment language]*** That is to say, if one were to cleanup the dust source term it would affect both the settled dust exposure calculation as well as the ambient air exposure calculations. More importantly, a receptor would be exposed to both the settled dust on indoor surfaces and the resuspended dust in the ambient air at the same time, thus requiring the consideration of a total BPRGdust. Indeed, if this same receptor would also be exposed to a contaminated building materials source which acts as a continuously regenerating reservoir of the contaminated dust source term, then this would also need to be reflected in a total BPRG equation and value. Clearly, the individual BPRG values cannot be summed or otherwise combined to obtain a total BPRG(dust_total) value, but rather a cumulative total BPRG(dust_total) equation must be derived.	EPA disagrees. As with the World Trade Center event risk assessment EPA does not believe that resuspension can be accurately modeled for indoor environments. The indoor air scenario accounts for resuspended dust that is in the air.
Clauberg	7	4.0	4.3.6	NA	The equation for the age-adjusted dust ingestion rate, IF, discussed in section 4.3.6 "takes into account" but does not "…average the differences in hand to mouth behavior, hand surface area, and exposure to hard and soft surfaces over the exposure durations of an adult and child…."	The commenter suggests replacing the word "average".	EPA agrees.
Clauberg	7	4.0	4.3.8	NA	In the section 4.3.8 discussion of the Binghamton State office Building case, the second parenthetical statement should read "dissipation rate constant of 0.38 yr-1" and not "decay rate"		EPA agrees.
Clauberg	7	4.0	4.5.1	NA	In section 4.5.1, the units of the defined terms of the presented equation for the external exposure pathway dose are missing (see for example 4.5.1.1).		EPA took this information from the source and believes the approach is appropriate without the revision.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Clauberg	7	4.0	4.5.1.2	NA	In section 4.5.1.2, the variables X and X‘ and ts for source thickness (in the equations for (X)2, (X’)2 , and μ, t appears to be without subscript) do not appear to be defined.		EPA took this information from the source and believes the approach is appropriate without the revision.
Clauberg	7	4.0	4.5.1.3	NA	In section 4.5.1.3, the variables fi and FA do not appear to be defined.		EPA took this information from the source and believes the approach is appropriate without the revision.
Clauberg	8	4.0	4.3.8	NA	The discussion in section 4.3.8 of the User’s Guide that “…To determine whether dissipation is a factor at a given site, the site manager should establish whether a significant reservoir of contaminated dust is present….The default value, in this BPRG calculator, for the dissipation rate constant is 0.0. This assumes that a contaminant reservoir is present. …. If a dissipation rate constant is used, it is assumed that the dust was deposited as a one time event (i.e.; dust cloud)…” appears to be circular reasoning. One cannot argue that the default assumption is that a contaminant reservoir is present, and that if one chooses a non-default value that this is evidence of a contaminant reservoir not being present.		EPA agrees that the current text is confusing and will provide clarifying language.
Clauberg	8	4.0	4.5	NA	At issue is the underlying exposure scenario assumptions for the ingestion of settled dust through transference to skin and then through hand-to-mouth activity in adults. No issue is taken with the other exposure pathways (air inhalation, nor with external exposures to dust, air (submersion), or contaminated building materials). Specifically, the issue is that the ingestion exposure pathway for settled dust on surfaces does not appear to be valid for adults. In particular, the duration and distinction of hand contact with hard and soft surfaces for adults does not appear to be realistic. The scenarios previously developed in other guidance and which were drawn upon when deciding on exposure pathways and routes for the BPRG were based on MEI receptors for RME scenarios of indoor residential exposures (see EPA Hubbard treatise on risk calculations based on surface wipes).	***[Note to EPA: This is a continuation of the comment language)*** The MEI receptor was typically a young child of toddler age, whose preferred mode of propulsion is on all fours, and who plays in direct contact with the floor a large portion of the day. Thus, a significant amount of dust will be transferred to the hands of the child. Here, differences in the transference of contaminated dust from different surface textures to the skin of the hand are very important. However, this assumes that the child will repeatedly touch the surface, which is a reasonable assumption.	In the equation for resident EPA uses hard and soft surfaces for the adult and child receptors. EPA considers the default values from the World Trade Center analysis to be adequate. These defaults and others for indoor environments may change in the future as EPA pursues additional research.
Clauberg	8	General	NA	NA	Yes, the BPRG website provides for adequate support of the equations, sources of toxicity information, and exposure parameter default variables and values through reference to the risk assessment literature, existing guidance, and/or site-specific BPRG experience.		No response needed.
Clauberg	8	General	NA	NA	there are a number of issues to be resolved for the equations. As to sources of toxicity information, these are adequately referenced, but some of the limitations of the underlying toxicity information itself (e.g. dose coefficients obtained from the Federal Guidance Report 12 assume geometries of infinite dimensions) has apparently been implicitly addressed, but hast not been explicitly discussed in the User’s Guide. Similarly, no discussion appears why the external exposure slope factors available in HEAST, which themselves are derived from Federal Guidance Report 13, were not employed or adapted. Hereto, Table 1 of the User’s Guide states that SFd-ext and SFsub are based on risk coefficients from FGR 13, while the justification paper “Dose Rate in Contaminated Rooms” by K. Eckerman states that external dose coefficients from FGR 12 are used. In light of these seeming deficits in providing a thoroughly sufficient background discussion to help the user understand the issues, it is not conducive to gaining public trust to then state “WARNING: … changing the value of t should only be done once a complete understanding of the mathematics involved in deriving the equation is gained…”.		EPA will make sure the FGR correct report number is used.
Clauberg	8	General	NA	NA	In general, however, the User’s Guide provides for adequate support of the selected exposure parameter default variables and values in the section 4.3 Exposure Parameter Justification.		No response needed.
Clauberg	9	4.0	4.3.1	NA	Adults, however, do not touch carpeted floors (i.e. soft surfaces) more than a few times a day with their hands, usually only to pick things up that had fallen down. They will, nevertheless, make hand contact with hard surfaces quite often during the day, e.g. countertops, desktops, tables, production lines, etc. Therefore, in section 4.3.1 the base exposure scenario assumption states that “…. assume that adult residents would spend 8 hr/d on carpets and 4 hr/d on hard surfaces. This totals 12 hr/d. Assuming that an individual sleeps 8 hr/d, the total time in a residence is 20 hr/d. For this calculator, the remaining for [typo: for] 4 hr/d was equally divided between exposure to hard and soft surfaces. This results in default values of 10 hr/d on carpets and 6 hr/d on hard surfaces for adult and child residents…”. Thus, an adult may in fact be located on a carpeted area in the home or workplace (e.g. office building) for 10 hrs/d, but will not be in hand contact with the soft surface during that time. Insteadblic trust to then state “WARNING: … changing the value of t should only be done once a complete under	Correcting this assumption could lead to an increase in the ingested dose because transference factors for hard surfaces are significantly higher than for soft surfaces, such as carpets. However, the relatively low frequency of hand to mouth events for adults and the relatively small skin surface area of the hand contacted by the mouth will limit the amount of contaminated dust ingested.	EPA disagrees and considers the default values that were adopted from the World Trade Center analysis to be appropriate.
Clauberg	9	4.0	4.3.1	NA	Adults, as well as children, will also be in dermal contact with dust through their heads, arms, and – if wearing shorts or skirts – through portions of their legs for most of the day. Although translocation/absorption of radionuclides from contaminated dust into the skin is relatively low, the fact that the dermal exposure occurs throughout the day seems to bear a larger potential for delivering an internal dose to a receptor than the infrequent and inefficient hand-to-mouth transfer. Prior personal experience of this reviewer suggests that the dermal exposure route is at least, if not more, significant for delivering an effective dose in adults than the hand-to-mouth ingestion route for adults (for children it is reversed and in accord with the base exposure scenario presented in the BPRG User’s Guide).	The commenter recommends that a dermal exposure pathway should also be calculated, which is in contrast to the statement in section 4.3.9 of the User’s Guide.	EPA disagrees and has added more text for its decision in Section 4.3.9 of the User Guide.
Clauberg	9	General	NA	NA	Yes, for the most part the construction of the calculator appears to be appropriate and reasonable given the assumptions presented and documented in the BPRG website. As stated above in the comment to question 4.b)., there are some issues regarding the basic exposure scenario assumptions that need to be resolved, as well as other issues presented in the previous comments, but – in general – the BPRG calculator is an extraordinarily helpful tool for EPA staff and professional risk assessors in providing a standardized methodological calculation and information tool for determining BPRGs.		No response needed, comments to 4b addressed elsewhere.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Clauberg	9	General	NA	NA	Also, the construction of a site-specifically adjustable, online calculator is particularly helpful when needing to adjust generic BPRGs to site-specific conditions, within the limitations of the underlying exposure scenarios, pathways, and routes. The design of the website itself appears to be very functional and intuitive. The User's Guide could be structured a little better to ease transitions and could benefit from a hyperlinked table of contents.		EPA disagrees with the commenter on the need for a Table of Contents. The large number of short sections in the User Guide would result in a very long Table of Contents in relation to the size of the User Guide which EPA considered not user friendly. EPA did make a number of changes to the User Guide to improve readability that are addressed in other comments.
Clauberg	10	1.0	NA	NA	In Section 1., the phrase "…combine exposure information and toxicity assessment as slope factors (SFs)…" should be changed to place exposure information on the same level as the toxicity information. Suggestion: "...combine exposure information and toxicity information in the form of slope factors (SFs)…"		EPA agrees.
Clauberg	10	1.0	NA	NA	In Section 1., add ", as a screening tool" to the end of the sentence "In general, generic PRGs are used before site-specific risk assessments…."		EPA agrees.
Clauberg	10	1.0	NA	NA	In section 1., change "at" to "for" in the sentence "…buildings at which risk is being assessed…"		EPA agrees.
Clauberg	10	1.0	NA	NA	In Section 1., consider changing the word "appropriate" to "warranted" for the sentence "…suggests that further evaluation of the potential risks is appropriate…"		EPA agrees.
Clauberg	10	3.0	3.2	NA	Name the document to which the word "here" links to (i.e. Dose Rate in Contaminated Rooms by K.F. Eckerman)		EPA will make change.
Clauberg	10	4.0	4.3.1	NA	The phrase "…and whether the source is a hard or soft surface…" appears to imply that the source is the surface substrate on which the contaminated dust settles and not the dust itself.	The commenter suggests changing to read: "…and whether the source is located on a hard or soft surface…".	EPA agrees.
Clauberg	10	4.0	4.3.1	NA	Insert "…the estimated time spent …" into the sentence "…Hard surface time is based on the estimated time spent in the kitchen and bathroom…".		EPA agrees.
Clauberg	10	4.0	4.3.1	NA	Correct typo "…remaining for 4 hr/d was equally …" to read "… remaining 4 hr/d were equally…".		EPA agrees.
Clauberg	10	4.0	4.3.1	NA	It is unclear why these 4 hours were equally divided and not proportionally, as would be expected for most exposure scenario developments. However, for the adult it is not applicable to consider surface-to-hand transference from soft surfaces (i.e. carpets), even if they spend 10 hr/d in rooms with carpeted surfaces.		Soft surfaces could be sheets or a couch.
Clauberg	10	4.0	4.3.1	NA	The statement that "… dust doesn't collect between sheets…" may be applicable, but significant ingestion of dust does occur during sleep. Specifically during sleep phases, inhaled dust particles are not expectorated in the mucus (phlegm) as during waking hours in form of wet coughing (or "clearing one's throat and spitting"), but rather is swallowed leading to a cross-over of inhaled particulate matter being ingested. Whether or not this is a significant contributor to the ingested radionuclide dose is unclear and practically no quantitative exposure data is available to properly assess this mechanism of ingestion.		EPA will add language in Section 4.3.1 of the User Guide that this exposure is not quantified due to lack of exposure information.
Clauberg	11	4.0	4.3.3	NA	The statement "…based on the area of a child's 3 fingers…" may be factually correct, but sounds awkward. Suggest changing to read "…based on the surface area for 3 fingers that a child will most likely use for hand-to-mouth transfer…"		EPA agrees.
Clauberg	11	4.0	4.3.3	NA	In Section 4.3.3, it is stated that the child's skin surface area of the hands is estimated from the adult's hand surface area and dividing by the total skin surface area increase factor (3 fold) for children from age 2 to adult. The increase in the size of the hands does not necessarily follow the same growth proportions as does the rest of the body. Also, 3 fingers out of 10, would not be equal to 5% of the total area of both hands, especially since the palms and back of the hands are not involved in the hand-to-mouth transfer. Quantitative estimates of the skin surface areas for different age cohorts should be available in the medical literature.	The commenter recommends that the medical literature (e.g. size of skin grafts needed for burn victims) is queried to at least verify the basic premise of the linear proportional increase between child and adult hand skin surface area.	EPA still considers this reference to be appropriate.
Clauberg	11	4.0	4.3.4	NA	It was stated that "…It was decided to step down this frequency as follows:…".	The commenter suggest replacing the phrase "step down this" with "group the age cohort-specific hand-to-mouth".	EPA agrees.
Clauberg	11	4.0	4.3.4	NA	Recognizing that there is very little quantitative exposure data available for this activity, what was the rationale for dividing the age cohorts into four non-standard, overlapping groups? In fact, there is probably a typo in the second and third age group, which are from 7 to 12 years and 8 to 18 years. The latter should probably be 13 to 18 years.		EPA believes the existing reference in Table 1 to WTC risk assessment is sufficient; EPA will correct typo.
Clauberg	11	4.0	4.3.8	NA	Although not a typo in Section 4.3.8, the Dissipation Rate Constant is given in yr-1. Because of the adjacent placement of the "r" in yr next to the superscripted –1, the minus sign is almost unreadable on the monitor.	Suggest changing either the unit abbreviation to read "1/yr" or "years-1".	EPA agrees.
Clauberg	11	4.0	4.3.8	NA	The sentence "…By putting these variables in the denominator of the BPRG resident and worker ingestion of dust equations, a higher BPRG concentration can be calculated.." sounds awkward and devil's advocates may say that it appears to imply that it is desirable to achieve higher BPRG concentrations.	The commenter suggests that the word "can" should be substituted with "will"	EPA prefers substituting with the word "would" which will seem like less encouragement.
Clauberg	11	4.0	4.3.8	NA	Exhibit 1 effectively shows that with the dissipation rate constant set at 0.38 years-1, the calculated PRG will effectively increase by an order of magnitude over a 30 year time span. What is not shown or discussed is how sensitive the equation is for changes in the dissipation rate constant. This reviewer verified the calculated values in Exhibit 1 and observed that the BPRG is essentially linearly related to changing k values above 0.1.		EPA agrees that a sentence or two on sensitivity may be useful. Few users will be familiar with the dissipation function. EPA added a table showing the variation of k=0.000001 to 1.
Clauberg	11	4.0	4.3.10	NA	Insert the abbreviation of the Surfaces Factor in the title to read "4.3.10 Surfaces Factor (FSURF)". See section titles 4.3.1 to 4.3.8.		EPA agrees.
Clauberg	11	4.0	4.3.10	NA	Second sentence, change "are" to "is" to read "…surfaces factor, … is based …".		EPA agrees.
Clauberg	11	4.0	4.3.11	NA	Insert the abbreviation of the Radionuclide Decay Constant in the title to read "4.3.11 Radionuclide Decay Constant (λ)". See section titles 4.3.1 to 4.3.8.		EPA agrees.
Clauberg	12	4.0	Table 1	NA	In the References after Table 1, there is a typo for the last reference "…Potential Concern…".		EPA will correct typo.
Clauberg	12	4.0	Table 1	NA	The references should also include citations for the Federal Guidance Reports 12 and 13, and URL links to them (http://www.epa.gov/radiation/docs/federal/402-r-99-001.pdf , http://www.epa.gov/radiation/docs/federal/402-r-93-081.pdf).		EPA agrees to add reference to FGR 13 since it is cited as reference for slope factors, but disagree with citing FGR 12.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Clauberg	12	4.0	Table 1	NA	In the reference support document "Dose Rate in Contaminated Rooms" by K.F. Eckerman, there is a typo in the sentence immediately following Equation (1).	The commenter recommends that the "linear attention coefficients" should be "linear attenuation coefficients".	EPA will correct typo.
Clauberg	12	4.0	4.3.11	NA	Change the first sentence to read "…a decay constant term (λ) which is based on the half-life of the isotope…" to avoid possible confusion that (λ) refers to the half-life of the isotope.		EPA agrees.
Clauberg	12	4.0	4.3.11	NA	Change the third sentence to read "…term is to derive realistic …".		EPA agrees.
Clauberg	12	4.0	4.5	NA	Typo in sentence under "Exposure to ambient air equations:", "…The inhalation equation…".		EPA will correct typo.
Clauberg	12	4.0	4.5.1	NA	Define Dniv and amend the units to the defined variables and factors.		No, this is quoted from the source and considered sufficient.
Clauberg	12	4.0	4.5.1.1	NA	Insert the full name of the Depth-and-cover Factor in front of the abbreviation in the title to read "4.5.1.1 Depth-and-Cover Factor (FCD)". See section titles 4.3.1 to 4.3.8.		EPA agrees.
Clauberg	12	4.0	4.5.1.1	NA	It is stated that the FCD is not included in the equations for this calculator because either the dust layer is so thin (suggest changing "so thin" to read "typically extremely thin") and direct external exposure risk coefficients are not concerned with depth. Both the arguments for discounting a depth-and-cover factor are not fully developed. For one, dust layers on smooth, hard surfaces are typically very thin but dust layers on soft surfaces can reach appreciable depths. Secondly, the external exposure pathway is concerned with depth, for instance when direct external exposure from contaminated building materials is considered (e.g. Styrofoam sound isolation boards on top of contaminated concrete or building blocks).	The commenter recommends that a more detailed justification of why the depth-and-cover factor is not considered in the BPRG calculator should be provided.	No, this is quoted from the source and considered sufficient.
Clauberg	12	4.0	4.5.1.1	NA	It is stated in the next-to-last sentence that values for the four unknown parameters were found for 67 radionuclides. This represents probably less than 10% of the total number of radionuclides available in the BPRG calculator.	The commenter recommends that a discussion of this issue be addressed in the calculator guidance.	EPA took this information from the source and believes the approach is appropriate without the revision.
Clauberg	12	4.0	4.5.1.2	NA	Insert the full name of the Area-and-Material Factor in front of the abbreviation in the title to read "4.5.1.2 Area-and-Material Factor (FAM)". See section titles 4.3.1 to 4.3.8.		EPA agrees.
Clauberg	12	4.0	4.5.1.3	NA	Insert the full name of the Off-set Factor in front of the abbreviation in the title to read "4.5.1.3 Off-set Factor (Foff-set)". See section titles 4.3.1 to 4.3.8.		EPA agrees.
Clauberg	12	General	NA	NA	On the BPRG Search webpage, clicking on the form button to "Select All" does not work.		EPA has corrected functionality.
Clauberg	13	3.0	3.2	NA	Yes, the discussion of background sources of radionuclide contamination is complete and adequate guidance and citations are provided. Although succinct, section 3.2 provides enough information to alert users to first check up on their site's radionuclide background values "…prior to applying BPRGs as cleanup levels…".	Although adequate guidance and citations are provided, additional references might include EPA's Guidance for Comparing Background and Chemical Concentrations in soil for CERCLA Sites, EPA 540-R-01-003, 2002, and EPA EFI's Determination of Background Concentrations of Inorganics in soils and sediments at Hazardous Waste Sites, EPA/540/S-96/500, 1995.	EPA thought that this might be confusing since the reference is for chemicals.
Clauberg	13	4.0	NA	Settled Dust	There are four primary issues with the BPRGs for settled dust. Firstly, the applicability of the BPRG's CSM to allow for repeated hand contact with soft surfaces (i.e. carpets) is not believed to be realistic for adults. Secondly, the equation for the PRGd-total considers both ingestion of contaminated dust and external exposure to dust, but does not follow the same dose equation for the external exposure contribution as that shown in the PRG3-D_dust BPRG. Thirdly, the dermal contact exposure route was discounted by the authors, but perhaps should be included if this route's contribution increases when the previous issues are addressed. Finally, the settled dust source term in indoor situations is linked to the ambient air source term and a total BPRG(dust_total) should consider the contribution of the settled dust on the ambient air BPRG and vice versa. Besides these issues, and the others mentioned in the previous comments, the exposure scenario and the equations used to describe it are generally appropriate.		(1) EPA believes defaults for adult contact with a soft surfaces is realistic (2) The PRG3_D includes external exposures from walls, ceilings, and floors while PRGd is floors only from external exposure. (3) EPA will add further explanation of its decision to exclude dermal. (4) EPA disagrees that resuspension of settled dust can be accurately modeled for indoor environments.
Clauberg	13	4.0	NA	Settled Dust	The default values are generally appropriate and most if not all default values are supported by referenced risk assessment literature or existing guidance. Specifically: The default value of 0.0 for the dissipation rate constant is conservative, but because of a division by zero resulting from this default value, the dissipation term must be stricken from the equation when k = 0. The default values for the exposure times are also conservative, with the above mentioned exception of the ingestion route for adults.	***[Note to EPA: This is a continuation of the comment language]*** The default values for the hand skin surface area for children should be verified through medical literature sources since it is properly derived, but the underlying assumptions of the derivation may be speculative. The default values for the frequency of hand-to-mouth activity are broken into non-standard, overlapping age cohort groups. Again, there is little quantitative exposure data available to support the estimates of the default values. The default value for the saliva extraction factor appears to be conservative but is supported by guidance and risk assessment literature. The age-adjusted dust ingestion rate for the resident receptor is a function of the above default values for exposure parameters and thus should also reflect a conservative approach.	EPA believes that the defaults are appropriate. EPA acknowledges that compared to other exposure scenarios, there is less data for indoor environments on which to base defaults. EPA is conducting further research on indoor environments focused on exposures to chemical (non-radiological contaminants) as part of another effort. This may lead to changes to the BPRG defaults in the future as well, particularly since the BPRG is using the same defaults for ingestion and inhalation as the World Trade Center analysis.
Clauberg	14	4.0	NA	Settled Dust	Yes, the above mentioned issues (see comment to Question 7.a).) with the distinction of the hand contact between hard and soft surfaces is fully applicable and appropriate for children. The issues of the dose equation for the external exposure contribution and of the a total BPRG(dust_total), however, also apply for the assessment of the risks to children. Noteworthy are the issues of the hand skin surface area default value for the child and the age cohort grouping for the frequency of hand-to-mouth activity.		No response needed.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Clauberg	14	4.0	NA	Settled Dust	This question in essence addresses the same issue as mentioned above for the discrepancy between the external exposure contribution in the equation for the PRGd-total and the equation of the PRG3-D_dust. Overall, the use of the external ground plane slope factor is appropriate given the listed assumptions for the dust source term (extremely thin depth) and the derivation of the surfaces factor, FSURF. This surfaces factor, together with the area-and-material factor and the off-set factor, allow for the appropriate consideration of the use of the external ground plane slope factor.		No response needed.
Clauberg	14	4.0	NA	Indoor Air	Yes, there are no significant issues that were identified with this pathway. The default values are generally appropriate and most if not all default values are supported by referenced risk assessment literature or existing guidance. Specifically: The default values for the exposure times, the exposure frequencies, and exposure durations for the resident and indoor worker are well established default values. The derivation of the total annual air submersion effective dose equivalent (in mrem/yr) is presented in Section 4.5.2 of the User's Guide. However, this is not used in the BPRG air submersion calculation, but rather the air submersion dose conversion factor (in mrem/yr per pCi/m3) is employed. How this air submersion dose conversion factor is converted from mrem/yr per pCi/m3 into risk/yr per pCi/m3, or whether the SFsub is directly taken from Federal Guidance Report 13, is not provided in the BPRG User's Guide.		EPA will add to Table 1 of the User Guide a reference to Federal Guidance Report 13.
Clauberg	15	4.0	NA	Indoor Air	The equations are the same for the child as for the adult since there is no size- or age-specific difference in the equations for the inhalation and submersion pathway. However, there is a difference in the inhalation rate between children and adults. The standard default value for the adult inhalation rate for a resident or a worker is provided in the BPRG as 20 or 60 m3/day, respectively, while the child inhalation rate is not listed (it is typically given as 10 m3/day – see U.S. EPA. 1997a. Exposure Factors Handbook. Office of Research and Development, Washington, DC. EPA/600/P-95/002Fa. http://www.epa.gov/ncea/pdfs/efh/).		EPA agrees, age-adjusted inhalation rate will be added to address children.
Clauberg	15	4.0	NA	Indoor Air	The external submersion slope factor is appropriate and is detailed in Federal Guidance Report 13.		No response needed.
Clauberg	15	4.0	NA	External Exposure	As already mentioned in the comment to Question 7.a). and previously, the equation underlying the external exposure of settled dust for the PRG3-D_dust is slightly different from the external exposure equation contribution for the PRGd-total equation. Specifically, the PRG3-D_dust considers the GSF and the derived values for FSURF .		No response needed.
Clauberg	15	4.0	NA	External Exposure	The equations and default values for the direct external exposure to contaminated building material appear to be identical to the external exposure of settled dust equation, with the one exception that the building material BPRG is calculated using soil volume risk coefficients from HEAST (which will account for internal shielding), while the settled dust BPRG is calculated using an adjusted ground planar risk coefficient derived from Federal Guidance Report 13 and a calculated, radionuclide-specific relative dose ratio, i.e. the surfaces factor, FSURF .		No response needed.
Clauberg	15	4.0	NA	External Exposure	Whether or not the supporting documentation ("Dose Rate in Contaminated Rooms", by K.F. Eckerman) is appropriate and sufficient to justify the use of a derived relative dose ratio coefficient (i.e. the surfaces factor, FSURF) with the external dose coefficients of FGR 12 (which assumes an infinite planar source) to determine a dose rate coefficient that is applicable to rooms with either a surface or volume contamination, is not clear.	A fully detailed analysis of all the underlying computations in the referenced supporting documents (specifically the "Dose Rate in Contaminated Rooms", by K.F. Eckerman, and the FGR 12 and 13) to discern if issues in the external exposure derivations are present, was not possible within the scope (and projected hours of effort) for this review. This reviewer, therefore, cannot definitively state with confidence if the underlying computational assumptions for the adjusted external exposure dose rate coefficients are appropriate and applicable.	EPA will add additional text to explain the underlying computations in the document.
Clauberg	15	4.0	NA	External Exposure	The default values are generally appropriate and most if not all default values are supported by referenced risk assessment literature or existing guidance.		No response needed.
Clauberg	16	4.0	NA	External Exposure	No distinction is made between the child and adult receptor for the external exposure pathways for either contaminated building material or settled dust. No distinction is warranted, albeit that the underlying assumption of the external dose rate coefficients in the Federal Guidance Reports are based on a dose determined for a height of 1m above an infinite plane of surface contamination. Thus, most of the children under the age of 7 yrs old will not even reach the hypothetical dose height. Whether or not this is a significant issue is not restricted to only the BPRG calculator, but to all risk equations utilizing the external dose rate coefficients of the Federal Guidance Reports		No response needed.
Clauberg	16	4.0	NA	External Exposure	This issue has been addressed in the comment to Question 9.a). In general, yes, the use of the adjusted dose rate using the FSURF surface factor for adjusting the external infinite source slope factor to a 3-dimensional contaminated room, is addressed and documented in the BPRG User's Guide and the supporting document ("Dose Rate in Contaminated Rooms", by K.F. Eckerman).		No response needed.
Paustenbach	1	1.0	NA	NA	State in the first paragraph of the introduction "how" the BPRG is going to "assist" risk assessors. I think what you mean is that you have developed a procedure which helps identify concentrations of radionuclides inside buildings which should not pose an increased health risk to residents.		EPA will delete "in soil".
Paustenbach	1	1.0	NA	NA	The words "streamlining" the remediation are used in the first paragraph of the introduction. I guess I would say that "The BPRG approach should allow the risk manager to quickly identify the likely costs of various target inside building clean-up concentrations". Is that what you mean to say?		EPA will delete "in soil"; "Streamlining" refers to facilitating the screening out of areas and contaminants of concern, thereby focusing the risk assessment.
Paustenbach	1	1.0	NA	NA	It seems to me that you have developed this tool to allow risk managers to quickly identify likely inside building clean-up levels….and that the results should be similar to those which will result from the application of more sophisticated approaches.		EPA will delete "soil"; EPA has not benchmarked BPRG against other methods.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Paustenbach	1	1.0	NA	NA	Paragraph 3 of the introduction. There is a grammatical problem with the sentence that says "important to demonstrate the equations".		EPA will correct the grammatical error.
Paustenbach	1	General	NA	NA	In large measure, the document does accurately represent existing guidance regarding risk-based PRGs. It would be good if the document would cite the other PRG documents.		To the extent these documents are a source for the BPRG, or overall policy on PRGs, they are cited.
Paustenbach	1	General	NA	NA	The ideas are all presented but it would be much better if a heading were provided that said "proper and improper uses of the BPRG".	The commenter would suggest that bulleted examples of when it should be used and not be used be provided. This would remove any ambiguity.	We have section 3.1 of User Guide which discusses Conceptual Site Model. The CMS discussions will be expanded based on other comments.
Paustenbach	2	General	NA	NA	I have some recommendations about how to make the calculator more effective to the user.	The commenter recommends to provide a set of supplemental references. There are a couple dozen key documents, which are not government publications, that should be brought to the attention of the readers.	EPA does not think that these documents which were not used in the development of the BPRG calculator or representing EPA CERCLA policy should be cited as sources for developing BPRG concentrations.
Paustenbach	2	General	NA	NA	As before, I think the document would be improved if a separate heading were added with the title "intended audience". From what I can determine, nearly anyone can find a benefit.		EPA believes this would be confusing; Clauberg's comments help clarify "audience" better.
Paustenbach	2	General	NA	NA	The supporting material provide the appropriate level of detail, technical content, and referencing for the intended audience is an area that needs improvement. More explanation is needed regarding why certain exposure factors were selected.	The commenter recommends that the studies underpinning the selection should be discussed and cited. If the desire is to keep this document simple, then the details that I am recommending could be provided in an appendix.	EPA believes that this type of appendix would be much larger than the User Guide and would also require continual updating. The justification for selection of exposure factors is in cited EPA documents. Every individual value is referenced.
Paustenbach	2	General	NA	NA	Using the tool could be a bit more straightforward for those who don't often use "on line" programs.		Changes will be made to the BPRG text in response to other comments to enhance readability.
Paustenbach	2	General	NA	NA	I did not find it easy to understand how the various exposure factors varied between the indoor and outdoor environment.		The BPRG calculator only deals with indoor environments.
Paustenbach	2	General	NA	NA	Under exposure time, you are referred to the exposure scenarios to figure out how the hours were distributed between the "time indoors" vs. "time outdoors" for the various age groups.		No response needed.
Paustenbach	2	General	NA	NA	On page 7 of 19, there is a discussion of the Exposure Parameter Justification. This would be better organized by discussing the Exposure Factors for Estimating Outdoor Intake….followed by a discussion of Exposure Factors used to Estimate Intake due to Indoor exposure. This is necessary and the original references, not EPA guidance, should be cited. The reader deserves to know the rationale for the selection (in summary form). Otherwise, they must go back and look at the original EPA document (which sometimes is not current and sometimes weighs data in a very conservative manner).		No, this would be confusing since BPRG doesn't cover outdoor exposure. No, cite previous EPA sources to show when EPA adopted the parameter. If user is interested in its origin, they can look it up from EPA guidance. However, the User should use site-specific data if they are not using the default parameter, not another literature value.
Paustenbach	2	General	NA	NA	There is no doubt that I would prefer that the "primary" original study upon which the exposure factor has been selected should be cited in this document. That would alert the reader to the citation as well as the "age" of that document. Often, that alone is enough to tell the reader that the value is solid or suspect.		These documents cannot be in PDF formats.
Paustenbach	3	General	NA	NA	It has been advocated in a number of papers that humans can be placed into as many as 3-5 categories (age brackets) over their lifetime. As exposure factors become more refined, I think this is appropriate. For example, age 0-1.5, 1.5-3.0, 3-9, 9-18, 18-70 years. This may be more detail than needed in this document.		No, for now. Superfund is currently looking at using additional age brackets. If adopted, BPRG defaults values will be revised.
Paustenbach	3	General	NA	NA	The above recommendation applies to each of the exposure factors. It would be good to make the "indoor" vs. "outdoor" assumptions more clear.		All assumptions are indoors. This will be made more clear in the beginning of "Homepage" and "User Guide".
Paustenbach	3	General	NA	NA	I have NOT run a sensitivity analysis on the equations but I believe this needs to be done. A sensitivity analysis would tell me which factors are "driving" the results. Normally, it is the degree of loading of the dust onto the hand or fingers which drive the assessment (then ingested). Sometimes, it is the actual ingestion of soil. After one understands what is driving the outcome, then you want to drill down and see if the exposure factor selected is truly based on the weight of evidence or if it is simply "a conservative value that has been used in regulatory guidance for many years". After one understands what is driving the outcome, then you want to drill down and see if the exposure factor selected is truly based on the weight of evidence or if it is simply "a conservative value that has been used in regulatory guidance for many years".		This is better looked at site-specifically since the exposure route and parameters which are driving will depend upon the radionuclide (e.g., gamma vs. alpha emitters) and the land use. We had some additional text suggestions from other peer reviewers to make caveats clearer. I think those will suffice.
Paustenbach	3	General	NA	NA	Unless one goes into the literature which is cited and analyzed in the various EPA guidance documents that are cited here, you can not determine whether the default variables and values are the correct ones.		EPA believes that the default values are appropriate.
Paustenbach	4	General	NA	NA	The BPRG is clear about where the data were obtained but, as I mentioned, you have to go back and carefully examine the batch of supporting documents. This could easily be rectified by have a supplemental reference list that lists all relevant articles, by topic.		EPA disagrees. The BPRG User Guide lists the sources that are used.
Paustenbach	4	General	NA	NA	I don't have a sense that this document communicates to the reader the importance of exposure to indoor dust? For example, it is normally exposure to carpets, upholstery, and toys that are the most important sources of intake by children. Surfaces on which foods are prepared are stored is often the most important source of exposure for adults.		EPA will add language that surfaces on which food is prepared may be an important pathway but this is not quantified due to lack of information.
Paustenbach	4	General	NA	NA	The default inputs for residential exposure calculations are quite conservative (e.g. likely to overestimate the true risk). For example, it is assumed that 100% of the time is spent indoors, that large areas of surfaces are touched, that there is NO dissipation (no cleaning of surfaces or other losses due to other factors), etc.		EPA believes that the default values for the time indoors and surface areas contacted are appropriate. Also, it would be inappropriate to apply a dissipation rate with site-specific data, so a default of no dissipation is appropriate.
Paustenbach	4	General	NA	NA	It was not clear to me how the indoor worker and resident excel spreadsheets varied. I don't think they were provided.		Default BPRG concentrations in "Download" webpage will be provided when the calculator is finalized.
Paustenbach	4	General	NA	NA	If there was a true PDF format, I would like to have reviewed it.		Default BPRG concentrations in "Download" webpage will be provided when the calculator is finalized.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Paustenbach	4	General	NA	NA	Insufficient detail was provided for me to understand the various pathways and routes EXCEPT by carefully reviewing the equations. I did not see text that described how the equations were built. Normally, all of the factors (abbreviations) are described immediately below each equation. That is NOT how this is set up on the web site in the equations section. HOWEVER, it is presented in this manner in the section which discusses residential exposure to settled dusts.		This can be done by running the calculator.
Paustenbach	4	General	NA	NA	It would help if an example calculation were offered. From what I can determine, the current default values provide a very "upper bound" estimate of risk. Usually, one doesn't maximize ALL exposure factors when trying to identify a screening value.		Default BPRG concentrations in "Download" webpage will be provided when the calculator is finalized. It is an RME scenario based generally on upper (e.g., 95%/90%) and 50% values. Will add to Section 1 of User Guide that BPRG concentrations are for RME receptor.
Paustenbach	5	General	NA	NA	Perhaps, IF this approach is simply one for identifying "acceptable or virtually safe" soil or house dust concentrations, then it is fine but this should be explained to the reader.		EPA will provide additional language on the role of the BPRG for screening out areas, sites, or contaminants from further evaluation.
Paustenbach	5	General	NA	NA	My major fear in putting out a document like this is that it will be used by persons who want a particular outcome which would enhance their own lives (thorough the legal system).		EPA has provided sufficient guidance on how to use the BPRG calculator properly.
Paustenbach	5	General	NA	NA	If the objective is to generate a "best estimate" of the soil or dust concentration that is safe, then the approach is too conservative. If it is to provide a concentration which will protect the "reasonably maximally exposed (RME)" person (an outdated term), then it is probably ok.		It is RME oriented, not central tendency. The intent to use RME approach will be added to the User Guide and Home Page.
Paustenbach	5	General	NA	NA	I would NOT call this calculator a reflection of "best practice". It would be much better if one were to do this using a Monte Carlo approach and, using some fairly well accepted PDFs, then you could more clearly portray the risk to the RME.		No, the risk to the RME would not change with a Monte Carlo analysis, just what percentile the RME is for that site/analysis.
Paustenbach	5	General	NA	NA	It is my view that it is now possible to predict, with a fairly high degree of accuracy, the likely intake of any contaminant if you truly understand the distribution of concentrations on the SURFACE of the contaminated media (soil, house dust, upholstery, toys, working surfaces, etc). It is not clear to me why this tool should not provide both a "best estimate" of intake and an RME type of result.		No. However, if Superfund adopts policy of providing central tendency and low exposed individuals with RME, the BPRG will be revised to reflect this change.
Paustenbach	5	General	NA	NA	As noted, I happen to support providing the results at the 25, 50 and 95th percentile using a Monte Carlo approach….since this is going to be set up using the "calculator" format. This would make obtaining this kind of information very trivial for the novice risk assessor.		No. However, if Superfund adopts policy of providing central tendency and low exposed individuals with RME, the BPRG will be revised to reflect this change.
Paustenbach	6	4.0	NA	Settled Dust	I am not certain. Let me explain since I can not seem to find the core information in the materials which I have reviewed. 1) the key factor which dictates the magnitude of settled dust is the outdoor soil concentration and the outdoor concentration of airborne dust; 2) then, the key factor is the particle size of the airborne particles and the particle size of the surface soil (which will be tracked indoors); 3) the K (dissipation factor) needs to be applied on a "per surface" basis. That is, kitchen counters get cleaned by the hour or several times a day. Conversely, other surfaces such as floors may not get cleaned for days or even weeks. Exposure frequency to each varies significantly. This should be accounted for. 4) I have mentioned previously that the duration values are too strict.		No, it is better for the user to prorate the surfaces and associated dissipation rate site-specifically, if they have a basis for doing so. Text will be added instructing the user that they may prorate the surfaces.
Paustenbach	6	General	NA	NA	I think I have identified the "missing pieces". These could easily be addressed if the effort were invested. I am a bit surprised, given the age of this document, that the BPRG has not matured to a more significant degree. Having said that, it will not be difficult to do this if EPA wishes to invest the effort.		The BPRG is not yet finalized.
Paustenbach	6	General	NA	NA	Much was learned as a result of the WTC experience, as well as the studies of some areas where house dust has been evaluated. There will also be much learned from the Univ of Michigan study of the City of Midland, Michigan.		BPRG is primarily based on WTC work.
Paustenbach	7	4.0	NA	Settled Dust	One major factor which is NOT discussed in this document is the enhancement factor between outdoor soil and indoor dust. This is not discussed much in the literature but I would direct you to an article I wrote ten years ago. It is the only such paper on this topic of house dust (Paustenbach, Long, et al…in the Inter J of Toxicology). Basically, for many chemicals, house dust often contains a higher concentration of contaminant than the outdoor soils. There are many reasons why this might occur.		EPA agrees; and will add text alerting the reader that because outside soil is protective does not mean that inside dust is also protective, and provide short explanation of why this may occur. Citation to the article will be added to the User Guide.
Paustenbach	7	4.0	NA	Settled Dust	*Do the equations, default values, and other input parameters adequately account for risks to children?* This is also a difficult question to answer due to the inadequate documentation to the primary literature.		EPA believes that it is appropriately citing to documents that were sources of information used in the calculator.
Paustenbach	7	4.0	NA	Settled Dust	The appropriateness of the use of the dissipation rate, including a default input parameter of 0 depends on what you want from the "calculator".		No response needed.
Paustenbach	7	4.0	NA	Settled Dust	Clearly, a dissipation factor of zero is never going to be accurate. There is no good reason to include it if "zero" is going to be adopted except that persons can apply these formula to cite specific situations if they wish.		Yes, the user can alter the default of zero based on site-specific data.
Paustenbach	7	4.0	NA	Settled Dust	As mentioned previously, I would recommend dividing the surfaces in the house into 5-10 boxes and use different dissipation factors for each "box" or "bin".		EPA disagrees.
Paustenbach	7	4.0	NA	Settled Dust	There appears to be an attempt to do this in the "residential equation" using the term "fraction of time spent in compartment".		This handles room if user wants different concentration for different rooms.
Paustenbach	7	4.0	NA	Indoor Air	The equations, default values, and other input parameters appear (from reviewing non-volatiles) appears to be appropriate for establishing risk-based BPRGs for this pathway.		No response needed.
Paustenbach	7	4.0	NA	Indoor Air	I would refer you to the two publications which specifically discuss exposure factors for children. One is by Val Zartarian and the other is by Williams and Paustenbach. Both are fairly comprehensive. I doubt that they were considered (based on my review of the BPRG document.		EPA used World Trade Center information as well as a draft risk assessment methodology for PCBs.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Paustenbach	Email	General	NA	NA	Upon further review, it looks like the format of this calculator is very similar to the already public soil screening guidance calculator for radionuclides. http://risk.lsd.ornl.gov/rad-ssg/radssl1.shtm		No response needed.
Paustenbach	Email	General	NA	NA	It is still my view that this calculator has a low level of transparency. One of the things that seems unfortunate is that is seems like a technical support document (like is available for soil screening guidance) should have been prepared and peer reviewed prior to programming the calculator. For example, maybe it could explained why it is best to use pCi/g to estimate hand to mouth dust/soil ingestion risk in the radionuclide soil screening guidance calculator (already public) and pCi/cm^2 in the indoor calculator.	The commenter suggests that it would be better if EPA would have presented the equation for dose for each scenario because it is always difficult to work backwards from a remediation goal to understand how the calculation is put to together.	EPA disagrees with the commenter. EPA considers the BPRG calculator to have a high degree of transparency, both in easily allowing the user to view the equations and the source of the parameters. Where allowable, EPA has also hot linked to sources of information used in the calculator so that the user may view source.
Paustenbach	Email	General	NA	NA	The EPA 2003 document Table 2 indicates that the range of dust loading is 5 to 700 ug dust / cm^2 for hard surfaces and < 100 to 6300 ug dust / cm^2 for rugs or an age 2 child at the upper bound of these literature values for dust amounts, we'd have: CARPET: 6300 ug/cm^2 dust x 15 cm^2 of hand x 9.5 events per hour x 10 hours per day carpet x 10% carpet factor x 50% saliva factor x 0.001 mg/ug= 450 mg/day HARD SURFACES: 700 ug/cm^2 dust x 15 cm^2 of hand x 9.5 events per hour x 6 hours per day hard surf. x 50% hard surf. factor x 50% saliva factor x 0.001 mg/ug = 150 mg/day Total indoor dust ingestion from hand to mouth contact in very dusty environment = ~600 mg dust ingestion/day At the lower end we have a total of about 5 mg dust ingestion per day so the range of dust ingestion rates corresponding to the approach selected by EPA is roughly 5 to 600 mg/day of dust ingestion from hand to mouth contact. To be fair, it if you look at typical dust levels based on that Table 2, the EPA approach corresponds to about 15 mg/day of dust ingestion from indoor surfaces for the 2 year old child. I think the essence of the issue this: is it better to know dust amount (grams) and concentration on dust (pCi/g) and get dose by using concentration and mass of dust incidentally ingested or is it better to know (pCi/cm2)?	To understand the dust ingestion equation, I typed a simplified version of the dose equation for indoor worker incidental dust ingestion below: Dose = EFw X EDw X Decay X "Concentration" X Dust Ingestion Rate Dose = days/year x year x pCi/cm^2 x cm^2/day = pCi Where Decay is a factor giving the average activity over the work tenure and Default dust ingestion (cm^2/day) = 1 event per hour x 45 cm^2 hand area x 50% transfer to skin from hard surfaces x 50% saliva extraction factor x 4 hours per day + 1 event per hour x 45 cm^2 hand area x 10% transfer to skin from hard surfaces x 50% saliva extraction factor x 4 hours per day = Default of 54 cm^2/day If you use pi/cm2 for incidental ingestion, you don't really know whether the risk was caused by poor housekeeping (dirty floors, etc.) or by very high dust radiation levels that cause risk despite good housekeeping. Does it make sense to give users the option of using dust mass concentration OR dust area concentration? It almost seems like if they are going to use the pCi/cm2 approach, they should give a list of recommended sampling methods… I think the pCi/cm2 approach is acceptable for ingestion as long the sample collection	EPA disagrees that it is necessary to make sampling recommendations in the BPRG User Guide. EPA does not have recommendations for standard sampling methods for radioactively contaminated buildings at CERCLA sites.
Paustenbach	Email	General	NA	NA	I have to say that it was very difficult to understand how EPA is estimating incidental ingestion from hand to mouth contact – the specific equation I chose to focus on. It is an important one when trying to understand house dust risk. The dust ingestion risk equation is in terms of activity per area, so it is impossible to compare to these inputs to physical amounts – i.e. mass of dust ingested per day – unless you assume some kind of typical dust loading and do the calculation yourself.		EPA will add a new Section 3.3. of the User Guide describing the slope factors.
Widner	1	General	NA	NA	Yes, the documentation clearly states that the BPRGs are intended to be used for screening-level assessment of sites and as initial cleanup goals. Given the anticipated use of the tool in screening, it might be wise to remind the user of the basic strategy for use of "conservative" screening to identify areas, contaminants, and/or conditions that do not warrant further attention. See the response to Item 2c.		Reminder language on the role of screening will be added to both the "Home" (Welcome section) and "User's Guide" (section 1) pages.
Widner	1	General	NA	NA	The document does accurately represent existing guidance regarding risk-based PRGs. I am aware of no guidance regarding risk-based PRGs that is misrepresented or that the tool and supporting information do not reflect.		No response needed.
Widner	1	General	NA	NA	The documentation clearly states that the BPRGs are intended to be used for screening-level assessment of sites and as initial cleanup goals. Used in screening, they can be used to identify areas, contaminants, and conditions at a particular site that do not require further attention under the Superfund program, provided the exposure assumptions used in the calculations match the actual conditions at the site in question. It is also made clear that when contamination exceeds a BPRG, it should be viewed as indication that further evaluation of the potential risks that may be posed by site contaminants is warranted.		No response needed.
Widner	1	General	NA	NA	The documentation makes it clear that BPRGs are not actual cleanup standards, but rather long-term targets to use in establishing cleanup levels (based on "nine criteria analysis" and site-specific information) and in analysis of remedial alternatives.		No response needed.
Widner	1	General	NA	NA	Yes, the intended audience is clear. The BPRG Home page clearly states that the purpose of this BPRG calculation tool is to assist risk assessors, remedial project managers, and others involved with risk assessment and decision-making at sites with contaminated buildings.		No response needed.
Widner	1	General	NA	NA	The calculator can be used as currently presented, but I would recommend a number of refinements as outlined in the response to Item 2d.		See later responses for 2d.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Widner	2	3.0	3.2	NA	The level of detail and extent of referencing is good, but in some cases it would be helpful if there was more discussion of the implications of some references that are cited, or how they impact use of the tool.	For example, Section 3.2 of the User's Guide says that "additional information on radioactive materials present in building materials can be found here," but it is not made as clear as it could be there or in the reference document if BPRGs should be applied to concentrations found above these concentrations, or including these concentrations.	Where comments indicate confusion, EPA will add clarifying language. EPA will add the full name of the hyperlinked report, and more text about ARARs.
Widner	2	General	NA	NA	Some additional guidance regarding use of the tool in screening should be provided. When screening is performed to identify contaminants, areas, or conditions that do not warrant further attention, exposure parameter values are typically selected that are expected to not lead to underestimation of risk to any real person. If risks associated with an area, contaminant, or condition fall below the Target Risk even with this level of conservatism applied, it is clear that further attention is not warranted.		Reminder language on the role of screening will be added to both the "Home" (Welcome section) and "User's Guide" (section 1) pages.
Widner	2	General	NA	NA	If risk assessors attempt to select values for parameters that are specific to their site without keeping this approach in mind, the likelihood that doses to real persons will be underestimated or that BPRGs will not be adequately protective of all persons increases. And if a user does not examine the equations used in calculating BPRGs, it may not be obvious whether lowering or raising a given parameter will raise or lower the BPRG value (i.e., make the BPRG more protective or less protective).		No response needed.
Widner	2	General	NA	NA	It may not be obvious to all users that multiple contaminants are selected by holding down the Ctrl key while clicking on contaminant names.	The commenter recommends a note to that effect would be helpful.	Will add explanatory language to "Search" page. Also will add to FAQ.
Widner	2	General	NA	NA	It would be good to show how CDI ends up with units of cm2.		Will add explanatory language to "User Guide" (Sections 4.1 and 4.2).
Widner	2	General	NA	NA	I would recommend a more descriptive label than "BPRG Search" for the tab that the user selects to get to the calculator; "BPRG Calculator" would have helped me find it easier.		No change was made since users of EPA Superfund risk calculators are familiar with terminology.
Widner	3	3.0	NA	NA	Section 3 of the User Guide, "Using the BPRG Table," discusses how the BPRG (sic) Download Area tables provides generic concentrations for use in the absence of site-specific exposure assessments, and how screening concentrations can be used for prioritizing multiple sites within a facility, setting risk-based detection limits for contaminants of potential concern, and focusing further assessment or response actions for the site or building. Numerous references to the table are contained in the User's Guide and the Web site, for example as a way to document changes in generic BPRGs over time. Despite the impression that the documentation gives that the tables are a widely used aspect of PRG information, when I tried to access those tables, the indication is that "this tool is restricted to EPA users."	I was told that no one can open that table at this time− that the table contains information related to generic 1x10-6 numbers and is not deemed necessary for the peer review. The table should be made available or the text promoting its use should be removed.	This will be available when the BPRG calculator is finalized. Typo will be fixed.
Widner	3	3.0	NA	NA	Default assumptions regarding indoor exposures do appear to be plenty conservative for screening calculations, considering children of all ages 0-11 on average spend at least four hours per day at places other than indoors at home. I am concerned that screening using all the default values may lead to excessive selection of areas for further investigation or action, particularly since point estimates are used for variables and input parameters and conservatism gets compounded.		Consistent with EPA's use of RME exposure scenarios for other Superfund risk assessment situations, several of the default values (such as time indoors) are based on upper bound (e.g., 95th, 90th) percentile, not 50th or average.
Widner	3	3.0	NA	NA	Once one gets beyond the screening assessment, it is important that site specific conditions be reflected before final cleanup levels are selected. Since the importance of house dust in overall exposures to residents near contaminated sites has been demonstrated, it is important that valid samples of indoor dust and building materials be analyzed. House dust can contain significantly higher levels of a contaminant than exterior soil, house dust is composed of smaller particles than soil, adheres to skin more effectively, and is generally more bioavailable.		No response needed.
Widner	3	3.0	NA	NA	Radiological contaminants are assessed in this tool by appropriate inclusion of special parameters that reflect their properties, such as the Surfaces Factor and decay constants, and inclusion of pathways for external exposure from settled dust, submersion in ambient air, and from radioactive contaminants in building materials.	I would be interested in seeing the assessment that was performed to justify the exclusion of the dermal absorption pathway for radionuclides, on the basis that "the radiation doses caused by this pathway would be much smaller than the doses caused by the other potential pathways already considered for most radionuclides." I would think that the dermal absorption behavior of radioactive material would depend largely on the compound the radioactive material was present in and its chemical properties.	EPA will add further explanation in Section 4.3.9. of the User Guide on the rationale for excluding dermal.
Widner	4	General	NA	NA	The BPRG calculator does address the most important and appropriate exposure scenarios, exposure pathways, and exposure routes. I would like to see the data behind the exclusion of the dermal absorption pathway for radionuclides.		Section 4.3.9 of the User Guide will include further explanation for this decision.
Widner	4	General	NA	NA	Yes, the design is appropriate and reasonable.	The commenter recommends that the generic BPRG tables should be made available to support the applications that are noted in the User's Guide and FAQ text.	No response needed.

Commenter	Page No.	Guidance Section	Guidance Sub-Section	Exposure pathway	Comment	Commenter Recommendation	EPA Resolution
Widner	5	4.0	NA	Background	My first thought was that there should be more guidance given regarding inclusion or exclusion of background radionuclides from concentrations that are compared to BPRGs or cleanup levels that are established.	After additional consideration of OSWER 9285.6-07P ("The Role of Background in the CERCLA Cleanup Program") and the Hobbs (2000) paper of radioactivity measurements on glazed surfaces, I believe that it is better to not be too prescriptive in this area. Rather, it is good to follow the guidance of OSWER 9285.6-07P when it describes how, when background concentrations are high relative to the concentrations of released contaminants, a comparison should be presented of site-related and background concentrations. This characterization and comparison can be used by risk managers to make decisions concerning appropriate remedial actions.	EPA agrees.
Widner	5	4.0	NA	Settled Dust	The equations, default values, and other input parameters appropriate for establishing risk-based BPRGs for this pathway are appropriate in my judgment.		No response needed.
Widner	5	4.0	NA	Settled Dust	Yes, in my judgment, the equations used with the default values and parameters provided adequately account for risks to children on a screening-level basis. Once assessments get beyond the screening level, more rigorous representation of actual exposure conditions should be incorporated to the extent possible.		No response needed.
Widner	5	4.0	NA	Settled Dust	The use of the external ground plane slope factor is appropriate in my judgment considering the fact that the settled dust layer is likely quite thin.		No response needed.
Widner	6	4.0	NA	Settled Dust	The term appears to be appropriate and important to include, if it can be identified that the contamination resulted from a discrete event. The presence or absence of a contaminant reservoir can be complicated, given that studies have shown that remediation of external soil can have little or no impact on levels in household dust. It is not clear to me if the method is set up to reflect time that may have passed since that discrete contaminating event, if that time was not part of the Exposure Duration for any real person. The User's Guide indicates that "t is equal to ED in all equations."		Will edit language to make clear that dissipation rate is for dissipation occurring from whenever the BPRG is calculated into the future.
Widner	6	4.0	NA	Indoor Air	The equations, default values, and other input parameters are appropriate for establishing risk-based BPRGs for this pathway in my judgment.		No response needed.
Widner	6	4.0	NA	Indoor Air	Yes, in my judgment, the equations used with the default values and parameters provided adequately account for risks to children on a screening-level basis. Once assessments get beyond the screening level, more rigorous representation of actual exposure conditions should be incorporated to the extent possible.		No response needed.
Widner	6	4.0	NA	Indoor Air	The use of the external submersion slope factor is appropriate in my judgment.		No response needed.
Widner	6	4.0	NA	External Exposure	The equations, default values, and other input parameters are appropriate for establishing risk-based BPRGs for this pathway in my judgment.		No response needed.
Widner	6	4.0	NA	External Exposure	Yes, in my judgment, the equations used with the default values and parameters provided adequately account for risks to children on a screening-level basis. Once assessments get beyond the screening level, more rigorous representation of actual exposure conditions should be incorporated to the extent possible.		No response needed.
Widner	7	4.0	NA	External Exposure	Yes, the method is appropriate for the tool in its intended applications. I have reviewed the cited reference, "Dose Rate in Contaminated Rooms" by Keith Eckerman and agree with its methods and conclusions; i.e., it was determined that position-specific and room-specific surfaces factors were not needed because emitted photons are not abundant in the low energy band, photons in this energy band contribute little to the risk effective dose, and the existing variations are likely within the uncertainty of the method used to derive them.		No response needed.
	4	3.0	3.1	NA	A referential link to EPA guidance(s) on developing CSMs (e.g. Planning Table 1 of RAGS-D, or Attachment A of the Soil Screening Guidance) should be included.	The commenter recommends that ideally, there should be a separate module of the BPRG website for aiding the user in the CSM development, tailored to building situations. That way, the boundaries of the default scenarios, pathways, and routes underlying the BPRG calculator can also be more quickly identified.	EPA will provide link to Rad SSG Attachment A; EPA will consider the possibility of quickly identifying the boundaries of default scenarios, pathways and routes underlying the BPRG calculator.
	7	4.0	4.5.1.1	NA	In section 4.5.1.1, for constraint #3, insert the word "as" before ts → zero, to indicate that source thickness is not assumed to be zero, but as it approaches zero, the DCF should match the contaminated surface DCF.		EPA took this information from the source and believes the approach is appropriate without the revision.