PARSONS ENGINEERING SCIENCE, INC.

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MEMORANDUM

Date 7/23/97

To: Stephen Absolom
From: Andrew Schwartz
cc.: Randy Battaglia
Keith Hoddinott
Mike Borisky
Mike Duchesneau

Subject: Follow-up to SEAD-12 Project Scoping Plan Summary Sheet and Responses to Comments by USEPA and NYSDEC.

The primary purpose of this memo is to follow-up on the SEAD-12 Project Scoping Plan Summary sheet you received from Mike Duchesneau during the last RAB meeting. The second purpose of this memo is to address the comments written by the USEPA and NYSDEC on the Draft-Final Project Scoping Plan.

Regarding the SEAD-12 Project Scoping Plan Summary sheet, several changes are proposed which reflect the suggestions made by the Peer Review Committee as well as the topics that were discussed in the June 26 meeting in Albany. In particular, Parsons needs input from the Army on the proposed changes for the following tasks (a copy of the summary sheet is attached to this memo):

1. Classify Survey Units,
2. Identify Site Specific Guideline Values,
3. Scanning Surveys and Alpha and Beta direct Measurements, and
4. Special Measurements and Sampling

Provided below are some discussions on the major issues for each of these tasks.

Classify Survey Units

The proposed changes for this task closely follow what was discussed at the June 26 meeting in Albany. Primarily, we are proposing to survey Buildings 803, 804, 805, 819 and only the Hot Rooms of Buildings 815 and 816 as Class One units. The rest of Buildings 815 and 816 will be reclassified as Class Two. If the results of the Hot Room surveys find any contamination that is greater than 25% of a release guideline value, then the rest of these buildings will reclassified back to Class One. In addition, if Buildings 803, 804, 805, and 819 are also found to be free of residual radioactivity (i.e. none is found above 25% of a release guideline) then the remaining Class Two buildings and rooms would be reclassified as Class Three, and Class Three buildings or rooms would be reclassified as Unaffected. The Class Two geophysical anomaly areas and the 360 acres that are now classified as Class Three will not be reclassified.

Identify Site Specific Guideline Values

There are two major issues regarding this task. The first is that we are disagreeing with NYSDEC's comment to use the indoor removable radiation guideline as the fixed radiation guideline. I have discussed this issue with Mike Borisky and the topics of our discussion are included in the response to NYSDEC (General Comment #4 from NYSDOH's Bureau of Environmental Radiation Protection).

The second issue deals with EPA's request that guideline values in structures be supported with risk analysis modeling. We are disagreeing with this comment for several reasons. First, NYSDEC only requires that we meet their Department of Labor Part 38 criteria. Second, we are also using NUREG 1500 guideline values, which were calculated using dose model formulas from the NUREG document EPA suggests we use for additional guidance (NUREG/CR 5512). And third, in a later EPA comment, General Comment #3 from the April 22 round of comments, the EPA states: "EPA guidance recommends an upper limit of 15 mrem/year as the radiation dose limit (equal to approximately 3x10-4 carcinogenic risk)." They do not state , however, which guidance they are referring to.

Scanning Surveys and Alpha and Beta direct Measurements

The major issues for this task are how we want to reduce the level effort for Class Two areas. What we have proposed (detailed on the Survey Comparison Sheet) is basically an 80% reduction in the amount of surveying in these areas. The methodology was taken from NUREG 5849, which states that affected areas where no residual radiation is found on the lower walls (below 2 meters) and floors, then the upper walls and ceilings can receive only 20% coverage, rather than the requisite 100% coverage for affected areas. We have taken this guideline and modified it to cover <u>all</u> surfaces of Class Two areas (lower walls, upper walls, and ceilings). The basis for this "modification" to the NUREG guidance is that no high levels of residual radiation are found in the Hot Rooms. If high levels are found in a Hot Room, then the originally proposed work will have to be performed.

Special Measurements and Sampling

Tom - Peanut probe

The only issue for this task is the use of special measurement services for drain line surveys. The Peanut Probe suggested by the Peer Review committee is made by Scientific Ecology Group (SEG). SEG now identifies their equipment as either spider detectors, which are modified Geiger-Mueller (G-M) detectors that are used to survey straight pipes; "snake detectors", which are also modified G-M detectors that are used to survey pipes with bends ('elbows'); or specialized gas proportional detectors, which are used to scan/measure residual radioactivity in small diameter, straight pipes. SEG offers surveying of pipes using these detectors on a contract basis. The detectors are not available as rental equipment.

To address NYSDOH's general comment #2 and NYSDOH's specific comment #7, the Army needs to decide if SEG's services (or another company that provides this type of specialized service, if one exists) will be used. The project scoping plan needs to be updated to state what we intend to do to address the interior of drain lines.

Concerning the project scoping plan comments from USEPA and NYSDEC, you will find attached to this memo all of the comments and responses that we have prepared to date. Please review them and indicate if the responses are consistent with what the Army is expecting. The significant comments and responses have been bolded. In general, most of the significant issues revolve around the selection of guideline values (as discussed above), how to address drain lines (also discussed above), the selection of receptor populations for the risk assessment (which have been changed from residential to recreational for future uses), and survey methodology.

Also please note that the proposed risk assessment for the future recreational exposure scenario includes groundwater exposure as a potential pathway.

I will contact you shortly to discuss the issues presented above so that the Final Draft Project Scoping Plan can be finalized and submitted to all of the parties involved.

TASK	PROJECT SCOPING PLAN SECTION AND PAGE	METHODOLOGY	BASIS FOR TASK / METHODOLOGY	INSTRUMENTATION
Ground Penetrating Radar Survey	4.2.1, p.4-4	survey each distinct EM-31 anomaly	screening tool	GSSI Subsurface Interfacing Radar, Sytem 3
Radon Soil Gas Survey	4.2.2, p.4-4 to 4-6	NaI downhole logging.	screening tool	Ludlum Model 44-62 gamma detector or industry standard slim-line borehole logging tool with NaI(Tl) crystal.
Classify Survey Units	4.2.3, p.4-9 to 4-11	MARSSIM	Most current guidance available, developped jointly by USEPA, NRC, DOE, and DOD. Likely to be finalized as early as September, 1997.	not applicable
Identify Site Specific Guideline Values	4.2.3, p.4-11 to 4-14	MARSSIM, except that the unity rule is replaced by selecting the lowest guideline value of any radionuclides that	Since the relative concentrations of contamination are not known, the unity rule presented in MARSSIM (and NUREG 5848) cannot be used until site data is available.	not applicable
Identify Survey Instrumentation	4.2.3, p.4-14 to 4-15	MARSSIM	Most current guidance available, developped jointly by USEPA, NRC, DOE, and DOD. Likely to be finalized as early as September, 1997.	ZnS for alpha, gas proportional for alpha and beta, and FIDLER or equivalent NaI with channel analyzers for gamma
Identify MDCs	4.2.3, p.4-15 to 4-17	MARSSIM and NUREG 1507	Most current guidance available, developped jointly by USEPA, NRC, DOE, and DOD. Likely to be finalized as early as September, 1997.	not applicable
Selection of Reference Area (Background data source)	4.2.3, p.4-17 to 4-19	MARSSIM and NUREG 1505	To identify a reference site from which background data will be collected and used in the statistical analyses of the site data.	not applicable
Scanning Surveys	4.2.3.1, p.4-19 to 4-22	MARSSIM. see Survey Comparison Sheet for specifics	To collect sufficient data to allow for site release, to demonstrate that areas are free of residual radiation.	See Identify Survey Instrumentation above.

Summary Sheet

TASK	SUFFICIENT TO FULFILL NUREG 5849 REQUIREMENTS	SUFFICIENT TO FULFILL MARSSIM REQUIREMENTS	CHANGES FROM CURRENT SCOPING PLAN / SIGNIFICANT ISSUES (FROM JUNE 26 MEETING OR FROM COMMENTS ON DRAFT FINAL SCOPING PLAN)	
Ground Penetrating Radar Survey	not applicable	not applicable	NONE	
Radon Soil Gas Survey	not applicable	not applicable	Dropped radon soil gas survey in favor of downhole gamma radiation survey	
Classify Survey Units	Yes, Class One and Class Two areas could be considered equivalent to Affected, and Class 3 to Unaffected	Yes	1) In Buildings 815/816, only the Hot Rooms are classified as Class One. The remaining areas of these buildings are now classified as Class Two. They will be up-graded to Class One only if a release is found to have occured in the Hot Rooms	CHECK
			2) A phased approach is now presented. If Class One Areas are free of radioactive contamination, areas classified as Class Two and Class Three will be down-graded to Class Three and Un-Affected, respectively.	CHECK
Identify Site Specific Guideline Values	Yes	Yes	1) NYSDEC will provide the guideline values for soil concentrations of radionuclides.	
			2) The interior release guidelines for fixed residual radiation will be used as the scanning guideline values.	CHECK
Identify Survey Instrumentation	Yes	Yes	Substituted "NaI detector" for "FIDLER or equivalent type detector"	
Identify MDCs	Yes	Yes	Table 4-4, Table Of Estimated MDCs, now uses estimated 4 pi geometry efficientcies, several instruments have been added (FIDLER, BICRON MicroRhem meter), and an Am-241 calibration source has been added to the list of available sources.	Action Itme:Have Am-241 c
Selection of Reference Area (Background data source)	not applicable	Yes	NONE	
Scanning Surveys	Class One areas: Yes, Class Two areas: Yes, except for floors and lower walls (if considered Affected), Class Three Areas: Yes	Yes	Most changes are for Class Two interior survey units, see Survey Comparison Sheet for specifics	

TASK	PROJECT SCOPING PLAN SECTION AND PAGE	METHODOLOGY	BASIS FOR TASK / METHODOLOGY	INSTRUMENTATION
Alpha and Beta Direct Measurements	4.2.3.2, p.4-22 to 4-24	MARSSIM. see Survey Comparison Sheet for specifics	To collect sufficient data to allow release to 10 mrem standard for exterior areas and 15 mrem or NYCRR Part 38 standards for interior areas	See Identify Survey Instrumentation above.
Exposure Rate Surveys	4.2.3.3, p.4-24 to 4-26	MARSSIM. see Survey Comparison Sheet for specifics	To collect sufficient data to satisfy release criteria.	BICRON microrem/hr meter. See Survey Comparison Sheet for survey details
Removable Radiation Surveys	4.2.3.4, p-4-26 to 4-27	MARSSIM	To collect sufficient data to allow release using NYCRR Part 38 standards for removable radiation.	Lab analysis of all LS samples and gross alpha/gross beta wipes.
Investigation of Radon Concentrations In Air	4.2.3.5, p.4-27	MARRSIM	To assess radon concentrations in affected buildings	Track-etch radon detectors
Special Measurements And Sampling	4.2.3.6, p.4-27 to 4-28	MARSSIM	To collect sufficient data to satisfy NYSDEC concerns and to characterize a 5,000 gallon UST located behind Building 804.	Peanut Probe, wipe samples
Surface Soil Sampling	4.2.4.1 p.4-28 to 4-30	MARSSIM, modified for the potential that exterior Class Two disposal areas are found to be Unaffected.	To collect soil data in those areas that are found to be affected, through scanning and/or preliminary surface and subsurface sampling, to statistically compare the area's data to reference data, and to determine if a site guideline has been exceeded.	Laboratory analyses.
Soil Boring Program	4.2.4.2 p.4-30 to 4-35	CERCLA	To characterize known and suspected disposal areas.	Laboratory analyses.
Test Pit Program	4.2.4.3 p.4-35 to 4-38	CERCLA	To characterize known and suspected disposal areas.	Laboratory analyses.
Surface Water and Sediment Program	4.2.5 p.4-38 to 4-41	MARSSIM	To determine if major drainage pathways have been impacted or are unaffected.	Scanning and laboratory analyses
Groundwater Program	4.2.6 p.4-41 to 4-43	MARSSIM and CERCLA	To characterize known and suspected disposal areas and to statistically compare site data to reference data	Laboratory analyses.
Ecological Investigation	4.2.7 p.4-43 to 4-47	CERCLA and NYSDEC	To complete an Ecological Risk Assessment	not applicable
Risk Assessment		CERCLA	To complete the Human Health Risk Assessment	not applicable

Summary Sheet

TASK	SUFFICIENT TO FULFILL NUREG 5849 REQUIREMENTS	SUFFICIENT TO FULFILL MARSSIM REQUIREMENTS	CHANGES FROM CURRENT SCOPING PLAN / SIGNIFICANT ISSUES (FROM JUNE 26 MEETING OR FROM COMMENTS ON DRAFT FINAL SCOPING PLAN)	
Alpha and Beta Direct Measurements	Class One areas: Yes, Class Two areas: Yes,except for floors and lower walls (if considered Affected), Class Three Areas: Yes.	Yes	Most changes are for Class Two interior and Class Three interior survey units	
Exposure Rate Surveys	Yes	Yes	Original plan called for using an NaI detector that was to be cross-calibrated to a PIC. Current plan uses a BICRON microrem/hr meter.	
Removable Radiation Surveys	Yes	Yes	NONE	Is Army going to use Ludlu
Investigation of Radon Concentrations in Air	Yes	Yes	NONE	
Special Measurements And Sampling	Yes	Yes	Original plan used a plumbers snake to obtain large area swabs, which were to be counted for gross alpha and gross beta radiations. Current plan uses a Peanut Probe for ducts and drain lines, which provides direct in-situ measurements of gamma radiations.	What does it measure?
Surface Soil Sampling	No	Yes	Buildings 815/816: If Hot Rooms are clean, and scanning of the earthen roofs reveals all as background, Class Two soil sampling will be performed (20 random for all roof soils). No surface soil sampling at Disposal Pit A.	All Class Two sampling unchanged.
Soil Boring Program	not applicable	not applicable	NONE	
Test Pit Program	not applicable	not applicable	NONE	
Surface Water and Sediment Program	No	Yes	NONE	
Groundwater Program	not applicable	Yes	NONE	
Ecological Investigation	not applicable	not applicable	NONE	
Risk Assessment	not applicable	not applicable	1) Added future on-site recreational visitor to possible exposure populations 2) Dropped all reference to future on-site resident 3) Dropped groundwater from further consideration (i.e. no pathways)	

Type of Survey	Area Classification	Draft-Final Scoping Plan Survey Schedule	Changes Proposed For Final Scoping Plan Survey Schedule	Rationale for Change	Meets NUREG 5849 Survey Requirements	Notes
Scanning Surveys	Class One (comparable to NUREG 5849 Affected	100% scan of floors, lower walls (to 2 m), pavement, roofs, exterior building surfaces to 2m from access points, horizontal (accumulation) surfaces above 2m, Hot Rooms, and exterior areas.	NONE		Yes	
Scanning Surveys	Class One (comparable to NUREG 5849 Affected	10% random scan of upper walls and ceilings in Buildings 803, 804, 805, and 819. 100% scan of upper walls and ceilings of Hot Rooms.	NONE		Yes, if lower walls and floors of Buildings 803, 804, 805, and 819 are clean.	
Scanning Surveys	Class Two (comparable to NUREG 5849 Affected)	100% scan of floors, lower walls (to 2 m), pavement, exterior building surfaces to 2m from access points, horizontal (accumulation) surfaces above 2m, and exterior areas.	For Buildings 815/816: if activity in Hot Rooms is less than 25% of the guideline value, then remainder of Buildings 815/816 surveyed at a density of one scan and measurement per 20 m^2, in 4m^2 grids (=20% coverage), of all surfaces.	Demonstrated that a release did not occur in the Hot Rooms.	No for lower walls and floors (if considered equivalent to Affected). Yes for all other surfaces.	Will reduce the scanning efforts by 80% for floors and lower walls.
Scanning Surveys	Class Two (comparable to NUREG 5849 Affected)	10% random scan of upper walls, ceilings, and roofs	For Buildings 815/816: if activity in Hot Rooms is less than 25% of the guideline value, then remainder of Buildings 815/816 surveyed at a density of one scan and measurement per 20 m^2, in 4m^2 grids (=20% coverage), of all surfaces.	Demonstrated that a release did not occur in the Hot Rooms.	Yes	Will double the scanning efforts.
Scanning Surveys	Class Three (comparable to NUREG 5849 Unaffected)	Interior surfaces below 2m: 10% of surface or 15 locations, whichever is greater, in randomly located 2m x 2m grids	NONE		Yes	
Scanning Surveys	Class Three (comparable to NUREG 5849 Unaffected)	Interior surfaces above 2m: 10% coverage in randomly located 1m x 1m grids	No scanning surveys for Class 3 areas, only limited scanning of areas where direct measurements are taken.	Follows NUREG 5849 guidance.	Yes	Will reduce scanning effort by approx. 85% for surfaces above 2m.
Scanning Surveys	Class Three (comparable to NUREG 5849 Unaffected)	exterior pavement: 10% of surface in randomly located 10m x 10m areas	NONE		Yes	
Scanning Surveys	Class Three (comparable to NUREG 5849 Unaffected)	exterior grounds: 10% of surface along survey lines that are separated by approximately 15 meters.	USRAD?, Aerial Survey?	??	Yes for current plan and USRAD, Maybe for aerial survey	

Type of Survey	Area Classification	Draft-Final Scoping Plan Survey Schedule	Changes Proposed For Final Scoping Plan Survey Schedule	Rationale for Change	Meets NUREG 5849 Survey Requirements	Notes
Direct Measurement Surveys	Class One (comparable to NUREG 5849 Affected	One location per scanning survey grid (see above), located in the area of the highest scanning survey reading	NONE		Yes	
Direct Measurement Surveys	Class Two (comparable to NUREG 5849 Affected)	One location per scanning survey grid (see above), located in the area of the highest scanning survey reading	For Buildings 815/816: if activity in Hot Rooms is less than 25% of the guideline value, then remainder of Buildings 815/816 surveyed at a density of one scan and measurement per 20 m^2, in 4m^2 grids (=20% coverage), of all surfaces.	Demonstrated that a release did not occur in the Hot Rooms.	No for lower walls and floors (if considered equivalent to Affected). Yes for all other surfaces.	Will significantly reduce direct measurement effort in Buildings 815/816 (approx. 80% reduction from current plan)
Direct Measurement Surveys	Class Three (comparable to NUREG 5849 Unaffected)	One location per scanning survey grid (see above), located in the area of the highest scanning survey reading	One measurement location (for total and removable radiation) per 50 m^2 of surface area or 30 random locations, whichever is greater.	Follows NUREG 5849 guidance.	Yes	Will probably double the direct measurement efforts in the Class Three interior survey units.
Exposure Rate Surveys	Class One (comparable to NUREG 5849 Affected	One location per scanning survey grid (see above), located in the center of the grid for interior measurements and located at each grid node or biased soil sampling location for exterior measurements.	NONE		Yes	
Exposure Rate Surveys	Class Two (comparable to NUREG 5849 Affected)	One location per scanning survey grid (see above), located in the center of the grid for interior measurements and located at each grid node or biased soil sampling location for exterior measurements, and at each sediment sampling location.	NONE		Yes	Work savings for scanning and direct measurements will be reflected in this task.
Exposure Rate Surveys	Class Three (comparable to NUREG 5849 Unaffected)	One location per scanning survey grid (see above), located in the center of the grid , and at each soil sampling and sediment sampling location for exterior measurements.	One location per direct measurement location (see above), and at each soil sampling and sediment sampling location for exterior measurements.	Follows NUREG 5849 guidance.	Yes	

Comments for
United States Environmental Protection Agency
(USEPA)
New York, NY 10007-1866
April 09, 1996

GENERAL COMMENT

Comment #1 Section 3 contains a review of existing data on which the current RI will expand. These include radionuclide concentrations in soil, sediment, groundwater, and surface water samples. As we have pointed out previously, the treatment of the soil data is flawed in that it ascribes annual radiation doses to individual samples. The Army contends in their response to comments that they are being conservative; we believe that the analysis is not meaningful.

Response #1 Agreed. All dose values have been deleted from the project scoping plan.

SPECIFIC COMMENTS

Comment #1 p. 3-22: The text attributes an exposure rate of 40-75 mR/hour to sample TP12A-1 and TP12A-2. It should read 40-75 μR/hour.

Response #1 Agreed. The text has been revised.

Comment #2 p. 3-23: The background exposure rate range is given as 10-15 mR/hour, rather than 10-15 μR/hour.

Response #2 Agree. The text has been revised.

Comment #3 Table 3-2B has multiple typographical errors, including misspelling of the word "exposure" and numerous misspellings of the abbreviation for disintegrations per minute (dpm), which appears as dmp.

Response #3 Agreed. The table has been revised.

Comment #4 p. 3-46, 3-47 and Table 3-4A: Annual radiation doses are calculated from individual soil samples and conclusions are reached relating individual sample concentrations to an annual dose equivalent clean-up criterion. These should be deleted. Equating an annual dose equivalent to a single datum is incorrect and not meaningful.

For example in Table 3-4A, the Army equates 1.6 pCi/g ^{226}Ra with a 88 mrem annual dose equivalent. In Table 3-14, a ^{226}Ra of 1.9 pCi/g is equated with a 141 mrem annual dose. Does this mean that the difference in the two, 0.3 pCi/g, results in the difference in the two dose estimates, i.e., 53 mrem? Note that in the USNRC NUREG 1500 guidance document on release criteria for site decommissioning, the

New York State TAGM dose equivalent limit of 10 mrem per year for the general public is achieved by reducing the ^{226}Ra soil concentration to 3.7 pCi/g above background. Two other dosimetric calculations illustrate the magnitude of the dosimetric error.

(1) Utilizing USEPA's health effects assessment summary table dose conversion factors for radium plus decay products, one can easily calculate an annual cancer risk of 6.74 E-06 from a 1 pCi/g soil concentration from the predominant pathway (external exposure). Multiplying this risk by the lower and upper range of the widely published risk per unit dose factors (4E-04-8E-04 per rem), the annual dose equivalent ranges from approximately 8 to 17 mrem based on the 1 pCig soil concentration.

(2) Federal Guidance Report Number 12(USEPA, 1993) lists dose coefficients for exposure to various layers of contaminated soil. For radium and its radioactive decay products, the significant dose is incorporated in the coefficient for its bismuth-214 decay product. Multiplying the 4.89E-17Sv-m3/Bq-s coefficient by 1 pCi/g and an assumed soil density of 1.6E3 kg/m^3 and applying conversion factors, one calculates a 9.1 mrem per year dose equivalent due to an infinite layer of 226Ra at 1 pCi/g. The calculated dose equivalents are lower when the coefficients for 1 com, 5 cm, or 15 cm layers are used, rather than the coefficient for the infinite layer of contamination.

On page 3-83, the text indicates that the soil concentration radium data at SEAD-63 is reflective of natural background. Yet the analysis of this "background data" results in dose equivalents which exceed the New York, State TAGM criterion. The response to comments indicates that this type of dosimetric analysis will not be used in the RI; however, its use is not appropriate in this document.

Recommendation: Soil concentrations should be presented and values which exceed the upper range of natural background should be pointed out.

Response #4 Agreed. All dose values have been deleted from the project scoping plan.

Comment #5 p. 3-54: The text states "...gamma radiation from ^{226}Ra and 2 of its associated radionuclides were found at concentrations ranging from 56 pCi/L..." Radionuclides have concentrations in media. Gamma radiation is energy emitted from some radionuclides and is not measured in media as a concentration.

Response #5 Agreed. The text has been revised and the word concentration ha been replaced with the word level.

Comment #6 p. 3-54: The MCL for ^{226}Ra is not 20 pCi/L; rather, the MCL for total radium (the sum of 226Ra and ^{226}Ra) is 5 pCi/L.

Response #6 Agreed. The text and tables have been revised.

Comment #7 p. 3-54: Text regarding annual doses based on gross beta concentration in water samples should be deleted. The dosimetry model used is not meaningful.

Previously, we have identified problems with the approach to groundwater dosimetry. We have pointed out the USEPA MCLs for radioactivity in drinking water are misinterpreted and are generating ingestion dosimetry which is not meaningful. This approach is still a part of the RI scoping document.
According to a response to a previously submitted comment, the Army intends to use "alpha and gamma spectral analyses...to quantify the site concentrations of K-40 as well as the radionuclides from the uranium, thorium, and actinium series. These results will then be used to compare the total beta emissions of these radionuclides to the gross beta radiations detected in the groundwater samples." Potassium-40 data should not be used in any comparison to the gross beta concentration data. The gross beta analysis is simply a screening measurement for man-made beta/gamma emitters. It is not intended to be use to evaluate radionuclide-specific concentration data of beta-emitters in the natural series.

Compliance monitoring for drinking water supplies calls for waters having greater than 50 pCi/L gross beta, 20,000 pCi/L tritium, and 8 pCi/L ^{90}Sr to be measured for additional man-made beta-emitters. Doses from each radionuclide of concern can then be calculated and summed using the dose per unit intake conversion factors (such as those published by USEPA in the health effects assessment summary tables (HEAST) for radionuclides. Note that naturally occurring beta-emitters (such as ^{226}Ra and ^{40}K) are not included in the dose assessment.

Response #7 Agreed. All dose values have been removed from the project scoping plan.

Comment #8 Tables 3-6A, 3-6B: As stated before, the data are not meaningful and the dose column could be deleted.

Response #8 Agreed. All dose values have been removed from the project scoping plan.

Comment #9 Table 3-10: Quantifying an annual dose from an individual sediment sample is not meaningful and the dose column could be deleted.

Response #9 Agreed. All dose values have been removed from the project scoping plan.

Comment #10 p. 3-66: It is stated that groundwater has been impacted by a release of radionuclides. It goes on to say that analysis of a duplicate sample failed to confirm the release and that the results were due to a laboratory problem. That being the case, one should not conclude that a release had occurred.

Response #10 Agreed. The text has been revised to indicate that the groundwater may be impacted by a release of radionuclides.

Comment #11 p. 3-83: Text regarding doses calculated from individual test pit sample data should be deleted. See Comment 4.

Response #11 Agreed. All dose values have been removed from the project scoping plan.

Comment #12 Table 3-14: For the reasons mentioned above, the dose column could be deleted.

Response #12 Agreed. All dose values have been removed from the project scoping plan.

Comment #13 Table 3-16: For the reasons mentioned above, the dose column could be deleted.

Response #13 Agreed. All dose values have been removed from the project scoping plan.

Comment #14 p. 3-91: The "calculated annual dose from the concentration of gross beta radionuclides in groundwater samples were below...4 mrem per year." should be deleted. The calculated doses are not meaningful.

Response #14 Agreed. All dose values have been removed from the project scoping plan.

Comment #15 Table 3-20: For the reasons mentioned above, the dose column could be deleted.

Response #15 Agreed. All dose values have been removed from the project scoping plan.

Comment #16 p. 3-98: Text regarding annual doses from the concentrations of radionuclides in the sediment samples should be deleted.

Response #16 Agreed. All dose values have been removed from the project scoping plan.

Comment #17 p. 3-116: Text states that "...presence of ^{226}Ra wastes in soils presents a significant radiological hazard due to the nature of...radon-222. In normal atmospheric conditions, ^{222}Rn exists as an inert gas." Radium-226 in soil may produce a significant radiological hazard, given a set of conditions relating to source strength, exposure pathways, occupancy patterns, land usage, etc. The text should be amended. Further, radon is an inert gas in any atmospheric condition, not only in a normal atmosphere as the text implies.

Response #17 Agreed. The text has been amended to include the wording in the comment.

Comment #18 p. 3-124f: Dermal contact with radon gas is not a potential exposure pathway, as indicated. Radon is solely an inhalation hazard.

Response #18 Agreed. The text has been revised.

Comment #19 pp. 3-124, 3-127: Sections 3.2.1.2.7 and 3.2.2.2.6 lists radon gas as an inhalation hazard to terrestrial biota. It appears unlikely that the carcinogenic potential of radon decay products is causing elevated incidences of lung cancer in any species of

terrestrial biota. There is no discussion on how this claim can be evaluated. It should be deleted.

Response #19 Agreed. The text has been revised to indicate that dust exposure is a potential pathway for current site workers and terrestial biota and that radon exposure is a potential exposure pathway for the current site workers.

Comment #20 p. 3-127, top: See comment 19.

Response #20 Agreed. The text has been revised and the reference to radon inhalation by hunted fauna has been removed.

Comment #21 p. 3-127, middle: See comment 19.

Response #21 Agreed. The text has been revised and the refcrence to radon inhalation by terrestrial biota has been removed.

Comment #22 p. 3-127, bottom: See comment 19.

Response #22 Disagree. The bottom of p 3.-127, Section 3.2.2.3, does not indicate that terrestrial biota are included in future exposure scenarios that are any different than those for current scenarios. The text has been changed, however, to indicate that radon is not a dermal contact exposure pathway.

Comment #23 p. 3-139: The text states that when high radiation screening measurements are found (above normal background levels), samples collected should be "subjected to more rigorous analytical techniques." The text does not explain what is meant by this. More importantly, (1) analytical techniques should be identical on all samples collected, and (2) if any additional "rigor" were applied to the analyses of a subset of samples, it would be the low activity, i.e., background samples which should be emphasized, since data at the low end will be used to release property for unrestricted use.

Response #23 Agreed. The text was meant to indicate that level one data screening is going to be used to identify if any sample matrix at a given sampling location shows any signs of a possible contaminant being present. As the USEPA is fully aware, many constituents can be present in discrete forms, such at debris collected from within a test pit excavation or a layer of stained soil from a soil boring. The level one field screening is intended to identify if there are any non-visual indications that a possible contaminant is present. If a level one screening measurement does indicate that a possible contaminant is present, than that portion of the sample matrix (i.e. that portion of the soil boring or area within a test-pit excavation) will be submitted for chemical and/or radiochemical analysis by a loboratory. The text has been revised and the word 'rigorous' has been removed.

Comment #24 p. 4-22: The text indicates that surface measurements will be compared to two screening levels. The first is the unit specific guideline value. This type of protocol is appropriate. However, the proposed program also intends to compare readings

made in the field to a daily flag value as a means of identifying surfaces with elevated quantities of radioactivity. This procedure should not be followed. The "daily flag" is based on several parameters, including detector efficiency and change from day to day. For example, the flag could fluctuate due to a malfunctioning detector.

Recommendation: The use of a daily flag should be deleted.

Response #24 Disagree. The use of the daily flag value is equivalent to setting an action level from MARSSIM guidance, or the ≤25% of the guideline level (for interior surveys) prescribed by NUREG 5849. The use of such a value is standard when planning and performing decomissioning surveys for radiation sites and it assures that the survey designs are sufficiently conservative to allow for release. Further, the use of a flag value is required by NYSDEC.

Comment #25 p. 4-25. The text states that survey instruments will be cross calibrated to a pressurized ion detector (PIC) on a daily basis. This is not necessary. The gamma scintillation detectors utilized should be field calibrated to a PIC. Once this is done, normal quality control monitoring of the scintillation detectors (e.g., voltage, background, battery, and source checks), can be used to determine the operability of the survey instruments. There is no need to continually repeat the PIC cross calibration.

Response #25 Acknoledged. Since the issue of the Draft Project Scoping Plan, the Army has identified the Bicron MicroRem/Hr meter as the instrument that will be used in the field. This instrument provides measurements in units of microrems per hour. The text has been revised to indicate that this instrument will be used for all exposure measurement surveys.

Comment #26 p. 4-54: See comment 26.

Response #26 This comment is not understood. If it was intended to refer to exposure rate measurements, there is no mention of exposure rate measurements on p. 4-54 of the Draft-Final Project Scoping Plan reviewed by the USEPA.

Comment #27 p. 4-56: See comment 27.

Response #27 Assuming the commentor was referencing Comment #25, Acknoledged. Since the issue of the Draft Project Scoping Plan, the Army has identified the Bicron MicroRem/Hr meter as the instrument that will be used in the field. This instrument provides measurements in units of microrems per hour. The text has been revised to indicate that this instrument will be used for all exposure measurement surveys.

Comment #28

Section 4 and Appendix D: The previous data (presented in Section 3) consist of 24 samples which have a mean ^{226}Ra concentration of 2.7 $\pm$ 4.8 pCi/g. Only two of the sample values clearly exceed the range of background (8.6 and 24 pCi/g, respectively) and only two other samples have ^{226}Ra concentrations greater than 2 pCi/g. Removing the 8.6 and 24 pCi/g samples (which clearly exhibit some degree of radium contamination) from the data set results in a 1.4 $\pm$ 0.4 pCi/g average, which is representative of a population of background data. The soil investigation at SEAD-12 (Section 4.2.4) will include collection of 540 samples for analysis of radiological parameters (from 47 borings, 26 test pits, and 318 surface soil locations). This effort will generate more than enough data to delineate the radium contamination which is suggested by the two elevated datum in the existing data set (if combined with subsurface gamma ray logging measurements). Yet, in addition to the comprehensive soils investigation, document proposes an extensive soil gas (i.e., radon) survey, the objective of which is to locate the extent of ^{226}Ra contamination in SEAD-12 soil.

The text states that the soil gas data "...will allow a delineation of source areas..." The text notes that assumption that radium is being transported downgradient of the disposal pit. The theory is that this transport will be evident in the radon gas contours which will be drawn from the radon gas survey data. However, there is no way to quantitatively relate, with reasonable certainty, the radon data to the soil radium concentration.

In a perfectly controlled environment, this type of study might have some merit. However, under field conditions, there is no way to predict the source of the radon gas relative to the measurement location in the unsaturated zone. An inert gas with a 3.8 day half-life, radon will travel through pores in the soil away from its point of origin. The transport will be affected by numerous parameters including barometric pressure, temperature, soil moisture, the presence of organic material, etc. For example, what would the "correct" conclusion be from a radon measurement three times that of an adjacent measurement? Perhaps, soil in the immediate vicinity contained a somewhat higher radium concentration. On the other hand, it may result from nothing more than the influence of the various parameters such as those mentioned above. The point is that one can not attain the stated objective, i.e., to determine the boundaries of source areas, from these data. This type of investigation is not generally used to delineate subsurface radium contamination. Rather, a combination of soil concentration data and surface and subsurface gamma ray flux measurements are collected and combined, resulting in a three dimensional picture of the contaminated soil.

The response to earlier comments on the plan for the soil gas survey was to state that radium and most of its decay products are primarily alpha emitters, which is incorrect (there are several alpha-emitters, but also several beta- and gamma-emitters). More importantly, as discussed above, the survey is not appropriate.

Recommendation: The radon soil gas survey should be deleted. It is unnecessary and will not provide the accurate, quantifiable data necessary to achieve the study objective. It is retained, technical literature, supporting its use, should be provided.

Response #28 Acknowledged. The radon soil gas survey has been deleted and replaced with a borehole gross gamma survey (using a NaI(Tl) detector). The proposed borehole gross gamma survey is detailed in the Geophysical Investigation section (Section 4.2.1) of the Final Project Scoping Plan. The proposed methodologies for obtaining the borehole gross gamma data are consistent with those described in the document "Estimate of Volume of Radium Contaminated Soil On Five Sites In Ottawa, Illinois, September-October 1988", Argonne National Laboratory publication ANL/ESH/TS-89/100. The gross gamma profiles for this survey will be collected from the same locations originally described for the soil gas survey. The gross gamma profiles will be used to qualitatively identify horizons of potential radium contamination. Following the completion of the soil sampling program, it might be possible to calculate a conversion factor to relate the gross gamma data (which will be recorded in counts per minute) to soil concentrations. The text of Section 4.2.1 has been revised appropriately.

Comment #29 p. D-4: The text states that groundwater which seeps into the void space created by the radon probe will be collected and that the radon concentration of the water will be measured in the field. The text offers no procedure for this measurement, nor does it indicate how the data will be evaluated. Will any quality control measurements be performed on these water analyses? How will the method distinguish between radon emanating from suspended sediment and radon which is actually dissolved in the water? If the data are to be used in the radiological site characterization, details are needed to describe how the data are to be generated.

Response #29 This section of Appendix D has been removed as the radon soil-gas survey has been deleted.

Comment #30 p. D-7: The text states that the radon detection instrumentation will be calibrated by the manufacturer. Unlike most hand held radiation detectors which can be response monitored in the field with check sources, radon detectors can not undergo calibration checks in the field. Blank measurements (ambient air) and duplicate measurements will be collected, but there will be no way to assure that the instrument is responding accurately. It is possible that the response of the instrument can shift, which would not be evident from duplicate measurements and may not be evident from blanks. This issue should be addressed in the text.

Response #30 This section of Appendix D has been removed as the radon soil-gas survey has been deleted.

Comment #31 p. D-8: The text states "The acquired vapor phase concentrations are evaluated to determine the relationship between soil gas and source soils." Radon is an inert gas. The term "vapor phase" is incorrect.

Response #31 This section of Appendix D has been removed as the radon soil-gas survey has been deleted.

RADIATION AND INDOOR AIR BRANCH

Comment #1 — It should be acknowledged that the MARSSIM document referenced and used in this Scoping Plan is currently draft. It is undergoing review within each contributing agency as well as by the public until July 1997 and is not yet official for reference. As such, it should not be used, cited, or quoted from in any report or work document. Until the guidance given in MARSSIM is finalized, which the MARSSIM workgroup anticipates may be December 1997, the NUREG guidance should be considered an applicable or relevant and appropriate requirement (ARAR). This may be a minor issue to correct since it appears that little more than terminology has been borrowed from MARSSIM. However, there is still concern on that account.

Response #1 — Disagree. Many EPA regions, as well as many other federal and state agencies, including NYSDEC, recommend using MARSSIM. And NUREG 5849 is also only a draft document. which will likely never be finalized. Futher, MARSSIM was developped in part by the USEPA. It would only stand to reason that such a guidance be used in-lieu of one which is not used by the USEPA, nor likely to ever be released as a final document. In addition, MARSSIM deals more with establishing minimum data requirements and the treatment of collected data, rather than on survey design. If the commentor had compared the proposed work to the guidance provided in both MARSSIM and NUREG 5849, he or she would have seen that the quantity of data proposed meets MARSSIM requirements and most of NUREG 5849 requirements. For those areas where the proposed work does not fully meet NUREG 5849 requirements, this is because the classification scheme of NUREG 5849 is not flexible. The quantity of data required by NUREG 5849 can not be proportionately adjusted to such levels that are comensurate with the actual use and design of facilities such as the storage and maintainance facilities at SEDA. MARSSIM provides such mechanisms so that an effective use of available resources can be acheived. This was one of the primary objectives in developing MARSSIM.

Comment #2 — NUREG 5849 (and the previous incarnation of the Scoping Plan) use the terms Affected and Unaffected Areas to describe the level to which an area has been or is suspected to have been impacted by radioactive contamination. MARSSIM, on the other hand, classifies areas as either impacted or non-impacted. An impacted area is further sub-categorized as being either Class 1, Class 2, or Class 3. The current Scoping Plan adopts this nomenclature in its classification of the AOCs. We recommend the use of terminology that is consistent with the NUREG documents.

Response #2 — Disagree. See response #1 above.

Comment #3 — The Scoping Plan does define these terms as they apply to site areas. Unfortunately, in their attempt to modify the document to fit MARSSIM, the Army appears to be indecisive about the true condition of the site. For example, SEAD-63 goes from having been "moderately impacted by Ra-226" in the previous Scoping Plan (p. 3-92) to "Possibly...impacted by Ra-226" in the current version (p. 3098).

Why the change? The Army should be consistent in its characterization of site condition. Furthermore, the classification of the AOC should be consistent with the site condition.

Response #3

Acknowledged. As stated in the comment, the current classification of the AOC is consistent with the site condition. It is classed as a Class Two Area. Whether moderately or possibly impacted, a Class Two area will receive the same level of effort.

Comment #4

Moreover, when using NUREG 5849, guideline values for surface contamination in structures should be supported with risk analysis modeling (RESRAD-Build is one such program) to show that the desired level of risk has been attained before any structures are released for unrestricted use. Additional guidance may also be found in the NRC document Residual Radioactive Contamination from Decommissioning, NUREG/CR-5512.

Response #4

Disagree. The guideline values that will be used to show that a structure can be released, whether restricted or unrestricted (which will be determined after the data have been collected and analysed), will be those that are shown in Table 4-3 of the project scoping plan. If additional radionuclides, which are not currently listed, are identified during the surveys, the guideline values that will be used will be taken from the same sources as those shown on Table 4-3: the New York State Department of Labor Part 38 release criteria and the building guidelines taken from NUREG 1500, Appendix B, Column 2. The latter guidelines are calculated from the dose algorithms contained in the NRC document Residual Radioactive Contamination from Decommissioning, NUREG/CR-5512.

Comment #5

In the event that the structures are found to possess residual radiological contamination, it is our recommendation that the affected areas (buildings and otherwise) be remediated such that the combined residual radioactive materials are present at concentration levels which express a combined excess lifetime risk, at a point of exposure, to an average individual no greater than between 10^{-4} and 10^{-6} (40 CFR 192.20).

Response #5

Disagree. See response #4. Also, the NYS Depratment of Labor criterial are promulgated standards that appear in the New York Code of Rules and Regulations. And the NUREG 1500 guidelines are dose based values that were calculated using the dose models and formulas in the NUREG guidance document suggested by the USEPA in comment #4 above. It should also be noted that the guideline values used from NUREG 1500, Table B2, are calculated to show the release criteria for a 15 mrem/year exposure limit. These values are therefore consistent with the EPA guidance value of 15 mrem refered to in the April 22 series of comments (general comment # 3B).

HAZARDOUS WASTE SUPPORT SECTION

Comment #1 The Revised Draft Scoping Plan for SEADs 12 and 63, dated November 1996, has been reviewed by this office. Following are comments generated upon review of this document, which includes SEDA's individual responses to prior EPA concerns as provided in Appendix K. These documents were transmitted to SEDA in July 1996 for SEAD 12 and in October for SEAD 63.

Response #1 Agreed.

SEAD 12

All previous comments have been addressed except for those that follow.

Comment #1 The issue regarding the Army's proposal to modify existing NYSDEC CLP analytical methods for certain constituents remains unresolved. The method modifications would result in a ten-fold reduction of current detection limits, thus demonstrating compliance with groundwater standards. In EPA's letter dated 11/15/96 to SEDA, the specific requirements which must be addressed in order to obtain approval of the modified methods, were delineated. EPA is awaiting response on this issue which will impact the Scoping Plan for SEAD 12. If the Army has reconsidered their prior proposal and will not have their lab modify the existing NYSDEC CLP methods, then the resultant data for certain compounds will be reported at concentrations exceeding the corresponding ARARs. This applies to prior EPA comment 2b and 3a.

Response #1 Agreed. The proposed modifications to the NYSDEC CLP methods are now contained as an addendum to the Chemical Data Acquisition Plan in Appendix F of the project scoping plan.

Comment #2 The response to prior EPA comment 10b requires further information. SEDA has stated that the NYSDEC ASP Category B deliverables package will be provided for data acquired by Method 524.2 in order to validate as per the NYSDEC data validation methods. A copy of the validation methods/procedures to be used on this data is to be included either in this Scoping Plan or in the Generic RI/RS Workplan.

Response #2 *Disagree. The original response eroneously stated that NYSDEC data validation methods would be used. This is incorrect. The validation procedures used are those that the USEPA stated the Army must use; the USEPA's functional guildelines for data validation. As for the validation procedures for the Method 524.2 groundwater analyses, which the USEPA requires the Army to perform, these data are validated using the same functional guidelines that are used for CLP data. Where the 524.2 data package is deficcient for some of the specific aspects of the CLP validation process (such as different surrogate compounds), professional judgement is used and the information provided in the 524.2 data package is applied as best as possible to the functional guidelines used in the CLP data validation.*

Comment #3 Prior EPA comment 10b has not been fully addressed. The intended use of the acquired TCLP data for 12 of the subsurface soil samples must be documented in this Scoping Plan. The most common reasons for performing the TCLP are: determining if an unknown waste is hazardous according to 40 CFR261.24, determining what type of disposal (hazardous or solid waste) is appropriate, demonstrating the effectiveness of treatment processes to comply with Land Disposal Restrictions, or fulfilling shipping or transportation requirements. An inappropriate use of the TCLP is for risk assessments. The TCLP model does not assess risk when potentially TC waste is disposed in any matrix except with garbage into sanitary landfills. The proposed TCLP analyses must be carefully evaluated and if deemed necessary, explicit justification is to be provided in the Scoping Plan. Additional information regarding TCLP may be found in EPA-902-B-96-001, revised June 25, 1996.

Response #3 Agreed. The TCLP data will not be used in the risk assessment. The TCLP data will be used to determine the leachability characteristics of any wastes that are identified, and will also be used for the feasibility study. Its uses will also be applied to the reasons for performing the TCLP listed in the comment.

Comment #4 Section 4.4, Data Reduction, Assessment and Interpretation does not specifically delineate the procedure(s) that will be used to validate, assess and interpret the collected radiological data. Components of this plan of action are partially included on pgs. 3-140 thru 3-142 and in the Discussion on MDCs on pages 4-15 thru 4-17. Topics to be addressed may include but are not limited to: identification of the personnel to perform the validation of the collected radiochemical data, definition of the required information to be provided to the validator from the laboratory (specified in the contract and in the laboratory method's SOPs), definition of the flexibility necessary to optimize/streamline the process, specification of the data validation tests (quality control, detection, and unusual uncertainty) and performance criteria (statistical confidence intervals and/or fixed limits) deemed appropriate to achieve this project's objectives, identification of data qualifiers, definition of how final qualifiers are assigned, and definition of the final content of the validation report.

Response #4 TO BE DONE

Comment #5 **Many of the contracted laboratory's certifications expire on 4/1/97. Documentation of renewed certification must be provided for all analytes of interest from all contracted labs involved in this investigation and any other sampling done at SEDA.**

Response #5 **Agreed. The two laboratories that are currently identifed to perform the radiological analyses, Core Laboratories and the Army's IDRL Nuclear Counting Laboratory at the Red Stone Arsenal will be certified for the analyses they will be contracted to perform.**

SEAD 63
All previous comments have been addressed except for those that follow.

Comment #1	Comment 1 above also applies to SEAD 63 (see prior EPA comment 1b).
Response #1	See response to comment #1 above.
Comment #2	Comment 2 above also applies to SEAD 63 (see prior EPA comment 9b).
Response #2	See response to comment #2 above.
Comment #2	Comments 3, 4, and 5 above also apply to SEAD 63.
Response #3	See responses to comments #3,4, and 5 above.

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contains a table of radionuclides included in the definition of gross beta and photon emitters; it excludes the radioactive daughter products ofthorium-232, uranium-235, and uranium-238 (which include the bismuth and lead beta-emitters which are the subjects of the document's beta radiation model).

In 1991, proposed revisions to the drinking water regulations for radionuclides were published in the Federal Register; they have never been adopted. In the proposed revision, beta and photon-emitting radionuclides are still referred to as man-made, although the USEPA proposed monitoring Pb-210 as an unregulated contaminant. Two monitoring alternatives are presented, but they both continue to consist of quantifying gross beta, tritium, and strontium concentrations (they do not include decay products of the natural series, such as the decay products of Ra-226). The wording in 40 CER 141.16 is clear - the MCL for beta particle and photon radioactivity applies to man-made radionuclides,

The comparison of SEDA groundwater data to existing and proposed drinking water standards is flawed. In addition to the beta/gamma 4 mrem standard, the USEPA has set a MCL specifically for Ra-226. (The existing MCL for the sum of Ra-226 and Ra-228 is 5 pCi/L; the proposed standard relaxes the MCL for each radium isotope to 20 pCi/L.) The radium MCLs incorporate the radiological significance of the decay of all radiations resulting from ingestion of the radium parent, including the bismuth and lead beta emitters. Segmenting out the beta emitting decay products of Ra-226 and comparing the resultant dose equivalent to the MCL established for manmade beta and gamma emitters is inappropriate. Further, the dosimetric impact from beta particles following ingestion of radium is minimal compared to the total dose from radium ingestion (which is primarily due to the interaction of alpha particles with skeletal tissue). In short, the USEPA has set a specific MCL for radium (which accounts for the dose from radium and its decay products. The drinking water regulations are not intended to regulate radium twice (once with the radium-specific MCL and a second time with the beta/gamma MCL).

Response #2 Agreed. All dose values have been removed.

Comment #3 It is stated that the computer code RESRAD will be used in the RI. The RESRAD code is acceptable for use provided the following modifications are made:

A) **Whenever applicable, default. parameters cited in OSWER Directive 9285.6-03** ***Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"*****, March25, 1991 and** ***Risk Assessment Guidance for Superfund (RAGS)*** **should be substituted in the RESRAD code.**

B) Section 4.6.3.1 Contaminated Zone Parameters of the *Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD, Version 5.0* gives 30 mrem/year as the radiation dose limit. EPA guidance recommends an upper limit of 15 mrem/year (equal to approximately 3 x 10-4 carcinogenic risk). The parameter for radiation dose limit in RESRAD should be modified to read 15 mrem/ year.

C) After the RESRAD program has been run, the Army's report to EPA should include the Health Risk Report (INTRISK.REP FILE) and the Summary Report (SUMMARY.REP FILE). In addition, EPA needs a copy of the input parameters on diskette.

D) Erroneous results can be generated by RESRAD users if they have not been trained at a DOE sponsored workshop (taught by the individuals from Argonne National Laboratory who wrote the RESRAD code). It is recommended that the Army request that Argonne National Laboratory run the RESRAD code for SEADs 12 and 63.

Response #3 **A) Acknowledged. As agreed to during the June 26 meeting between the Army, NYSDEC, and the USEPA, the RESRAD code will be run by NYSDEC to determine what the exterior guideline values will be. NYSDEC will use their default paramters when using RESRAD. It should be noted that a preliminary review of the default factors for Ra-226 in the RESRAD Version 5.62 indicat that the program uses the same exposure factors as those in the HEAST and EPA Dose Conversion Factors Federal Guidance Report #11 documents.**

B) Acknowledged. However, it is very likely that NYSDEC will use an upper limit of 10 mrem per year for the RESRAD dose limit. The radiation dose limit in RESRAD is used only to derive soil giudelines. When the RESRAD code is used to calculate doses, this parameter is not used by the program.

C) Agreed.

D) Acknowledged. The persons using the program within the Army, or on the Army's behalf, will be sufficiently familiar with dose modeling/assessment to ensure that erroneous data is not reported.

Comment #4 There is an extensive body of literature on the population dose from sources of natural background radiation. One authoritative text, *Environmental Radioactivity,* states that an individual will receive 13.9 mrad per year from I pCi/g of terrestrial U-238 in equilibrium with its decay products over an infinite plane (Eisenbud, 1987). The National Council on Radiation Protection and Measurements ~CRP) published the same value in *Exposure of the Population in the United States and Canada from Natural Background Radiation, NCRP Report No.94* QJCRP, 1987). In that document, the NCRP states that the average U.S. and Canadian resident receive 28 mrem per year from all terrestrial radionuclides combined. Average concentrations of uranium and thorium series nuclides fall in the 0.8-1.8 pCi/g range.

The RESRAD results which appear in the SEDA documents equates annual dose equivalents of as high as 75 mrem per year to one pCi/g of Ra-226 in soil; For example, annual dose equivalents of 1342 mrem and 492 mrem are attributed to 24 pCi/g and 8.6 pCi/g of Ra-226, respectively; The RESRAD results with these high dose equivalents

indicate that they are not accurate assessments of the dosimetric impact of radium in soil due to their variance with scientifically valid, peer-reviewed dosimetric data.

Response #4 Acknowledged. The dose values have been deleted from the project scoping plan.

Commend #5 The RESAD values lead to problems when they are compared to ARARs. For example at site SEAD-63, soil sample TP63-9 contained 2 pCi/g of Ra-226, a concentration which could be due solely to natural background[1]. Based on the flawed dosimetry described above, an annual dose equivalent of 150 mrem is attributed to this sample, half of which is suggested to be an "above background dose." That being the case, one would conclude that the "extra" 1 pCi/g of radium, in addition to the 1 pCi/g from background sources, would cause an additional 75 mrem annual dose equivalent, or 75% of the 100 mrem per year limiting acceptable dose equivalent set for members of the general public by the Nuclear Regulatory Commission, Department of Energy and others. This is simply not the case, as supported by the published relationship between terrestrial radionuclide concentration and dose referenced above. Based on this alleged "dose,"[1] the document erroneously concludes that the 2 pCi/g datum is evidence that SEAD-63 soil has been moderately impacted by radium contamination.

[1] The background concentration of any naturally occurring radionuclide is represented by a range, not a single value. While 2 pCi/g is approximately 2.5 times the frequently published value of 0.8 pCi/g for Ra-226, it is possible that such a concentration could occur in the absence of any technologically enhanced Ra-226.

Response #5 Agreed. The dose values in the project scoping plan have been deleted.

SPECIFIC COMMENTS

General Response: Most of these comments are copied from the USEPA's comments on the Draft version of the project scoping plan. Almost all of the page and paragraph references provided below (by the USEPA) refer to pages and paragraphs in the Draft Document and not the Draft-Final document. Although the Army is providing responses to these comments to address what the Army sees as the source of the USEPA's concerns, many of these comments were apparently submitted without reviewing the Draft-Final project scoping plan, which was supposed to have been the document reviewed by the USEPA. The Draft-Final project scoping plan contained many updated paragraphs which were modified from the Draft version based on USEPA comments.

Comment #6 Page 3-36, Table 3-4A and elsewhere: 40 CFR 192, or UMTRCA, is cited as an ARAR. The USEPA has specifically chosen not to use the 15 pCi/g standard for the subsurface at many CERCLA sites. Therefore, the documents should be amended to delete that reference to the 15 pCi/g subsurface radium standard.

Response #6 Agreed. The tables have been revised and all mention of the 15 pCi/g standard have been deleted.

Comment #7 Page 3-110: The statement that "The presence of ^{226}Ra wastes in soils presents a significant radiological hazard due to.. ,radon" is an exaggeration. Obviously, radium is the source of radon gas which could cause an inhalation hazard in a structure built on top of or adjacent to radium-contaminated soil. However, given the conditions described at SEDA, it does not seem appropriate to describe the radon hazard as having radiological significance.

Response #7 See response to EPA comment #17, dated April 9, 1997, above.

Comment #8 Figure 3-20 and Figure 3-21: In addition to ingestion, inhalation, and dermal contact, the potential for "direct exposure" should be added as a possible exposure route for radionuclides.

Response #8 Agreed. Direct exposure has been added as a possible exposure route for the soil, goundwater, and surface water and sediment secondary sources as well as those already identified.

Comment #9 **Page 3-54: To assess the dose equivalent from the potential ingestion of Seneca groundwater, one can simply measure the concentration of the radionuclides of concern and utilize the ingestion slope factors published by USEPA. Continued use of the "beta dosimetry" model will continue to fail to properly evaluate the dosimetric consequence of the groundwater data.**

Response #9 **Aknowledged. All dose values have been removed from the project scoping plan. Use of the ingestion slope factors will be considered as an ARAR when site data are tabulated for presentation in the RI report.**

Comment #10 Pages 3-123 and 3-124, Section 3.2.4: The intent of this section is unclear and the potential receptors identified are inconsistent with those identified in prior sections. Consideration should be given to eliminating this section.

Response #10 **Disagree. This section describes the exposure assessment assumptions that will be used in the conceptual site model for the risk assessment.**

Comment #11 **Page 3-124: Rather than using the actual data values, exposure point concentrations are often best estimated by computing the upper 95 percent confidence limit of the arithrnetic mean of the log transformed data.**

Response #11 **Disagree. Parsons has worked closely with EPA Headquarters to develop a conservative and realistic methodology for selecting EPCs. The methodology presented is consistent with draft EPA Headquarters guidance on this topic. Futher, the Army believes that the methodology proposed is a better way to evaluate EPCs, rather than always selecting the 95th UCL of the geometric mean. The proposed methodology assures that a conservative value is selected from either the 95th UCL of the arithemetic or geometric mean and the maximum detected value. However, the**

selected EPC will never be greater than the maximum detected value. Using the 95th UCL of the geometric mean as the EPC would often result in the EPC being greater than the maximum detected value if the data set had few positive detections and/or most of those detections were below the contract required quantitation limit.

Comment #12 Section 3.6 (3.6.1, 3.6.2, and 3.6.3): One goal described for the remedial investigation is to determine the distribution coefficients for ^{226}Ra and ^{238}U. The document should indicate how knowledge of this parameter will be used in the feasibility study.

Response #12 This data may not be used in the FS. The intended use of this data is presented in Section 4.2.8.1

Comment #13 Section 4.4: If sampling takes place before MARSSIM becomes final and NUREG guidance is used; the following comment applies:

A) The radionuclide data for SEAD-63 was consistently at or very near the background range. The extensive sampling/investigation planned does not seem appropriate. A more reasonable investigation protocol would consist of an exposure rate scan (&ground level) of the area; collection of soil samples in areas where the exposure rate exceeds a pre-set limit, such as twice background; and scanning all soil samples collected for radiological parameters with a GM pancake detector, or equivalent, to identify subsurface radiological contaminants.

If sampling occurs after MARSSIM becomes final, the following comment applies:

B) The investigation of SEAD 63 should be designed to be consistent with the MARSSIM survey criteria. The approach described in MARSSIM enables the investigator to review existing data and classify an area as "impacted' or non-impacted". Impacted areas are further classified based on a comparison to derived concentration guideline levels (DCGLs), which are residual levels of radioactivity that correspond to allowable radiation dose standards. For naturally occurring radionuclides such as the radionuclides of concern at SEDA, the DCGLs refer to average levels above appropriate background levels.

Without knowledge of the DCGL values for SEDA radionuclides of concern, it is not possible to conclude whether SEAD 63 can be designated as a non-impacted area, a Class 2 impacted area, or a Class 3 impacted area. Section 4 of MARSSIM states that areas that have no potential for residual contamination do not require any level of survey coverage and are designated as non-impacted areas, these may. be released for unrestricted use. Characterization surveys are necessary for Class 2 and 3 impacted areas.

Response #13 A) MARSSIM is being used, and this comment will not be addressed.
B) Agreed. The project scoping plan for SEAD-63, as well as for SEAD-12, was designed to meet the MARSSIM requirements for release based upon the infromation that is available for these sites.

Comment #14 The first paragraph states that the scenarios evaluated in the baseline risk assessment will be based on the community reuse plan and that the Generic Installation RI/FS workplan will be revised when the community reuse plan is written. If the Army plans to include scenarios in the Risk Assessment that are not currently addressed in the Generic Installation RI/FS workplan, revised text to the workplan should be proposed by the Army and agreed to by EPA before the risk assessment is completed and submitted for regulatory review.

Section 4.4 BASELINE RISK ASSESSMENT of the Generic Installation RI/FS workplan states, "in an attempt to reduce quantitative recalculations, a risk assessment workplan and a pathway analysis (as two separate and consecutive deliverables) will be submitted to the USEPA, Region II for review before proceeding with quantitative aspects of the evaluations."

We strongly urge the Army to follow through with this task, which will ultimately save DoD, EPA and NYSDOH time and resources. These deliverables would have been beneficial before the Risk Assessments for SEADs 25, 26, 16 and 17 were submitted to EPA.

Response #14 **Disagree. Section 4.5, Baseline Risk Assessment, states that Risk Assessement Guidance for Superfund (RAGS) will be used to for the risk assessment. The potential exposure pathways (pathway analysis) are presented and discussed in Section 3.2, Preliminary Identification of Receptors and Exposure Scenarios. This section (Section 3.2) also includes discussions on the exposure assessment assumptions and the selection of exposure point concentraitons that will made for the risk assessment. Section 4.5 has been revised to explicitly indicate that the information in Section 3.2 will be used in the risk assessment.**

It should be noted that SEAD-12 and SEAD-63 are both in an area that the community reuse plan intends to setup as a wildlife conservation area. This future intended use was developped by the Local Redevelopment Authority (LRA). Therefore, as requested in the comment, the future exposure pathways that are now presented in Section 3.2, and which will be evaluated in the risk assessment, are consistent with this future intended use. Specifically, the risk assessment for future scenarios at these sites will only consider potential exposure to a recreational visitor population.

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Response to Comments for
The New York State Department of Environmental Conservation (NYSDEC) and
the New York State Department of Health (NYSDOH)
Draft Final Scoping Plan for Conducting RI/FS at Sead 12 and 63
Seneca Army Depot Activity
Romulus, NY
March 1997

General Comments:

Comment #1 Records: The currently available documents have been adequately summarized in the draft final report. The release of the additional documents is appreciated. We strongly urge the Army to continue to review and declassify all relevant records and reports regarding use of radioactive materials and any potential emissions or accidental releases of these materials to the grounds, water or air, on or off the base.

Response #1 Acknowledged.

Comment #2 Guidance Documents: The use of the Draft MARSSIM and NUREGs referenced in this version of the plan is seen as a substantive improvement. We do have a question regarding the use of NUREG-5849 vs. The Army Generic Survey Plan. As a result of the August 1996 meeting at the base, our understanding was that it was actually the Army survey plan that was being used as a basis for this plan, not NUREG-5849, and that the Army plan was generally based upon that NUREG. After a review of the Army plan it is obvious that it is indeed based on NUREG-5849, but with much editing. What we would like to know is if the Army Generic Survey Plan is still considered as a guidance document for this plan, or if it has been dropped in favor of the NUREG and MARSSIM guidance documents. Please send a brief explanation of this subject to our attention.

Response #2 Acknowledged. As discussed at the June 26 meeting between NYSDEC, USEPA, and the Army, It was explained that MARSSIM was used to prepare the SEAD-12 and SEAD-63 Project Scoping Plan.

Specific Comments:

Comment #1 Page 3-54, Radionuclides: The last three sentences are unclear. It appears that the gross beta analysis used to calculate the H-3 content, and this was then compared to the New York Class GA Gross Beta Criteria of 1000 pCi/l. Since most Gross Beta analytical methods have comparatively low efficiencies for the low H-3 beta energy, it is an extremely ineffective way to calculate H-3 concentrations. Please clarify this in the final approach.

Response #1

Agreed. Tritium was analyzed for during the ESI. The gross beta analysis was not used to calculate the H-3 content. Since H-3 is a beta emitter, and since their is no specific NYS Class GA Tritium guideline, it was believed appropriate to compare the H-3 analysis results to the NYS Class GA standard for gross beta radiations for the purposes of the ESI (which was to determine whether a threat existed from the detected levels of radionuclide emissions). The text has been revised to state this information.

Comment #2

Section 3.2.3, Exposure Assessment Assumptions: The application of the basic statistical tests chosen seems both legitimate and appropriate. Indeed, the Wilcoxon Ranked Sum in many cases may be more sensitive to differences between independent populations than a parametric t-test. However, we have some specific concerns in regards to certain aspects of the proposed procedures.
The Plan states on page 3-128 that it will use two basic statistical measures as criteria for making determinations concerning analyses. I used both detection frequency and 95th upper confidence limits to define the Reasonable Maximum Exposure (RME) and Central Tendency (CT), presuming data to be either normally distributed or log-normally distributed.

The whole idea behind using nonparametric statistical procedures is that the shape of a distribution need not be known. It is true that many data distributions normally found in the environment are observed to be log-normal, however, this is certainly not always the case. Before using REM and CT, which presumes a log-normal distribution, it is necessary to demonstrate that this distribution is appropriate for you data.

Should it not be possible to fit the data to any selected distribution (e.g., the chi-square test), utilization of such measure might lead to misleading interpretations. One needs to examine distribution not only to determine their basic form, but also to make sure that one is not dealing with bimodal distributions, etc.

Concerning methods used for selecting the REM and CT values presented for each of three different detection frequencies for analyses: It is stated in the Plan on page 3-129 that for chemicals with 50% or greater detects, the log-transformed data 95% UCL and the maximum detected value are compared and the RME is selected as the lesser of the two. The CT is the lesser of the log-transformed mean and the maximum detected value.

First, an assumption seems to be made that using log-transformed data will somehow protect against all biases introduced by ignoring censored data. Nothing is stated about how censored data will be handled. There are many methods for dealing with these data points; for instance, actual results that are less than the MDA can be used, a zero value can be used for all nondetects, all nondetects can be ignored and left out of the data set, or a linear regression can be used to calculate a value for nondetects based upon their frequency. No matter which method is chosen the way that censored data will be handled is significant and can bias results. An explicit description of how these data will be included in the analyses should be provided.

Next, page 3-129 states that the CT value will be determined as the lesser of the log-transformed mean and the maximum detected value. We do not understand the utility of generating a measure of central tendency using a maximum detected value. If we read this correctly, the maximum detected value could not possibly be less than a log-transformed mean value of the data --- the mean value, whether log-transformed or not, will always be less than the maximum value, unless there is only a single value. A clear explanation of this point is necessary before we are able to judge the appropriateness of this measure.

The same sort of objection as above concerning the derivation of the CT value holds for cases with other detection frequencies as well, as described on pages 3-129 and 3-130. The use of non-parametric analyses of environmental pollutant data is the right approach, but a more detailed explanation of the concerns expressed above is needed.

Response #2 **Disagree. The text states that the statistical analyses will be performed in order to determine whether the detected concentrations of radionuclides and inorganic elements is distinguishable from background or not. Once a constituent has been determined to be present at concentrations (on site) that are distinguishable and above background, the RME and CT levels that will be used in the risk assessment for that constituent will be determined using the selection criteria that are described in Section 3.2.3, Exposure Assessment Assumptions. These selection criteria assure that conservative and realistic exposure point concentrations (EPCs) are selected. Specifically, the EPC selection criteria that are presented ensure that an EPC is not selected, for any given analyte, at a concentration that is above the maximum detected concentration.**

It should be noted that the text as been changed to indicate that the CT EPC will be the same as the RME EPC. All other aspects of the CT assessments will not be changed (i.e. exposure frequencies, exposure factors, etc..)

Comment #3 Table 6-1: Is the time line depicted by this table current? Specifically, has all of the GPR and EM survey work for SEAD-12 been completed? If not, the table should be updated.

Response #3 Agreed. The EM survey has been completed. *The timeline has been revised to reflect the current estimated start date of* _____

Comments from NYSDOH's Bureau of Environmental Radiation Protection

General Comments

Comment #1 **Radon in Soil Gas:** The proposed plan includes a substantial number of soil gas samples to screen for potential radium contamination. While this type of screening has been used at other sites contaminated with Ra-226 it has not been explained how military "components" containing Ra-226 which are presumably

intact or at least not dispersed, provide a sufficient source term to pin point the burial location.

Other factors, such as radon background variability, emanation rate, soil permeability, soil moisture content, soil Ra-226 concentration, and underlying bedrock can cause soil gas measurements to be highly variable. In New York State, soil gas measurements have been shown to vary by hundreds to thousands of pCi/l.

Given the possibility of variable levels of radon in soil gas; what guideline value above background will be used to trigger an area to be included for further study?

What other means will be employed to localize the buried components if the radon in soil gas method is inconclusive.

Response #1

Agreed. The soil radon survey has been dropped in favor of a borehole geophysical survey using a NaI(Tl) borehole tool. The proposed borehole gross gamma survey is detailed in the Geophysical Investigation section (Section 4.2.1) of the Final Project Scoping Plan. The proposed methodologies for obtaining the borehole gross gamma data are consistent with those described in the document "Estimate of Volume of Radium Contaminated Soil On Five Sites In Ottawa, Illinois, September-October 1988", Argonne National Laboratory publication ANL/ESH/TS-89/100. The gross gamma profiles for this survey will be collected from the same locations originally described for the soil gas survey, except only 5, rather than 10, background locations will be surveyed. The gross gamma profiles will be used to qualitatively identify horizons of potential radium contamination. Following the completion of the soil sampling program, it might be possible to calculate a conversion factor to relate the gross gamma data (which will be recorded in counts per minute) to soil concentrations. The text of Section 4.2.1 has been revised appropriately.

Comment #2

Building 815 & 816 Sub-Floor Gas Samples: As part of the characterization for hazardous materials, a number of soil gas samples are contemplated for building 815 and 816. Since penetration through the concrete floor will be made, it would be advantageous to obtain 0-15 cm soil samples from a representative number of these locations to help characterize for radiological contamination in the sub-slab region of these buildings. Other buildings listed as Class I, especially those which have sub-slab drains or utilities will also require characterization.

Response #2

Acknowledged. The project scoping plan does not call for sub-floor penetrations in Buildings 815 or 816. It does describe sub-floor penetrations for Buildings 813, 814, and 817, in order to perform volatile organic soil vapor surveys to search for rumored paint disposal areas. To address the need for sub-floor drain characterization in Class 1 areas, the Army proposes to use specialized detectors that can be 'snaked' through the drain lines and ventilation ducts. These specialized detectors will be either gas proportional, ZnS, and/or NaI(Tl) type detectors. Section 4.2.3.6, Special Measurement and Sampling, has been revised to describe the proposed surveys.

Comment #3

Tritium Screening: The proposed plan does not address the methods to be employed to detect tritium contamination other than by wet swipe techniques on interior building surfaces. While windowless gas proportional counters will detect the presence of tritium, assuming no other beta emitter is present, there has not been any other means described which could field screen these swipes. Scanning instruments and probes described will not detect tritium contamination. Perhaps it would be better to count swipes on a liquid scintillation counter. Lacking that capability would necessitate that all swipes would require laboratory analysis for tritium.

It's stated that soil samples will be analyzed for tritium using the LANL Method 906, which presumably vacuum distills all soil moisture out of the soil, with the results reported in pCi/l of soil. While this value is needed to fit an agricultural uptake model, it does not provide enough information, specifically the moisture content of the soil, i.e., wet weight versus dry weight. Without this information it is impossible to determine, in pCi/l, the tritium levels in ground water and consequently compare these values to drinking water standards.

Response #3

First paragraph. Acknowledged. It is stated that all tritium wipes are to be liquid scintillation (LS) wipes, and that all LS wipes are going to be analyzed by a laboratory. The Army laboratory at Red Stone Arsenal in Alabama, IRDC Nuclear Counting Laboratory, will perform the tritium analyses.

Second paragraph. Agreed. The moisture content of the soil is reported as part of the analytical data package for the organic and in-organic analyses. For those analyses that do not undergo organic or inorganic analyses, and are analyzed only 0for radionuclides, the analyzing laboratory will furnish soil moisture information in units of percent moisture.

Comment #4

Additional Swipes: During previous discussions agreement was reached concerning the survey and swipes of horizontal surfaces above two meters and interior drains. However, in this plan no mention is made of the characterization of the interior surfaces of ventilation ducting in the Class I and Class II buildings. These surfaces must be addressed in the final survey report.

An additional item to be considered is the interpretation of fixed contamination limits as shown under NYS Department of Labor, Part 38 regulations. Since these buildings may undergo renovation for future use, the concept of contamination being fixed under layers of paint or other coverings cannot apply. Therefore, all contamination limits will be considered removable and the appropriate limits applied for any review of a final survey.

Response #4

First paragraph. Agreed. The project scoping plan now identifies ventilation ducting, as well as drain and wastewater lines, as being the subjects of special measurements, which will include being surveyed using specialized detectors

Second paragraph. Disagree. The release criteria for fixed and removable radiation under NYS Department of Labor, Part 38, will be used as intended. If NYSDEC provides ??official?? documentation that the removable radiation release guideline is intended to be used as a fixed radiation guideline to protect a potentially exposed individual in a building renovation scenario or a post renovation building occupation scenario, then the Army will use the removable radiation guideline as stated in the comment. The Army believes that using a standard that is intended to be protective for long-term scenarios (such as commercial or industrial use of a structure) is not a reasonable requirement for a very short-term exposure scenario (i.e. a building renovation scenario). It is also understood that the fixed radiation guideline would have been calculated with the assumption that renovation to a surface would occure and that a percentage of the fixed radiation would become removable. Therefore, the fixed radiation guideline is already protective of a future renovation scenario. Lastly, it is not reasonable to expect that any surfaces that may be exposed in the future would remain exposed. It is very likely that any such surface would be re-surfaced, either with a new coat of paint, wall paneling, or some other type of covering. However, if a surface were stripped of its surface coatings and left exposed, it is likely that most removable radiation would also be removed during the stripping process.

Specific Comments:

Comment #1

Page 4-11, Site Specific Guidelines: This paragraph refers to setting of an exterior dose limit of 10 mRem/yr. above background. The radioisotopes of concern are listed on Table 4-3, with the applicable NUREG 1500 concentrations for each radionuclide. What seems to be lacking in the guidelines is any reference to the sum of fractions rule for determining total exposure. As written, it appears that the concentrations shown would be equivalent to 10 mRem/yr. for each radioisotope. Section 4.2 and 4.3 of the draft MARSSIM document specifically states that where multiple radionuclides are involved, the unity rule must be used in establishing Derived Concentration Guideline Levels (DCGL's), and that the DCGLs would be proportionately lower than those calculated for each radionuclide alone.

Response #1

Agreed. However, use of the unity rule requires prior knowledge of the activity ratios for all radionuclides that are present at levels that are distinguishable from background. Since these ratios are not known, the unity rule can not be used at this stage of the SEAD-12 investigation to establish DCGLs that are based on the unity rule. The text has been revised to indicate that the unity rule will be used to compare site data wherever more than one principal radionuclide of concern is identified. It should be noted that the unity rule will not be used when all of the radionuclides that are distinguishable from background are from the same decay chain, and the guideline value for the principal radionuclide of that chain accounts for all of the radiations from its progeny. In such instances, the levels of the principal radionuclide will be compared directly to its guideline level.

Comment #2

Table 4-4 Table of Estimated Minimum Detectable Concentrations or Activities: This table lists various probes contemplated for use at this site along with approximate efficiencies to be used in calculating Minimum Detectable Activity (MDA). In reviewing these efficiencies it appears that the manufacturer's published data was used, which is normally expressed as the efficiency in 2π geometry. Prior to calculating MDA's these numbers should be revised to show the estimated efficiencies in 4π geometry, which more accurately depicts activity.

Alternatively, probes and instrument package pairs should have efficiencies calculated using NIST traceable standards in appropriate physical source sizes and activities, emissions and energy levels prior to calculating MDA's. As shown, these efficiencies would underestimate contamination levels (dpm/100cm^2) by at least a factor of two.

Response #2

First paragraph. Agreed. The table has been revised and the 4π geometry efficiencies have been used.

Second paragraph. Agreed. As described in the project scoping plan, the probes and instrument package pairs will have efficiencies calculated on a daily basis using the sources listed in Section 4.2.3, under the heading Discussion On MDCs.

Comment #3

Section 4.2.3.2 - Flag Values: Flag values for alpha and beta emissions would be established on a daily basis for each instrument, based in part, on the instrument's efficiency. Since instrument efficiency is a key value, 4π efficiencies in cpm/dpm/100cm^2, corrected for probe size, would be required in the calculation. In some cases the <25% detection guideline value might not be met.

Response #3

Acknowledged and disagree. As stated above, the instrument efficiencies will be calculated on a daily basis. At present, the selection of instruments and the proposed survey methodology are believed to be adequate to meet the <25% of the guideline value detection requirement. The estimated MDC listed in Table 4-4 (calculated using the 4π geometries published by the manufacturers) shows that the MDC for at least two instruments (the floor monitor and the 100cm^2 ZnS detector) are less than 25% of the lowest guideline value. It should be noted that the background rates used in this table were also estimated, and were estimated conservatively. If a more realistic background rate of 3 cpm or less for the 100 cm^2 gas proportional detector is used, the estimated 4π efficiency of the 100 cm^2 detector also has an MDC that is below 25% of the lowest preliminary guideline value.

Comment #4

Page 4-17 Calibration Sources: The list of available calibration sources does not include an Americium-241 standard for the NaI detectors proposed.

Response #4

Agreed. SEDA has located an Am-241 calibration source and it is now included in the list NIST traceable sources that will be available for the survey.

Comment #5

Page 4-19, 20 - Class I Survey Units: While NaI detectors are referenced for use to scan for gamma surveys, no mention is made of utilizing FIDLER probes to detect the presence of Am-241, (or by surrogate measurement Pu-239) from the 60KeV gamma associated with Americium decay. Americium-241, Pu-239, U-238 and U-235 are only listed as alpha emitters.

In discussing this issue at our meeting at Seneca, FIDLER probes were suggested for use both inside buildings where paint, dirt, grease or porous surface etc., could mask alpha emissions and outside, where these materials could have been incorporated into the shallow surface soil. The availability of these probes to the surveyors was not conceived to be a problem at that time by Army personnel. In addition, as part of this draft plan supporting documentation of previous surveys by Army personnel in Appendix H, indicates that surveys were conducted using single-channel analyzers and FIDLER probes.

Also on page 4-19, please note that Co-57 is not a beta emitter and H-3 cannot be detected be any of the probes listed for beta scans.

Response #5

Agreed. The text has been revised to indicate that FIDLER or equivalent types of detectors will be used. Also, Co-57 and H-3 have been removed deleted as sources of radionuclides that will trigger the scanning for beta radiations.

Comment #6

Section 4.2.3.4, page 4-26, Removable Radiation Surveys: The statement is made that swipes will be submitted for analysis if site guidelines are exceeded, based on field screening measurements. Since field screening is typically a much less sensitive method than laboratory analysis, it would seem that if a field screening measurement exceeded the site guideline values the area would be posted for further study or be targeted for decontamination. A more prudent method might be that if a sample exceeded some agreed upon percentage of the guideline value, then the sample would undergo more sensitive to insure that cleanup or regulatory guides were not exceeded.

Conversely, if a swipe is field screened or counted on site and found to be only a small fraction of the site specific guidelines, the sample should be submitted for lab analysis. If the results confirm that the area sampled is below the release criteria the data may then be used as evidence for the final release survey and no further sampling would be necessary.

Response #6

Agreed. All wipe samples, both alpha/beta wipes and LS wipes, will be submitted to the IRDC Nuclear Counting Lab at Red Stone Arsenal in Alabama. If a gross alpha or gross beta count from a wipe sample is found to exceed the site guideline for removable radiation, then that sample will be further analyzed to identify the source of the elevated radiation. The text has been modified accordingly.

Comment #7

Section 4.2.3.6, page 4-27, Special Measurement and Sampling: According to this procedure "Swabs" or pieces of cloth used to access floor drains or waste piping would be screened using the gas proportional counting instruments used for the survey and if they exceed the guideline value they would be submitted for analysis. Given that there could not be any efficiency established with any

standard for this type of geometry, self absorption, dirt loading, etc., a flag value could not be determined other than some multiple of background. It would thus be necessary to submit all such samples for laboratory analysis.

Response #7 **Acknowledged. The Final Draft Scoping Plan now indicates that specialized measuring probes will be used to scan drain pipes and ventilation ducts. Swabs will not be collected.**

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