REGION I TECHNICAL ASSISTANCE REQUEST	
Date: February 2, 2000	Package Accession No. ML003681399

ADAMS Send to: Donald A. Cool, Director
Division of Industrial and Medical Nuclear Safety, NMSS
(Copy to Charlotte L Estep)

From: George Pangburn, Director
Division of Nuclear Materials Safety

Original signed by: /RA/George Pangburn 2/7/2000

Licensee: VA Medical Center in Brooklyn, NY		
License No. 31-02892-06	Docket No. 030-34751	Control No. 127749
Letter Dated: 12/16/99 (most recent letter)	ADAMS Accession No. ML003681428	

Enforcement Action being held in abeyance:		Yes	X	No

Problem or Issue:

Evaluate licensee-proposed Derived Concentration Guideline (DCGL) for soil at site to be decontaminated and decommissioned. Approve licensee proposal, submitted by the US Army Corps of Engineers (which is responsible for performing the decommissioning for the Brooklyn VA). If the proposed soil DCGL is not approved, provide an acceptable alternative soil DCGL based upon the licensee's submitted data. Detailed information and analysis is attached.

Action Requested:

Review and approve the proposed DCGLs for the D&D of the St. Albans Extended Care Center in Queens, NY. The proposed soil DCGL for ^{90}Sr of 35 pCi/g is greater than the default DCGL of 17 pCi/g, published by NRC in the Federal Register on Dec. 7, 1999. The licensee's basis for the proposed DCGLs is described in the attached documents, and includes use of the RESRAD code, v. 5.91, with default parameter values defined by the NRC in the "Preliminary Guidelines for Evaluating Dose Assessments in Support of Decommissioning". Site-specific parameter values that deviate from the NRC-defined defaults are identified and justified by the licensee.

Recommended Action and Alternatives	X	Accept		Reject

Approve the proposed DCGLs.

TARs addressing similar issues (subject, date and location):

Background Documents (Include date and ADAMS Accession Number):

C:\st.albans.TAR.wpd
BLANK FORM: G:\Reference\Blank Forms\TarForm.wpd

Region I Technical Assistance Request
Licensee: VA Medical Center in Brooklyn, NY Control No. 127749

Reference Documents ("attachments"):

1. Discussion summary of Region I analysis of the proposed DCGLs, included as part of this TAR document file.
2. Printout of Region I RESRAD run to duplicate licensee's 10/14/99 run [ML003681428].
3. Data file used to produce attachment 2, available from T. Jackson (tjj).
4. Draft final decommissioning plan, dated 12/16/99, which includes discussion of the use of DCGL for concrete (App A to Plan) submitted in response to comments [ML003681435].
5. Letter, dated 12/6/99, titled "Addendum to Justification for DCGLs" [ML003681439].
6. Addendum to Justification for DCGLs, dated 10/18/99 [ML003681444].
7. Justification for Modified DCGLs, dated 6/24/99 [ML003681445].
8. Copy of current NRC materials license for the St. Albans facility [ML003681447].

Remarks:

Note that the US Army Corps of Engineers has funding authorized to perform this work. NRC review of the proposed DCGLs is requested expeditiously in order to not jeopardize authorized funding for the current fiscal year.

Reviewer: Todd J. Jackson CHP	(610) 337- 5308	Reviewer Code: Q9

Needed By (date): **March 3, 2000**

DOCUMENT NAME: C:\st.albans.TAR.wpd

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OFFICE	DNMS/RI	N	DNMS/RI	N	DNMS/RI			
NAME	TJackson/tjj		RBellamy/RRB1		GPangburn/GCP			
DATE	2/7/00		2/7/00		2/7/00			

SUMMARY FOR ST. ALBANS Derived Concentration GuideLines (DCGLs): ATTACHMENT 1 TO TECHNICAL ASSISTANCE REQUEST

Overview

The present St. Albans Extended Care Center is a former Navy Hospital, located in Queens, NY. Contamination at the site is essentially all ^{90}Sr, with some trace ^{3}H in discrete spots. The DCGLs proposed for release of equipment and materials are based on NRC's 1993 Guidelines for the Decon of Equip and Materials Prior to Release..., and therefore are considered acceptable. The DCGLs proposed for release of building surfaces are based on the NRC's criteria published in the Federal Register on November 18, 1998, and therefore are also considered acceptable. The DCGL proposed for ^{90}Sr in soil/bulk material is 35 pCi/g, which is greater than the 17 pCi/g acceptable default value published by the NRC in the Federal Register on December 7, 1999. In response to NRC Region I comments, the licensee has clarified how they define "bulk material" (contained in Attachments 4 and 5).

The scope of this TAR is to evaluate the proposed soil/bulk material DCGL and its basis. Approval of the soil/bulk material DCGL is recommended.

Background

- St. Albans was a Navy Hospital in the 1960s.
- The facilities being decommissioned were the former hospital's rad lab
- Contamination is ^{90}Sr from a spilled solution circa 1962 (Some ^{3}H in a former bathroom, very limited extent)
- Navy license was terminated in 1973, property later transferred to VA (which is the current owner)
- NRC's ORNL review of terminated licenses identified potential problems; NRC followup confirmed that significant contamination remained
- Early 1990s: some remediation, sewer line isolated
- July 98 NRC licensed VA Brooklyn for decommissioning of site, confirmed US ARMY Corps of Engineers (COE) responsible for cleanup under Formerly Utilized Defense Sites (FUDS) program.
- Detailed characterization survey was performed in 1999
- June 1999 - COE proposed DCGLs for site D&D.

Proposed DCGLs

In Oct 1999 the COE, contractor for VA, proposed revised DCGLs as follows:

	Release of Equip & Materials (Surfaces)	Building Surfaces	Soil/Bulk Materials
Value	200 /1000 /3000 dpm/100 cm2 removable/total/max *[Acceptable, Based on Reference]*	^{90}Sr: 8700 dpm/100 cm2 ^{3}H: 1.2 E8 dpm/100 cm2 *[Acceptable, Based on Reference]*	35 pCi/g ^{90}Sr to produce 25 mrem/y (vs. 17 pCi/g default in the 12/7/99 FR Notice) ***[To Be Evaluated in TAR]***
Refer-ence	1993, NRC Guidelines for Decon of Facilities and Equipment Prior to Release.... (also RG 1.86)	NRC in FR, Nov 21, 1998 (derived with DandD)	RESRAD with limited site-specific mods, using NRC default parameter values specified in "Preliminary Guidelines for Evaluating Dose Assessments in Support of Decommissioning"

The scope of this TAR is to evaluate the proposed soil/bulk material DCGL for ^{90}Sr.

Licensee Calculation of Proposed Soil/Bulk Material DCGLs

COE used RESRAD v. 5.91 with NRC default parameter values (published in "Preliminary Guidelines for Evaluating Dose Assessments in Support of Decommissioning") with input modifications as follows:

- Data:Soil contam is limited mostly to 6" depth, 2200 pCi/g max sample value
- Resident farmer scenario used.
- Parameter differences from the NRC defaults:
  - K_d of 30 used. Representative soil in Region, based on Brookhaven study, indicates actual K_d is probably about 10. Value used is conservative, resulting in calculated 20.5 mrem/y at t_0.
  - Contaminated area used is 90 m^2, depth 15 cm (vs 10,000 m^2 default)
  - Plant ingestion pathway is included (and is the limiting pathway), although it is considered highly unlikely in high pop density metro area.
    - Fraction of diet provided by this pathway is set at 0.5 (vs NRC default of 1) because the contaminated area is small and food grown on-site would have to be supplemented (by 50%). Using 0.5 is still considered to be conservative.
  - Fraction of diet from onsite livestock is set at 0.25 (vs. NRC default of 1) because affected area is a small fraction of that required to raise livestock. This is conservative because actual value is realistically more likely to be 0 due to the size of the affected property and the dense metro area population.
  - Groundwater included, but very little groundwater use remains in Queens
  - Erosion rate changed from 0.001 to 0.00001 m/y based on area rainfall
  - Distance to drinking water aquifer changed from 100 to 10 m
  - Assumes the building will be intact for at least 20 years, delaying introduction of contamination into the modeled ecosystem, delaying the start of potential farming, and allowing additional radioactive decay (^{90}Sr half life is 29.1 y).

NRC Region I Evaluation of Licensee Proposed Soil/bulk material DCGL

The DandD soil default values, published by NRC in the Fed Register on December 7, 1999, included Sr-90. For Sr-90, 17 pCi/g produces 25 mrem/y per the Fed Register table. It is our understanding that the table values are based upon conservative, "worst-case" assumptions. Use of the table is permissible for simple conditions in which licensees do not want to perform a detailed site-specific evaluation and calculation.

The licensee-proposed DCGL value of 35 pCi/g is approximately two times the default value. The proposed parameter modifications used by the licensee's contractor (US Army COE) in RESRAD version 5.91 are reasonable and logical, and produce a calculated dose of 20.5 mrem/y peak. Additionally, per licensee's plan ALARA principles will also be applied and are also expected to result in remaining soil concentrations lower than 35 pCi/g.

The NRC Region I license reviewer (T. Jackson) re-ran RESRAD, v. 5.91 using the parameter values provided in the RESRAD output submitted by the COE to verify the model's output. Results of the COE's model runs were duplicated and confirmed that parameter values were utilized as stated.

Discussion of NRC review of the Proposed DCGLs

The Corps of Engineers (COE) had asked early in 1999 if RESRAD could be used instead of DandD to model the site and calculate DCGLs. As a result of that request to NRC Region I Todd Jackson contacted Boby Eid in NRC/HQ. Boby replied that use of RESRAD was acceptable.

In July 1999 the COE submitted an initial draft decommissioning plan including proposed DCGLs (345 pCi/g for ^{90}Sr in soil/bulk materials) based on RESRAD, version 5.82. This proposed DCGL was viewed as too high, and was significantly different than previously acceptable DCGLs. Region I became aware of a March 16, 1999 memo from John Hickey/HQ that required the Region to obtain HQ participation on the DCGLs. Bob Nelson was contacted in HQ (8/18/99) to determine the NRC procedure for internal review, and he indicated the way to proceed was to discuss the technical details of the calculation with Mark Thaggard. Once any issues noted by Mark were resolved, the next step Nelson described was to convene by conference call Nelson, Camper, Bellamy, Thaggard and Jackson to efficiently reach concurrence on the licensee's proposal.

Mark Thaggard was first contacted in Aug 99 to discuss the proposed DCGL, and based on his comments the licensee was asked to revise their calculations. Specifically Mark stated that the RESRAD published default parameter values were not acceptable to NRC and the values published in the March 16, 1999 Hickey memo (default values published as part of "Preliminary Guidelines for Evaluating Dose Assessments in Support of Decommissioning") must be used by the licensee.

A conference call was set up for October 1, 1999. Mark Thaggard was the HQ DWM representative on the call (Nelson informed Region I that he was diverted to another meeting at last minute). On Oct. 1, Bellamy and Jackson discussed with Thaggard the course of action for RESRAD calculations to be revised by licensee. The Corps of Engineers was informed of the necessary changes to the calculations by letter from Todd Jackson, dated October 7, 1999. Revised calcs using the NRC default parameters were received on or about October 20, 1999,

which included the proposed Sr-90 DCGL of 35 pCi/g, calculated using the NRC-required parameter defaults and explaining the justification for all site-specific data used. Based on continuing discussions with DWM staff, in January 2000 it was determined that submittal of the licensee's proposed DCGLs to HQ as a Technical Assistance Request (TAR) was necessary, and the TAR was immediately prepared.

Current Project Schedule

Review of the proposed DCGL is necessary as soon as possible. The COE has funds currently available and further delay may jeopardize funding. Funding has been difficult to secure, and has taken about four years of effort to date. As of February 3, 2000, the COE stated they were prepared to authorize a contract by February 8, 2000, to perform the D&D work at St. Albans. Per the project schedule, if work begins in February the site remediation could be complete by summer 2000. The COE may decide to begin the project using 17 pCi/g as an interim DCGL, pending review and approval of this TAR.

TECHNICAL EVALUATION REPORT
OF
PROPOSED SOIL AND CONCRETE SR-90 DCGLS
FOR
ST. ALBANS EXTENDED CARE CENTER, QUEENS, NEW YORK

ATTACHMENT

TECHNICAL EVALUATION REPORT

LICENSEE NAME: St. Albans Extended Care Center
LICENSE NUMBER: 31-02892-06 **DOCKET NUMBER:** 030-34751
FACILITY: VA Medical Center - Queens, New York
TYPE OF REQUEST EVALUATED: Approval of DCGLs for Strontium-90 in Soil and Concrete
DATE OF REQUEST: 2/14/00 **DATE EVALUATION COMPLETED:** Acceptance Review: 2/24/00, Final Review: 4/11/00
EVALUATED BY: Dominick Orlando, Richard Clement, (concrete), Mark Thaggard (soil)
SUPPORT: Rateb (Boby) Abu-Eid (resuspension factor), Ralph Cady (DandD Screen code)
RESPONSIBLE STAFF MEMBER: Dominick Orlando

SUMMARY:

Division of Waste Management staff (DWM) evaluated the licensee's request to use 35 pCi/g as the Derived Concentration Guideline Level (DCGL) for Strontium-90 Sr-90 in soil and concrete at its Queens New York facility. Based on the staff's evaluation of the licensee's request, the staff recommends that the DCGL for concrete not be approved until the licensee can adequately demonstrate to Region I that it is highly unlikely that an individual would occupy the Ejector Pit for more than about 1100 hours per year. In addition, the staff recommends that the DCGL for soil not be approved until the licensee has adequately justified either the use of the default distribution coefficients for Sr-90 used in its dose modeling or its use of the nondispersion modeling approach. The staff also recommends that Region I forward the licensee's justification for using the Sr-90 distribution coefficients or the nondispersion modeling approach to DWM for review.

SUPPLEMENTARY INFORMATION:

On February 14, 2000, staff of the Division of Industrial and Medical Nuclear Safety forwarded a Technical Assistance Request (TAR) from the Region I Division of Nuclear Materials Safety to DWM to review and approve the St Alban's Extended Care Center's DCGL of 35 picocuries per gram (pCi/g) of Strontium-90 (Sr-90) in soil and concrete that will remain at the facility at the completion of decommissioning.

To support this request, Region I staff provided the following information:

1. TAR dated February 2, 2000, summarizing the licensee's request and Region I's activities to validate the licensee's proposed DCGLs. Note that this TAR also included several ADAMS Accession Numbers for additional information supplied by the licensee to support the request;

2. Pages 3-3, 3-4, 5-7, and 5-8 of Volume I of the U.S. ARMY Corps of Engineers report entitled "Radiological Characterization Survey Report" describing the

concrete Ejector Pit and the method used to obtain concrete cores from the ejector pit floors and walls;

3. A letter from Michael T. Van Der Karr (Roy F. Weston, Inc.) to Randy Godfrey (U.S. Army, Corps of Engineers) dated March 3, 2000, summarizing the volumes of concrete that could remain if the proposed DCGLs were approved and core sampling results for the walls and floors of the Ejector Pit;

4. Pages 5-1 through 5-8 of Volume I of the U.S. ARMY Corps of Engineers report entitled "Radiological Characterization Survey Report" describing the radiological condition of the Ejector Pit;

5. Figure 5-4 from the report entitled "Draft Final Workplan - Volume 1 for the Radiological Characterization Survey of the St. Albans Veterans Administration Extended Care Center, Queens, New York and accompanying fax cover sheet discussing the dimensions of the Ejector Pit.

The DWM staff's evaluation of the request is summarized below.

CONCRETE

DWM staff evaluated the potential doses from residual radioactive material in the concrete at the proposed DCGL under building occupancy and concrete recycle/disposal scenarios. DWM staff believes that these scenarios encompass the most reasonable potential future uses of the concrete.

DWM staff evaluated the potential doses (Total Effective Dose Equivalent) to individuals occupying the Ejector Pit using Version 1 of the DandD Screen dose modeling code. The surface activity used in the code (18,648 dpm/100cm^2) was developed by assuming that the activity in the first cubic centimeter of concrete is at the proposed DCGL (35 pCi/g) and that all of this activity is present on the surface of the concrete. This is expressed in the following equation:

$$35 \text{ pCi/g} \times 2.4 \text{ g/cm}^3 \times 2.22 \text{ dpm/pCi} \times 1 \text{ cm} \times 100\text{cm}^2/(100\text{cm}^2) = 18{,}648 \text{ dpm/100cm}^2$$

Note that 2.4 g/cm^3 is the density of the concrete, based on information supplied by the licensee (density of 150 lbs/ft^3), as well as information in Draft NUREG 1640 "Radiological Assessments for Clearance of Equipment and Materials from Nuclear Facilities" and the Radiological Health Handbook (1984 edition).

Based on this evaluation, the potential dose from the residual radioactive material in the Ejector Pit is approximately 54 mrem/yr. However, approximately 51 mrem/yr of this dose is received via the inhalation pathway and requires that an individual is present in the Ejector Pit for approximately 2339 hours per year.

The staff evaluated the impact that modifying the resuspension factor had on the potential dose. The default resuspension factor used in the DandD Screen code (1.42E-5/m) has raised concerns from the staff in the past, as it is felt to be extremely conservative, and is based on a

limited number of referenced values. Currently, the staff is re-evaluating the resuspension factor in the DandD Screen code and expects to revise the value in the future. Staff involved in this effort stated that the default resuspension factor could be reduced by as much as a factor of 20. DWM staff decreased the resuspension factor by a factor of 10 from 1.42E-5/m to 1.42E-6/m and determined that the potential dose from the residual radioactive material in the Ejector Pit to an individual occupying the Ejector Pit is approximately 8.5 mrem/yr.

The staff also determined that, as long as an individual did not occupy the Ejector Pit for more than approximately 1080 hours per year, (i.e. , 45, 24 hour periods) the dose to the individual would be less than 25 mrem/yr. Note that this estimate was developed using the default resuspension factor. Enclosure 1 contains the DandD Screen code printouts

DWM staff also modeled potential total effective dose equivalent (TEDE) rates to an individual occupying the Ejector Pit using the RESRAD-BUILD Version 2.37 computer code. The RESRAD-BUILD code is primarily intended for site specific analysis since it provides greater flexibility than the DandD Version 1.0 code used for screening purposes. However, the parameter values in the RESRAD-BUILD code have not been validated by NRC staff. Because the licensee did not provide justification for site specific values used in the code, NRC staff used the RESRAD-BUILD default parameters (with the exception of the indoor fraction parameter). Use of the default parameters would normally be expected to result in a conservative estimate of the TEDE rates.

The source term in the conceptual model considered secular equilibrium conditions (Sr-90+D) of the daughter progeny yttrium-90 (Y-90) with the parent Sr-90 of unit activity concentration. Enclosure 2A describes nuclear data for Sr-90 and Y-90. Calculated TEDE rates based on unity activity concentrations were scaled to 35 pCi/g. The model further assumed the following:

- Sr/Y-90 contamination is homogenous and uniformly distributed in concrete of 2.4 g/cm^3 density;
- total surface area of the contaminated walls is 117 ft^2 (10.9 m^2) (therefore each wall area represents 10.9 m^2 ÷ 4 = 2.7 m^2);
- total surface area of the contaminated floor is 200 ft^2 (18.6 m^2);
- depth of contamination in the walls and floor is 15 cm;
- room height is 6 ft (1.8 m);
- an individual occupies the center of the room with the receptor located at 1 meter above the floor; and,
- an exposure period of 2000 hours in one year.

The calculation was repeated for wall and floor thickness of 1 cm using the same parameter values and assumptions given in Enclosure 2B. Enclosures 2C and 2D include RESRAD-BUILD code printouts for 15 cm- and 1 cm-thick contaminated concrete. Using the RESBUILD-BUILD code, NRC staff calculated potential TEDE rates ranging from 0.15 mrem/y to 0.05 mrem/y, depending on the assumed thickness of the concrete (15 cm and 1 cm, respectively).

DWM staff also evaluated the potential dose to workers renovating the Ejector Pit using Version 1 of the DandD Screen code. Based on this evaluation, the potential doses to workers renovating the Ejector Pit is approximately 1.4 mrem/yr. Note that the use of the DandD Screen code for evaluating the renovation scenario has not been supported by the staff, as the

parameters in the code have not been fully validated. In addition, in revising the DandD Screen code, staff has focused their efforts on the residential farmer and building occupancy scenarios, as these scenarios are believed to bound any potential doses from residual radioactivity at licensed facilities. As such, the DWM staff performed an evaluation of the potential doses under a building renovation scenario for reference only.

DWM staff also evaluated the potential doses from recycling or disposing of the concrete at the proposed DCGL using the dose conversion factors in Table 7.2 of Draft NUREG-1640 "Radiological Assessments for Clearance of Equipment and Materials from Nuclear Facilities ." At the 95 percent confidence interval, the dose conversion factor for Sr-90 is 2.8E-2 mrem/yr per pCi/g. Use of this factor yields a potential dose from recycling or disposing of the concrete of approximately 0.98 mrem/yr. Enclosure 3 contains Table 7.2 of Draft NUREG-1640 "Radiological Assessments for Clearance of Equipment and Materials from Nuclear Facilities ."

Based on the evaluations summarized above, it appears that recycling or disposing of the concrete does not result in a significant threat to the public health and safety. However, the potential dose to an individual occupying the Ejector Pit could be in excess of NRC's limits for unrestricted use, if the individual occupies the Ejector Pit as envisioned in the DandD Screen code (i.e., if the default parameters for the occupancy time and the resuspension factor are used).

As stated above the staff believes that these two factors are extremely conservative. In addition, the estimated doses to individuals occupying the Ejector Pit developed using the RESBUILD code indicate that potential doses are well below the NRC's criteria for decommissioning licensed nuclear facilities.

The staff believes that there are four options available to the NRC with respect to the use of the proposed DCGL for concrete:

- Staff could approve the proposed DCGL, because: a) it is unlikely that an individual would be present in the Ejector Pit for 2,337 hours per year; and b) the estimated dose using the RESRAD-BUILD code indicates that doses are well below the NRC's decommissioning criteria of 25 mrem/yr;

- Staff could deny the request because the estimated dose to an individual occupying the Ejector Pit may be in excess of the NRC's limit for unrestricted use, as determined using the DandD Screen code and all of the code's default parameters;

- Staff could delay a decision on the concrete until the staff's re-evaluation of the resuspension factor is completed and, assuming the revised resuspension factor is adopted, approve the request at that time. Note that staff involved in revising the resuspension factor cannot provide an estimate of when the re-evaluation of the resuspension factor will be completed; or,

- Staff could request additional information from the licensee to support a site-specific estimate of the potential doses from an individual occupying the Ejector Pit and base the final staff recommendation on the results of this evaluation.

RECOMMENDATION

Staff should only approve the DCGL for concrete if the licensee can adequately demonstrate to Region I that it is highly unlikely that an individual would occupy the Ejector Pit for more than about 1100 hours per year. Given the debate surrounding the resuspension factor in the DandD Screen code, the staff does not believe that it is appropriate to deny the licensee's request based on the estimated doses using the DandD Screen codes default parameters. However, there is no guarantee that the resuspension factor will be revised in the near future or in a manner such that the resulting estimate of the potential dose to an individual occupying the Ejector Pit would be acceptable. This could result in the staff requiring the licensee to remove the concrete at a later date. Relying on a demonstration that the occupancy time in the Ejector Pit is less than the default occupancy time in the DandD Screen code would permit the staff to approve the proposed DCGL using a more readily justifiable modification to the DandD Screen code. Relying on the reduced occupancy time in the Ejector Pit would also obviate any concerns that staff may have on the validity of the parameter values in the RESRAD-BUILD code.

It is important to note that the release of volumetrically contaminated material is a policy issue currently being debated within NRC and is the subject of several Commission papers and initiatives (e.g. clearance). Until the Commission decides on whether or not it is appropriate to allow the release of volumetrically contaminated material, it may not be appropriate to approve the DCGL for concrete.

SOIL

Staff evaluated the licensee's derivation of the DCGL for soil and concluded that it was generally acceptable, as long as the non-irrigated plant pathway is the dominant exposure pathway. However, the licensee used distribution coefficient (K_d) of 30 cm^3/g. The default K_d in RESRAD for Sr-90, for the contaminant, unsaturated, and saturated zones is 30 cm^3/g. The default K_d value (and higher values) is sufficient to allow the activity to be essentially retained in the contaminant zone. Without a cover over the contaminated soil (as was assumed by the licensee), the predominant exposure pathway remains the non-irrigated plant ingestion pathway. However, when a lower K_d value such as 3 cm^3/g is assumed for the three zones, the Sr-90 readily migrates to the ground water resulting in the drinking water pathway becoming the predominant pathway.

The licensee justified using the default K_d (i.e., 30 cm^3/g) because the actual K_d value is believed to be smaller based upon a measurement at another site, and the smaller K_d results in a lower dose estimate (i.e., higher DCGL). No information was provided on why the K_d value is considered representative (e.g., similar soil texture, pH and redox conditions, etc.) for the licensee's site. Use of the smaller K_d value of 3 cm^3/g results in a smaller dose (i.e., larger DCGL) only because the licensee used the nondispersion ground-water model in RESRAD. Although the nondispersion model is the default modeling approach, it requires that certain assumptions be made with regards to the hypothetical well location in relationship to the contamination. Generally, the nondispersion modeling approach results in a less conservative

dose estimate than the alternative mass balance modeling approach. Because it is generally less conservative than the mass balance approach and because the mass balance approach is more consistent with the modeling approach used in developing the screening DCGLs, the nondispersion approach should not be used without justification.

Using the mass balance approach, the derived DCGL is greatly reduced. A key parameter is the fraction of water obtained onsite. As with the fraction of onsite plant food, it is probably not reasonable to assume that the hypothetical resident will, in the near future, get all of its water from an onsite well given that the site is located in an urban setting. Based upon staff calculations, the peak ground water concentration occurs roughly 15 years after the onset of the analysis. Although the contaminants have been present at the site for more than 25 years (i.e., assuming as reported that the licensed activities ended on December 31, 1973), significant leaching from the soils are not likely to occur until the building is removed. Enclosure 4 contains the staff's review of the licensee's derivation of the soil DCGLs.

RECOMMENDATION

Staff believes that the COE has developed a conservative DCGL for Sr-90 for cleaning up the soils at the VAECC site, assuming that the Sr-90 is retained in the soil. However, staff does not believe that the COE has sufficiently justified the assumption that the Sr-90 will be retained in the soils and use of a smaller distribution coefficient could result in a higher dose estimate (i.e., lower DCGL) with the use of the less conservative mass balance modeling approach. Accordingly, additional information should be provided to either support the use of the default distribution coefficients for Sr-90 or use of the nondispersion modeling approach.

Enclosures:

1. DandD Screen code results for building occupancy and renovation scenarios

2. Memo from Richard Clement to Nick Orlando summarizing the RESRAD-BUILT evaluations of the licensee's proposed DCGLs

3. Table 7.2 of Draft NUREG 1640 "Radiological Assessments for Clearance of Equipment and Materials from Nuclear Facilities"

4. Report entitled "Review of Proposed Soil Sr-90 DCGL for St. Albans" by Mark Thaggard