Minnesota Pollution Control Agency

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

August 30, 1995

Mr. David Cabiness, Code 1862
Commanding Officer
Southern Division
Naval Facilities Engineering Command
PO Box 190010
North Charleston, SC 29419-9010

RE: Naval Industrial Reserve Ordnance Plant

Dear Mr. Cabiness:

The U.S. Navy (Navy), the Minnesota Pollution Control Agency (MPCA), and the U.S. Environmental Protection Agency (EPA) met on August 3, 1995, to discuss MPCA and EPA staff responses to the Feasibility Study Report for Operable Unit 2 (OU2). The MPCA staff rejected the OU2 FS Report in the July 20, 1995, letter (Letter). In the meeting many issues surfaced regarding the present and future status of the NIROP Site. After further consideration of all of the issues impacting the present and future status of the Site, the MPCA staff has determined that the best course of action for the Site is to proceed in a new, more holistic approach to investigating and remediating the Site.

Pursuant to the reasons identified in Attachment 1 to this letter, this new approach involves completing the OU2 FS Report pursuant to Attachment 2 to this letter; transferring much of the OU2 FS and some follow-up OU2 RI work to OU3 pursuant to Attachment 3 of this letter; and proceeding with the investigation and cleanup of the Site by thinking of OU2 as a potential subarea of OU3. The new approach involves MPCA staff modification of the Letter as explained in Attachments 1, 2, and 3.

The Navy shall complete the work in Attachment 2 to complete the OU2 FS. The Navy shall carry forward the "OU2 FS Report alternatives" to the OU3 FS. Alternative remedies identified in the OU3 FS Report may address remediation of contamination in "OU2."

The Navy shall use the carcinogenic polyaromatic hydrocarbon (cPAHs) cleanup levels identified in Attachment 4 of this letter for the NIROP Site under the following three land use scenarios: unrestricted use (5 parts per million (ppm) cPAHs); industrial use without a

vegetated cover (current site conditions) (12 ppm cPAHs); and industrial use with a vegetated cover (20 ppm cPAHs).

If you have any questions regarding this letter, please contact David Douglas of my staff at (612) 296-7818.

Sincerely,

James L. Warner

James L. Warner, P.E.
Division Manager
Ground Water and Solid Waste Division

JLW:lma

cc: Sidney Allison, Navy, Southern Division
Mark Briggs, RMT, Inc.
Thomas Bloom, US Environmental Protection Agency

Attachment 1

Reasons for New Approach to
the Investigation and Cleanup
of the NIROP Site

The following are reasons for the new approach to the investigation and cleanup of the NIROP Site:

1). The Navy has agreed to accept soil cleanup numbers based on the MPCA Soil leaching Model for contaminated soil located in the unsaturated zone at the August 3, 1995 meeting of the MPCA, EPA, and Navy staff at the offices of the MPCA.

2.) The Navy is committed to completing an RI/FS for OU3, including the investigation for the presence of DNAPL at the Site.

3.) The Navy is committed to conducting a 3-dimensional acoustic imaging of the main building at the Site as part of the OU3 RI.

4.) The MPCA staff has requested and hereby reiterates the request that the Navy conduct a 3-dimensional acoustic imaging study of OU2. The success of combining the two operable units relies on the 3-dimensional acoustic imaging of both OU2 and OU3. The MPCA staff feel that the use of this tool over the entire site, although more costly up front, will ensure that the quality of data concerning the geological picture at the Site is adequate to insure the success of the OU3 RI/FS.

5.) The MPCA staff continues to reject the conclusion of the draft OU2 FS Report that selects institutional control as the sole remedy for contaminated soil at OU2. The OU2 RI has indicated that contaminated soil exists at the site at or above levels of concern. The MPCA staff has worked with the Navy to scope and limit the technologies that may be evaluated in the FS to remediate the soil. Treatment technologies are available that can remediate the soil at costs that the MPCA staff feels are not prohibitive. Institutional controls may be necessary as a component of a remedy for a given operable unit at the Site, but are unacceptable as a total remedy for Site soils.

6.) The OU2 RI indicates that contaminated soil exists above the MPCA cleanup levels at the Site (using the MPCA Soil Leaching Model) and that soil remediation is required. A much higher mass of solvent probably exists as DNAPL at the Site, including OU2. At the present time the Navy is planning to investigate DNAPL for OU3.

7.) The Navy recently committed to completion of a Remedial Investigation/Feasibility Study (RI/FS) Workplan for OU3 that will include investigation for DNAPL. This was not a commitment that MPCA and EPA were able to obtain from the Navy in the past.

8.) Until the OU3 RI has been completed, the full magnitude and extent of solvent contamination at the Site remains unknown. In addition, the relationship of any DNAPL as a source to the ground water contamination at the Site is not fully understood.

9.) The uncertainty concerning the magnitude and extent of potential sources of solvent at the Site in the soil and as DNAPL and the uncertainty concerning the relative contribution of these potential sources to ground water contamination (and overall Site risk) makes the proper selection of a remedy for OU2 soils inappropriate at this time.

For example, DNAPL is likely present in the "North 40" area where barrels were disposed of in trenches. Sampling did not occur below the water table during the OU2 RI (or at any other time). As a result, the magnitude and extent of any DNAPL in the North 40 is not known. If DNAPL is present in the North 40, a remedy different from the remedies being evaluated in the draft OU2 FS Report may be appropriate.

10.) A great deal of uncertainty exists concerning the geology (stratigraphy) beneath the Site, including under the 53-acre main building. No data is currently available concerning the geology, hydrogeology and contamination under the building. The Navy's planned use of 3-Dimensional Acoustic Imaging techniques in the OU3 investigation will define the geology beneath the building. Its use at OU2 when combined with the data for OU3 will define the geology for the Site as a whole. This data will lead to more informed decisions regarding the investigation, remedy selection, and remedial design, as well as improve the chances for a successful remedy.

11.) Selection of a global remedy for both OU2 and OU3, once the OU3 RI is completed, should lead to a much more cost effective, holistic remedy.

12.) A cost savings will be realized by forgoing additional work on OU2 FS (as originally planned) that is partly based on incomplete site-wide information. Much of the work done to complete the FS for OU2 likely will be superseded by information gathered by the acoustic study and by the proposed excavation of possible barrels currently planned.

13.) The MPCA staff are now aware of innovative remedial technologies for TCE contamination recently demonstrated at the Savannah River Site that should be considered at NIROP. The MPCA staff became aware of these technologies during a site tour of the Savannah River Site in late June, 1995. These technologies were not considered in the OU2 FS due to lack of adequate staff knowledge of the technologies when the FS was scoped in late 1994. Applied to a combined OU2/OU3 remediation at NIROP, they could lead to a different remedy for the combined operable units than is presently evaluated in the draft OU2 FS Report.

Attachment 2

Work Needed to be Completed
for the Operable Unit 2
Feasibility Study

The Navy shall complete only the work identified in this attachment to finalize the OU2 FS. In other words, the Navy shall disregard all other modifications in Attachment 1 to the July 20, 1995 letter from the MPCA staff to the Navy regarding Operable Unit 2.

The Navy shall complete the following items in the MPCA staff letter of July 20, 1995:

1). Items 16 and 41 as follows:

The Navy shall modify MPCA staff modifications to Items 16 and 41 by preparing a map that indicates the location and extent of all solvent contaminated soil identified in the OU2 that exceeds the cleanup numbers generated from the MPCA Soil Leaching Model. The map shall also include the location of areas where barrels where removed from the site, including the number of barrels recovered, when the barrels were removed and an estimate of how much solvent was released at each site. The Navy shall also calculate the volume of contaminated soil which exceeds the cleanup numbers.

2). Item 52 as follows:

The Navy shall determine the magnitude and extent (volume in cubic yards) of cPAH - contaminated soil identified in the OU2 RI using the risk-based preliminary remedial goals (PRGs) developed by the MPCA staff as explained in Attachment 4. Using these PRGs, the Navy shall produce the maps showing the location of areas which exceed the PRGs.

Attachment 3

Rationale and Direction for
the Remedial Investigation and Feasibility Study
for Operable Unit 3

The Navy shall complete the RI/FS for OU3 as follows:

1.) The Navy shall incorporate OU2 RI data in the OU3 RI Report.

2.) The Navy shall evaluate the contribution of OU2 and OU3 contaminant sources to the ground water contamination at the Site in the OU3 RI Report, including OU2 VOC and cPAH data from the OU2 RI and all new information collected in the OU3 RI concerning contamination beneath the building, including DNAPLs.

3.) In the OU3 RI, the Navy shall complete a risk assessment for OU3 using OU2 and OU3 data. The risk assessment shall evaluate the cumulative risk of all contaminants of concern at these two operable units. The Navy shall determine the risk from contaminants of concern identified in the OU2 RI and any others identified by the OU3 RI for both an unrestricted and an industrial land use scenario. If the Navy can provide compelling evidence that the land use will continue to be industrial at NIROP, the MPCA staff may approve the Navy completing the risk assessment using only the industrial land use scenario.

4.) If DNAPL is found in OU2 and/or OU3, the Navy shall: 1) produce an OU3 FS that includes DNAPL as a source of ground water contamination; 2) determine, in the OU3 FS, the relative short- and long-term time frames and costs of operating the existing OU1 ground water pump and treatment system to reach Site ground water cleanup goals listed in the ROD compared to the short- and long-term costs of remediation of any OU2 and OU3 DNAPL source areas; and 3) evaluate combined remedial measures that will address both OU2 and OU3 contamination , including DNAPL.

5.) The Navy shall complete the following items identified in Attachment 1 of the MPCA staff letter of July 20, 1995 to the Navy regarding the OU2 FS Report and incorporate the results of this work, including the MPCA staff rationale and direction, in the OU3 RI/FS: 2, 3, 5, 11, 13-20, 22-23, 25, 27-35, 38, 43-46, and 48-51.

Attachment 4

SF-00006-05 (4/86)

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA

Office Memorandum

DATE: August 18, 1995

TO: Dave Douglas
Site Response Section
Ground Water and Solid Waste Division

FROM: Helen Goeden, Ph.D.
Site Response Section
Ground Water and Solid Waste Division

PHONE: 296-7358

SUBJECT: Cleanup Goals for Carcinogenic PAHs for an Industrial Land Use Setting

A cleanup goal for total carcinogenic polyaromatic hydrocarbons (cPAHs) was developed for unrestricted and industrial land use exposure scenarios. The exposure scenarios consisted of:

1) Exposed Receptor(s)
Unrestricted - - Residential adult and child receptors for unrestricted land use and
Industrial - - Adult worker whose job duties require periodic outdoor work during the warmer months industrial land use; and

2) combined direct exposure pathways
- incidental soil/dust ingestion;
- dermal contact; and
- inhalation of vapors and suspended particulate.

The cleanup goal is a risk-based soil concentrations based on the above exposed receptors and correspond to a specific risk level of 1×10^{-5}. The specific exposure parameter values utilized in the calculations are attached to this memo.

The basic rationale for the exposure value utilized is presented in the exposure parameter tables. Additional rationale for the soil ingestion rate utilized is presented below.

Soil Ingestion Rate

Unrestricted Land Use Receptors -
EPA default soil/dust ingestion rates were adjusted so that they were more representative of central tendency values--resulting in a mix of upper- and central-tendency values in the soil ingestion calculations as is consistent with RME (reasonable maximum exposure) assessments. The incidental soil ingestion rate for children was set at a more central tendency value of 100 milligrams per day (mg/day). The EPA default value of 200 mg/day is comparable to a high average value.

The studies upon which the incidental soil ingestion rate was estimated utilized mass balance equations and tracer levels in soil and dust (indoor as well as outdoor) and in feces. Children were monitored for several days and an average daily rate was calculated. The mass balance studies indicated that a portion of the ingested tracers came from outdoor soil. The remaining portion came from a variety of other sources, including indoor dust and inhalation of indoor and outdoor suspended dust. It is therefore inappropriate to 'limit' exposure time to outdoor time since the incidental ingestion rate includes indoor sources as well.

Typically one-half the ingestion rate in children is assumed to be the ingestion rate in adults living under similar conditions (e.g., residential child--residential adult). EPA has utilized this assumption in deriving their default value (i.e., 100 mg/day for an adult resident). The incidental ingestion rate for adults was assumed to be one-half the child ingestion rate (i.e., 50 mg/day) for the unrestricted land-use scenarios.

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OF 10% POSTCONSUMER WASTE

Industrial Worker at NIROP -
In the occupational setting, incidental ingestion of soil and dust is highly dependent on the type of work being performed (EPA 1989 Standard Default Exposure Factors, PB91-921314). EPA has recommended an interim incidental ingestion rate of 50 mg/day for a "typical" worker. This ingestion value (50 mg/day) was based on a pilot study conducted at the University of Massachusetts involving 6 adult volunteers. Although the type of employment was not noted for the volunteers it is unlikely that the individuals were industrial workers. For workers engaged in outdoor work such as construction or landscaping, EPA recommended an interim value of 480 mg/day . The 100 mg/day value recommended by the MPCA staff is equivalent to EPA's default value for a residential adult but twice what would be assumed for the MPCA's unrestricted land use adult scenario. The issues considered in deriving the 100 mg/day value were:

1) the potential for exposure between the various land-use scenarios. Residential environments relative to industrial environments are often landscaped and contain paved areas which limit the amount of dust available (e.g., generated and transported) for exposure. Industrial facilities are generally not maintained at the same level of cleanliness (e.g., vacuumed, dusted, etc.) as a residence, this also increases the potential for exposure.

2) NIROP site specific industrial setting would include outdoor work activities, warehouses, bare soil, etc.

Based on the above considerations and information it was believed that 100 mg/day represented a reasonable industrial incidental soil ingestion rate for the current conditions at the NIROP site. If bare areas of soil were eliminated through vegetative cover the level of exposure would decrease. A second cleanup goal was calculated utilizing the MPCA default soil ingestion rate for adult residents (i.e., 50 mg/day) and a slightly lower soil to skin adherence factor - - the resulting cleanup goal could only be applied if the areas of contamination had a good vegetative cover.

Adjustment of Incidental Ingestion Rate for Climatic Changes -
Adequate information could not be found to quantitatively determine seasonal impacts on incidental soil ingestion rates or outdoor soil contributions to indoor dust although limited information did suggest the possibility that incidental soil ingestion may be lower during colder/rainier weather. The literature information did not suggest that indoor incidental soil ingestion does not occur rather it suggested that indoor exposure did occurred. In an attempt to be conservative, yet reasonable, the soil concentration was adjusted by assuming that the overall exposure from the incidental soil ingestion pathway during the colder 5 months of the year and on precipitation days during the warmer 7 months of the year was half what it was during the warmer 7 months. The derivation was:

$$([0.5 \times 152 \text{ days}] + [0.5 \times 30] + [1 \times 183]) / 365 \text{ days} = 0.75$$

Therefore, a factor of 0.75 was included in the soil ingestion exposure equation when indoor as well as outdoor incidental ingestion potentially occurs.

Cleanup level -

The only cPAH contaminant with a cancer potency slope is benzo(a)pyrene. The cleanup goal for benzo(a)pyrene which corresponded to an excess cancer risk of 1 E-5 was 1.2 ppm for unrestricted land use, 3 ppm for industrial land use with current site conditions and 5 ppm for industrial land use but with added vegetated cover.

Based on the specific profile of carcinogenic PAHs reported in Appendix K of the Remedial Investigation Report for the Soils Operable Unit at the Naval Industrial Reserve Ordnance Plant, May 1993, Vol. II,a site specific weighted potency factor of 0.25, utilizing EPA's provisional guidance for PAHs (EPA/600/R-93/089), was calculated for the mixture of cPAHs present at the site. The calculated benzo(a)pyrene soil concentration was divided by the site specific weighted relative potency factor to generate a "safe" total cPAH soil level. The calculated cleanup levels for total cPAHs were 5 ppm for unrestricted land use, 12 ppm for the industrial land use with current site conditions and 20 ppm for industrial land use with good vegetative cover. The application of the total cPAH soil concentration is based on the assumption that the profile of cPAHs remain constant (i.e., is not significantly affect by remediation technology).

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OF 10% POSTCONSUMER WASTE

Unrestricted Future Land Use Exposure Assumptions - Ingestion of chemicals in soil.

Intake (mg/kg-day) = (Cs x IR x 0.75 x CF x FI x EF x ED)/(BW x AT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs (back-calculated)		
IR	Ingestion Rate (mg soil/day)	100 (< 6 yr)	C	Davis et al, 1990; Calabrese and Stanek 1991;
		50 (> 6 - 30 yr)		Stanek and Calabrese, 1995
		60 (age-adjusted)		
0.75	Adjustment for climate conditions		NA	Time-weighted average, assuming exposure is half during winter months (5 mon/yr) and on precipitation days during warmer months (1 day/wk for 7 months)
CF	Conversion Factor (kg/mg)	1.00E-06		
FI	Fraction ingested from contaminated area	1.00	U	
EF	Exposure Frequency (day/yr)	350		Utilized with average daily soil ingestion rate.
ED	Exposure duration (years)	6 (child < 6 yr)		EPA 1989a
		24 (> 6 - 30 yr)		
		30 (total duration)	U	EPA 1989a
BW	Body weight (kg)	15 (child < 6 yr)	C	EPA 1989b
		57 (> 6 - 30 yr)	C	
		50 (age-adjusted)	C	
AT	Averaging Time (days)	2190 (child < 6 yr)		Noncancer Evaluation AT = exposure duration
		8760 (> 6 - 30 yr)		
		10950 (total duration)		
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
U = Upper Bound Value

Unrestrictive Future Land Use Exposure Assumptions - Dermal contact with chemicals in soil.

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
CF	Conversion Factor (kg/mg)	1.00E-06		
SA	Skin surface area in contact with soil (cm2)	2000 (< 6 yr)	U/C	25% (U) of ave total body surface area (C)
		4100 (> 6 - 30 yr)	U/C	(7300 cm2 (<6 yr) and 16364 cm2 (>6-30 yr)
		3680 (age-adjusted)		(EPA, 1992)
AF	Skin Adherence factor (mg/cm2)	0.6	M	between central tendency (0.2 mg/cm2) and upper bound value (1 mg/cm2) (EPA 1992)
ABS	Absorption factor	Chemical Specific		EPA 1992, Wester et al, and professional judgement
EF	Exposure Frequency (day/yr)			
		150 (< 6 yr)	U	Assume negligible exposure during 5 mon of indoor exposure
		100 (> 6 - 18 yr)		(ave. 5 d/wk for 7 mons/yr)
		74 (>18 - 30 yr)		(5 d/wk for 3 mon + 2 d/wk for 4 mon)
		100 (age-adjusted)		(3 d/wk for 3 mon + 2 d/wk for 4 mons)
ED	Exposure Duration (years)	6 (child < 6 yr)		EPA 1989a
		24 (> 6 - 30 yr)		
		30 (total duration)	U	EPA 1989a
BW	Body Weight (kg)	15 (child < 6 yr)	C	EPA 1989b
		57 (> 6 - 30 yr)	C	
		50 (age-adjusted)	C	
AT	Averaging time (days)	2190 (child < 6 yr)		Noncancer Evaluation AT = exposure duration
		8760 (> 6 - 30 yr)		
		10950 (total duration)		
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
U = Upper Bound Value
M = between Central Tendency and Upper Bound Values

Unrestrictive Future Land Use Exposure Assumptions - Daily Air Concentration Estimation

Noncancer Evaluation: Air Conc (mg/m3) = [Cs x (1/VF + 1/PEF) x EF x ED]/AT

Cancer Evaluation: Air Conc (ug/m3) = [Cs x (1/VF + 1/PEF) x EF x ED x 1000 ug/mg]/AT

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
1/VF	Inverse of the volatiliaztion factor (kg/m3)	Chemical specific calculation		EPA Methodology
1/PEF	Inverse of the particulate emission factor (kg/m3)	1E-09	NA	EPA default - may not be protective of dusty industrial sites.
EF	Exposure Frequency (day/yr)	350		EPA 1989a
ED	Exposure duration (years)	6 (child < 6 yr)		
		24 (> 6 - 30 yr)		
		30 (total duration)	U	EPA 1989a
AT	Averaging time (days)	2190 (child < 6 yr)		Noncancer Evaluation AT = exposure duration
		8760 (> 6 - 30 yr)		
		10950 (total duration)		
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available

C = Central Tendency Value

M = between Central Tendency and Upper Bound Values

U = Upper Bound Value

RME Industrial Future Land Use Exposure Assumptions - Ingestion of chemicals in soil.

Intake (mg/kg-day) = (Cs x IR x 0.75 x CF x FI x EF x ED)/(BW x AT)

Variable	Definition	Value Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration (mg/kg)	Cs (back-calculated)		
IR	Ingestion Rate (mg soil/day)	100	C	Professional judgement based on site conditions; Calabrese and Stanek, 1991
0.75	Adjustment for climate conditions			Time-weighted average, assuming exposure is half during 5 mon/yr (winter months) and precipitation days (approx 1 d/wk) during nonwinter months.
CF	Conversion Factor (kg/mg)	1.00E-06		
FI	Fraction ingested from contaminated area	1.00	NA	Conservatism of percentile depends on site activities.
EF	Exposure Frequency (day/yr)	245	NA	Utilized with daily average value. Takes into account vacation time and sick time. Assumes workweek of 5 days per week.
ED	Exposure duration (years)	25	U	EPA - represents approx. 95 percentile of employment duration.
BW	Body weight (kg)	70	C	EPA 1989b
AT	Averaging Time (days)	9125		Noncancer Evaluation AT = exposure duration
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
U = Upper Bound Value

RME Industrial Future Land Use Exposure Assumptions - Dermal contact with chemicals in soil.

Dose (mg/kg-day) = (Cs x CF x SA x AF x ABS x EF x ED)/(BW x AT)

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
CF	Conversion Factor (kg/mg)	1.00E-06		
SA	Skin surface area in contact with soil (cm2)	3000	C	15% of ave total body surface area (19400 cm2). Corresponds to the hands, forearms and part of the head.
AF	Skin Adherence factor (mg/cm2)	0.6	M	between central tendency (0.2 mg/cm2) and upper bound value (1 mg/cm2) (EPA 1992)
ABS	Absorption factor	Chemical Specific		
EF	Exposure Frequency (day/yr)	65	C	Assume 3 d/wk during warmer months of the year (May - Sept.)
ED	Exposure Duration (years)	25	U	EPA - represents approx. 95 percentile of employment duration.
BW	Body Weight (kg)	70	C	
AT	Averaging time (days)	9125		Noncancer Evaluation AT = exposure duration
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
M = between Central Tendency and Upper Bound Values
U = Upper Bound Value

Industrial Future Land Use Exposure Assumptions - Daily Air Concentration Estimation

Noncancer Evaluation: Air Conc (mg/m3) = [Cs x (1/VF + 1/PEF) x EF x ED]/AT

Cancer Evaluation: Air Conc (ug/m3) = [Cs x (1/VF + 1/PEF) x EF x ED x 1000 ug/mg]/AT

Variable	Definition	Variable Utilized	Percentile	Rationale/Reference
Cs	Soil Concentration	Cs back-calculated		
1/VF	Inverse of the volatiliaztion factor (kg/m3)	Chemical specific calculation		EPA Methodology
1/PEF	Inverse of the particulate emission factor (kg/m3)	2E-09	NA	EPA default - may not be adequately protective of site with large patches of bare soil and vehicle traffic.
EF	Exposure Frequency (day/yr)	100	NA	During warmer months
ED	Exposure duration (years)	25		
AT	Averaging time (days)	9125		Noncancer Evaluation AT = exposure duration
		25550		Cancer Evaluation AT = 70 year lifetime

NA = Not available
C = Central Tendency Value
M = between Central Tendency and Upper Bound Values
U = Upper Bound Value