

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action

Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

7/8/04VB

Facility Name: National Naval Medical Center (NNMC)
Facility Address: 8901 Wisconsin Avenue, Bethesda, Maryland, 20889
Facility EPA ID #: MD4 17 002 4687

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

If yes - check here and continue with #2 below.

If no - re-evaluate existing data, or

if data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

CURRENT HUMAN EXPOSURES UNDER CONTROL
Environmental Indicator (EI) RCRIS code (CA725)

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be “contaminated” above appropriately protective risk-based “levels” (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>X</u>	<u> </u>	<u> </u>	Key contaminants in groundwater at the facility include arsenic, chromium, iron, manganese, chloroform, TCE, dieldrin and heptachlor epoxide
Air (indoors)	<u> </u>	<u> </u>	<u>X</u>	No significant VOC contamination detected in soil near buildings at Priority I sites. No significant VOC contamination is expected near buildings at the Priority II or III sites.
Surface Soil (e.g., <2 ft)	<u>X</u>	<u> </u>	<u> </u>	Key contaminants at Priority I sites include arsenic, lead, polycyclic aromatic hydrocarbons (PAHs), Aroclor-1260, chlordane, and dieldrin; key contaminants at Priority II and III sites are expected to be similar
Surface Water	<u>X</u>	<u> </u>	<u> </u>	Key contaminant in Stoney Creek is lead.
Sediment	<u>X</u>	<u> </u>	<u> </u>	Key contaminant in Stoney Creek is iron.
Subsurf. Soil (e.g., >2 ft)	<u>X</u>	<u> </u>	<u> </u>	Key contaminants at Priority I sites include arsenic, and benzo(a)pyrene; key contaminants at Priority II and III sites are expected to be similar.
Air (outdoors)	<u> </u>	<u> </u>	<u>X</u>	Concentrations detected in soil at Priority I sites are not at levels that would be a concern in outdoor air; concentrations expected at Priority II and III sites are not at levels that would be a concern in outdoor air.

 If no (for all media) - skip to #6, and enter “YE,” status code after providing or citing appropriate “levels,” and referencing sufficient supporting documentation demonstrating that these “levels” are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each “contaminated” medium, citing appropriate “levels” (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

 If unknown (for any media) - skip to #6 and enter “IN” status code.

Rationale: -Concentrations of some constituents in surface soil, subsurface soil, sediment, surface water, and groundwater exceed EPA Region III residential soil risk-based concentrations (RBCs), tap water RBCs, or MCLs. See *Interim RFI Report No. 1*, dated July 30, 2003 and 5/25/04 NNMC Data, HH EI,

References:

1. NNMC March 11, 2004 letter, *Documentation of Environmental Indicator Determination,(CA725)*, Figure 1, SWMUs and AOCs at NNMC.
2. *Interim RFI Report No. 1*, dated July 30, 2003.
3. *Final Site Investigation Report, National Naval Medical Center, Bethesda, Maryland*, Dames And Moore, Inc., September 1992
4. NNMC 5/25/04 letter, Enclosure(1), *Documentation of Environmental Indicator Determination,(CA725)* Attachment A, Tables 1 – 9.

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

3. Are there **complete pathways** between “contamination” and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

Contaminated Media	Potential Human Receptors (Under Current Conditions)						
	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food ¹
Groundwater		<u>No</u>	<u>No</u>	<u>No</u>			<u>No</u>
Air (indoors)							
Soil (surface, e.g., <2 ft)	<u>Yes</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>
Surface Water	<u>No</u>	<u>Yes</u>			<u>No</u>	<u>No</u>	<u>No</u>
Sediment	<u>No</u>	<u>Yes</u>			<u>No</u>	<u>No</u>	<u>No</u>
Soil (subsurface e.g., >2 ft)				<u>Yes</u>			<u>No</u>
Air (outdoors)							

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors’ spaces for Media which are not “contaminated”) as identified in #2 above.
2. enter “yes” or “no” for potential “completeness” under each “Contaminated” Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential “Contaminated” Media - Human Receptor combinations (Pathways) do not have check spaces (“___”). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- _____ If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter ”YE” status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
- X_____ If yes (pathways are complete for any “Contaminated” Media - Human Receptor combination) - continue after providing supporting explanation.
- _____ If unknown (for any “Contaminated” Media - Human Receptor combination) - skip to #6 and enter “IN” status code

Rationale:

Residents via contaminated:

- Groundwater: pathway not complete; no groundwater use in or near the facility.
- Surface soil: residential homes are sufficiently close to SWMU 5 to create a pathway for residents to the surface soil there, north of Taylor Road.
- Surface water: pathway not complete; the nearest potentially contaminated surface water body, Stoney Creek (SWMU 23), is sufficiently far from the residences that an exposure is not likely.
- Sediment: pathway not complete; the nearest potentially contaminated sediment is in Stoney Creek (SWMU 23), which is sufficiently far (more than 500 feet away) from the residences that an exposure is not likely. No signs of trails to access the sediment or the surface water in Stoney Creek are visible at the site.

¹ Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

Workers via contaminated:

- Surface soil: facility maintenance and grounds workers periodically drop-off and pick-up vegetative debris in the small open area in SWMU 2; facility employees and utility workers may be exposed to the surface soil in SWMU 5 while using the sidewalks or working on utilities on the edges of the site; utility workers are exposed to the surface soil in SWMU 9 while working on utilities within the site.
- Surface water: utility workers are exposed to the surface water in Stoney Creek (SWMU 23) while working on utilities that run along and/or cross the creek.
- Sediment: utility workers are exposed to the sediment in Stoney Creek (SWMU 23) while working on utilities that run along and/or cross the creek.

Day-care facilities via contaminated:

- Groundwater: pathway not complete; no groundwater use in or near the facility.
- Surface soil: the day-care facility is fully fenced and is sufficiently far (more than 500 feet of walkable terrain) from the nearest SWMU or AOC to make an exposure to surface soil extremely unlikely. No signs of trails to access the sediment or the surface water in Stoney Creek are visible at the site.

Construction workers via contaminated:

- Groundwater: the depth to groundwater (15 to 70 feet below the surface) and the fact that the groundwater exists within, or marginally above, the fractured bedrock makes it extremely unlikely that construction workers will be exposed to groundwater during excavation work within any of the SWMUs or AOCs.
- Surface soil: construction work within SWMUs or AOCs which includes surface disturbance will certainly expose construction workers to surface soil.
- Subsurface soil: construction work within SWMUs or AOCs which includes excavation will certainly expose construction workers to subsurface soil.

Trespassers via contaminated:

- Surface soil: the presence of trespassers at NNMC is extremely unlikely, due to the high level of security involved with entering the facility, and the fact that an uninterrupted security fence exists along the entire perimeter of the facility. Therefore, no pathways need to be evaluated for this receptor.
- Surface water: the presence of trespassers at NNMC is extremely unlikely, due to the high level of security involved with entering the facility, and the fact that an uninterrupted security fence exists along the entire perimeter of the facility. Therefore, no pathways need to be evaluated for this receptor.
- Sediment: the presence of trespassers at NNMC is extremely unlikely, due to the high level of security involved with entering the facility, and the fact that an uninterrupted security fence exists along the entire perimeter of the facility. Therefore, no pathways need to be evaluated for this receptor.

Recreational users via contaminated:

- Surface soil: recreational users of the walking trails around SWMU 5 may be exposed to surface soil.
- Surface water: recreational users of the walking trails around and crossing Stoney Creek (SWMU 23) are not likely to be exposed to the surface water in the creek, due to the access limitations provided by the steep slopes and heavy vegetation around the edges of the creek. No signs of trails to access the sediment or the surface water in Stoney Creek are visible at the site.
- Sediment: recreational users of the walking trails around and crossing Stoney Creek (SWMU 23) are not likely to be exposed to the sediment in the creek, due to the access limitations provided by the steep slopes and heavy vegetation around the edges of the creek. No signs of trails to access the sediment or the surface water in Stoney Creek are visible at the site.

Food users via contaminated:

- Groundwater: pathway not complete; no groundwater use in or near the facility.
- Surface soil: pathway not complete; the vegetable garden at SWMU 5 is no longer used.
- Surface water: surface water in Stoney Creek not used for irrigation of any food crop areas on site.
- Sediment: sediment in Stoney Creek (SWMU 23) is not used in any food crop areas on site.
- Subsurface soil: pathway not complete; the vegetable garden at SWMU 5 is no longer used.

Reference(s): See Page 2

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **“significant”**² (i.e., potentially “unacceptable” because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable “levels” (used to identify the “contamination”); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable “levels”) could result in greater than acceptable risks)?

X If no (exposures can not be reasonably expected to be significant (i.e., potentially “unacceptable”) for any complete exposure pathway) - skip to #6 and enter “YE” status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If yes (exposures could be reasonably expected to be “significant” (i.e., potentially “unacceptable”) for any complete exposure pathway) - continue after providing a description (of each potentially “unacceptable” exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to “contamination” (identified in #3) are not expected to be “significant.”

_____ If unknown (for any complete pathway) - skip to #6 and enter “IN” status code

Rationale: - To determine if the exposures for the complete pathways identified in #3 can reasonably be expected to be "significant" when appropriate, the potential risk was quantitatively evaluated. These calculations are shown in NNMC 5/25/04 letter, Enclosure(1), Documentation of Environmental Indicator Determination, Attachment A, Tables 1 – 9. The exposure pathways are based on current site conditions and uses. The risk calculations incorporate the general methodology described in Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual, Part A (USEPA, December 1989) and applicable USEPA Region III Technical Guidance Manuals for Risk Assessment.

The levels of arsenic measured at SWMU 5 and SWMU 9 appear fully consistent with the natural background levels in the area. Because it is assumed that the arsenic measured is representative of background conditions, arsenic has not been included in any of the quantitative risk calculations.

Trans-1,4-dichloro-2-butene was reported in one soil sample at SWMU 5. This single detection at 61 ug/kg was detected in a field duplicate and was qualified as an estimated value (J-flagged) by the validator due to a continuing calibration error. However, the parent sample for this duplicate did *not* detect trans-1,4-dichloro-2-butene down to 5.3 ug/kg. While there is not an RBC for trans-1,4-dichloro-2-butene in soil, there is an RBC for 1,4-dichloro-2-butene in ambient air. As a conservative measure, the single soil detection was used to estimate air concentrations associated with fugitive and volatile emissions from soil. The method presented in the USEPA’s Soil Screening Guidance Document (USEPA, May 1996) was used and the calculated air concentration was compared to the USEPA Region III ambient air RBC for trans-1,4-dichloro-2-butene. The estimated air concentration of trans-1,4-dichloro-2-butene (3.8E-06 mg/m³) exceeded the RBC (6.7E-07 mg/m³) and therefore was quantitatively evaluated in the risk calculations.

Further, the additionally potential risks from dermal and ingestion exposure to the measured soil level of trans-1,4-dichloro-2-butene was estimated by EPA, and those risks are of the same order of magnitude as those from inhalation. Thus, the maximal potential risks are about twice the inhalation calculations, or 3 E-05.

However, the inclusion of trans-1,4-dichloro-2-butene in the risk calculations represents a maximum risk evaluation since the compound was detected in only a single sample, and was not detected in its duplicate.

² If there is any question on whether the identified exposures are “significant” (i.e., potentially “unacceptable”) consult a human health risk assessment specialist with appropriate education, training and experience.

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

Therefore the potential calculated risks from exposure to trans-1,4-dichloro-2-butene via inhalation and dermal and ingestion contact are overstated, both because the sample results may not be real and because, if the detection is real, it occurred in only one sample. Thus, actual risks would likely be far lower than those reported herein.

At SWMU 2:

Facility grounds workers: Facility grounds workers are not at the SWMU every day, and when they are at the SWMU, are only there for a short period of time. Therefore, although the maximum detected concentrations of benzo(a)pyrene and benzo(b)fluoranthene in surface soil slightly exceed the industrial soil RBCs, SWMU 2 is not expected to pose an unacceptable risk to human health due to the lower frequency and duration of contact these receptors might have with soil than those used to calculate industrial soil RBCs.

At SWMU 5:

Residents: Five constituents (chlordan, arsenic, chromium, thallium, and vanadium) were detected in surface soil at SWMU 5 in at least one sample at a concentration greater than their respective USEPA Region III risk-based concentration (RBC) for residential contact with soil.

The detected concentrations of arsenic in surface soil at SWMU 5 are within concentrations that are likely naturally occurring in the local and regional area. Because it is assumed that the arsenic measured is representative of background conditions, arsenic has not been included in any of the quantitative risk calculations.

The maximum detected concentration of each constituent was used as the concentration that a resident may come into contact with. This assumption likely overestimates actual exposure to residents.

The non-carcinogenic hazard index (HI) for the adult resident (0.09) is below the USEPA target HI (1). The non-carcinogenic hazard index (HI) for the child resident (1) is at the USEPA target HI (1).

Chlordane is the only constituent detected that is evaluated as a carcinogen. Using the maximum detected concentration of chlordane, the resident Excess Lifetime Cancer Risk (ELCR) would be 3E-06. Although this is greater than 1E-06, since the maximum detected concentration was used, the ELCR is likely to be less than the calculated maximum of 3E-06 and thus residential risks are deemed acceptable.

Recreational Users: Five constituents (benzo(a)pyrene, arsenic, chromium, copper, thallium, and vanadium) were detected in surface soil at SWMU 5 in at least one sample at a concentration greater than their respective USEPA Region III RBC for residential contact with soil. Two constituents (chromium and trans-1,4-dichloro-2-butene) were detected in surface soil at SWMU 5 at concentrations greater than their respective USEPA Region III RBC for ambient air. The ambient air concentrations were calculated in accordance with USEPA Soil Screening Guidance Document (USEPA, May 1996). However, the inclusion of these two constituents results in ELCRs that represent a maximum possible risk since it is assumed that all chromium in soil is hexavalent chromium, which is unlikely and since trans-1,4-dichloro-2-butene was detected in only a single duplicate sample, and not in its parent sample. Therefore the potential calculated risks from inhalation exposure to chromium and from inhalation and dermal exposure to trans-1,4-dichloro-2-butene are overstated and actual risks would likely be lower.

The detected concentrations of arsenic in surface soil at SWMU 5 are within concentrations that are naturally occurring in the local and regional area. Because it is assumed that the arsenic measured is representative of background conditions, arsenic has not been included in any of the quantitative risk calculations.

The non-carcinogenic HI for the adult recreator (0.1) and youth recreator (0.1) are below the USEPA target HI (1). The ELCRs for adult (9E-07) and youth (6E-07) recreators are below 1E-06, and therefore not considered 'significant'.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

Construction Worker: It was assumed that construction workers could be exposed to surface and subsurface soil at any location within SWMU 5. Seven constituents (benzo(a)pyrene, chlordane, arsenic, chromium, copper, thallium, and vanadium) were detected in surface soil at SWMU 5 in at least one sample at a concentration greater than their respective USEPA Region III RBC for residential contact with soil. Five constituents were detected in subsurface soil (benzo(a)pyrene, arsenic, chromium, thallium, and vanadium) in at least one sample at a concentration above their respective RBCs for residential contact with surface soil. Two constituents (chromium and trans-1,4-dichloro-2-butene) were detected in surface soil at SWMU 5 at concentrations greater than their respective USEPA Region III RBC for ambient air. The ambient air concentrations were calculated in accordance with USEPA Soil Screening Guidance Document (USEPA, May 1996). However, the inclusion of these two constituents results in ELCRs that represent a maximum possible risk since it is assumed that all chromium in soil is hexavalent chromium, which is unlikely and since trans-1,4-dichloro-2-butene was detected in only a single duplicate sample, and not in its parent sample. Therefore the potential calculated risks from inhalation exposure to chromium and from inhalation and dermal exposure to trans-1,4-dichloro-2-butene are overstated and actual risks would be lower than those reported herein.

The detected concentrations of arsenic in surface soil at SWMU 5 are within concentrations that are naturally occurring in the local and regional area. Because it is assumed that the arsenic measured is representative of background conditions, arsenic has not been included in any of the quantitative risk calculations.

The non-carcinogenic HI for the construction worker (1) is at the USEPA target HI (1). The ELCR for construction worker (2E-05) is greater than 1E-06. This risk is driven by inhalation of chromium and trans-1,4-dichloro-2-butene (4E-06). However, the construction worker ELCR is conservative because it assumes that all chromium in the surface and subsurface soil at SWMU 5 is hexavalent chromium, and that the single detection of trans-1,4-dichloro-2-butene in the duplicate sample is a valid result. Thus, this potential risk is deemed acceptable.

Utility Worker: It was assumed that utility workers could be exposed to surface soil at any location within SWMU 5. Seven constituents (benzo(a)pyrene, chlordane, arsenic, chromium, copper, thallium, and vanadium) were detected in surface soil at SWMU 5 in at least one sample at a concentration greater than their respective USEPA Region III RBC for residential contact with soil. Two constituents (chromium and trans-1,4-dichloro-2-butene) were detected in surface soil at SWMU 5 at concentrations greater than their respective USEPA Region III RBC for ambient air. The ambient air concentrations were calculated in accordance with USEPA Soil Screening Guidance Document (USEPA, May 1996). However, the inclusion of these two constituents results in ELCRs that represent a maximum possible risk since it is assumed that all chromium in soil is hexavalent chromium, which is unlikely and since trans-1,4-dichloro-2-butene was detected in only a single duplicate sample, and not in its parent sample. Therefore the potential calculated risks from inhalation exposure to chromium and trans-1,4-dichloro-2-butene via inhalation and dermal exposure are overstated and actual risks would be lower than those reported herein.

The detected concentrations of arsenic in surface soil at SWMU 5 are within concentrations that are naturally occurring in the local and regional area. Because it is assumed that the arsenic measured is representative of background conditions, arsenic has not been included in any of the quantitative risk calculations.

The non-carcinogenic HI for the utility worker (0.4) is below the USEPA target HI (1). The ELCR was based on utility worker exposure to benzo(a)pyrene via incidental ingestion and dermal contact with soil and inhalation of chromium from soil particulates. The ELCR for utility worker (4E-06) is greater than 1E-06. This ELCR represents a maximum risk but it is acceptable because it assumes that all chromium in soil was hexavalent chromium, which is highly unlikely, and that the single detection of trans-1,4-dichloro-2-butene in the duplicate sample is a valid result. Therefore actual ELCR would likely be below 1E-06 and therefore not 'significant'.

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

At SWMU 9:

Construction Worker: It was assumed that construction workers could be exposed to surface and subsurface soil at any location within SWMU 9. Three constituents (benzo(a)pyrene, arsenic, and chromium) were detected in surface soil at SWMU 9 in at least one sample at a concentration greater than their respective USEPA Region III RBC for residential contact with soil. Two constituents were detected in subsurface soil (arsenic and chromium) in at least one sample at a concentration above their respective RBCs for residential contact with surface soil. The maximum detected concentrations of these constituents were used in the risk calculations as the concentration to which receptors would be exposed. These risk calculations therefore are assumed to overestimate actual exposure and consequently risk.

The detected concentrations of arsenic in surface and subsurface soil at SWMU 9 are within concentrations that are naturally occurring in the local and regional area. Because it is assumed that the arsenic measured at SWMU 9 is representative of background conditions, arsenic has not been included in any of the quantitative risk calculations.

The non-carcinogenic HI for the construction worker (0.2) is below the USEPA target HI (1). The ELCR for construction worker (8E-08) is far less than 1E-06. This ELCR is conservative since it assumes that all chromium in the surface and subsurface soil is hexavalent chromium, which is not likely an accurate characterization of site conditions.

Utility Worker: It was assumed that utility workers could be exposed to surface soil at any location within SWMU 9. Three constituents (benzo(a)pyrene, arsenic, and chromium) were detected in surface soil at SWMU 9 in at least one sample at a concentration greater than their respective USEPA Region III RBC for residential contact with soil. The maximum detected concentrations of these constituents were used in the risk calculations as the concentration to which receptors would be exposed. These risk calculations therefore are assumed to overestimate actual exposure and consequently risk.

The detected concentrations of arsenic in surface soil at SWMU 9 are within concentrations that are naturally occurring in the local and regional area. Because it is assumed that the arsenic measured at SWMU 9 is representative of background conditions, arsenic has not been included in any of the quantitative risk calculations.

The non-carcinogenic hazard index (HI) for the utility worker (0.09) is below the USEPA target HI (1). The ELCR for utility worker (2E-06) is greater than 1E-06. However, this ELCR represents a maximum risk but it is acceptable because it assumes that all chromium in soil was hexavalent chromium, which is highly unlikely. Based on this and the use of the maximum detected concentration as the exposure concentration, the actual ELCR would likely be below 1E-06 and therefore not 'significant.'

At SWMU 23:

Utility Worker: Utility workers could be exposed to surface water and sediment in Stoney Creek (SWMU 23). The maximum detected concentration of lead in Stoney Creek surface water is 27.4 ug/L and exceeds the screening level of 15 ug/L. Since the screening level is based on daily ingestion of potable water, the actual contact rates for utility workers with surface water in Stoney Creek is significantly less than a potable drinking source, the screening level exceedance is not indicative of a potentially "significant" exposure to utility workers.

Although the maximum detected concentration of iron in Stoney Creek sediment (29,800 mg/kg) exceeded the screening value (23,000 mg/kg) none of the potentially complete exposure scenarios would result in contact/exposure with Stoney Creek sediments at the high rates assumed in the screening value. Given the low magnitude of the exceedance and the high contact rates assumed in the screening values, utility worker contact with sediments in Stoney Creek are not 'significant.'

Reference(s): See Page 2

Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)

5. Can the “significant” **exposures** (identified in #4) be shown to be within **acceptable** limits?
- _____ If yes (all “significant” exposures have been shown to be within acceptable limits) - continue and enter “YE” after summarizing and referencing documentation justifying why all “significant” exposures to “contamination” are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
- _____ If no (there are current exposures that can be reasonably expected to be “unacceptable”)- continue and enter “NO” status code after providing a description of each potentially “unacceptable” exposure.
- _____ If unknown (for any potentially “unacceptable” exposure) - continue and enter “IN” status code

Rationale and Reference(s):

**Current Human Exposures Under Control
Environmental Indicator (EI) RCRIS code (CA725)**

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

X YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the National Naval Medical Center facility, EPA ID # MD4 17 002 4687, located at 8901 Wisconsin Avenue, Bethesda, Maryland under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.
(unknown for surface water, sediment, and groundwater)

Completed by (signature) _____ /s/ _____ Date 7/9/04
Vernon Butler
RPM

Supervisor (signature) _____ /s/ _____ Date 7/9/04
Bob Greaves, Chief
RCRA Operations Branch
EPA Region III

Locations where references may be found:

EPA Region III RCRA Reference Library, Philadelphia, PA

Contact telephone and e-mail numbers
(name) Vernon Butler, RPM
(phone #) (215) 814 - 3425
(e-mail) butler.vernon@epa.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.