



DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 36
CRANF., INDIANA 47512-5000

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NSWC CRANE
5090.3a

IN REPLY REFER TO
5090/4.7.5
Ser 0592/5374

14 DEC 2005

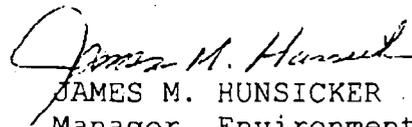
U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Corrective Action Section
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center submits the Final Statement of Basis (SB) for the Dye Burial Grounds (DBG), Solid Waste Management 02 as enclosure (1). Also presented, as enclosure (2), are the responses to the November 10, 2005 comments by the U. S. EPA on the Draft DBG SB. The permit required Certification Statement is provided as enclosure (3).

If you require any further information, my point of contact is Mr. Thomas J. Brent, Code 0592-TB, at 812-854-6160, email thomas.brent@navy.mil.

Sincerely,


JAMES M. HUNSICKER

Manager, Environmental Protection
By direction of the Commanding Officer

Enclosures: 1. Final DBG SB
2. Response to the U. S. EPA Comments
3. Certification Statement

Copy to:
ADMINISTRATIVE RECORD
SOUTHNAVFACENGCOM (Code ES31) (w/o encl)
IDEM (Doug Griffin)
TTNUS (Ralph Basinski) (w/o encl)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James M. Henside

SIGNATURE

Manager, Environmental Protection

TITLE

12/14/05

DATE

Enclosure (1)
Final Statement of Basis
for
Dye Burial Grounds
Solid Waste Management Unit 02

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY STATEMENT OF BASIS
FOR CORRECTIVE ACTION AT SOLID WASTE MANAGEMENT UNIT #02/11
(DYE BURIAL GROUNDS)
NAVAL SURFACE WARFARE CENTER CRANE, CRANE, INDIANA

INTRODUCTION

This Statement of Basis (SB) was prepared to satisfy requirements of the Resource Conservation and Recovery Act (RCRA) Corrective Action process. This process is designed to identify sites that are known to be, or may be, hazardous to human health and the environment and to propose and implement remedies for correcting unacceptable environmental conditions. This introduction describes the site to which this SB applies, the environmental conditions at the site, and the action that is proposed to ensure future protection of human health and the environment.

FACILITY NAME AND DESCRIPTION

This SB applies to the Dye Burial Grounds (DBG), located in the east central area of Naval Surface Warfare Center (NSWC) Crane (Figure 1). NSWC Crane is located in a rural, sparsely populated area in the south central region of the state of Indiana. Most of NSWC Crane is forested, and the surrounding area is wooded or farmed land.

NSWC Crane manufactures, renovates, and tests equipment, shipboard weapons systems, and ordnance for the United States Navy. More detailed physical and operational descriptions of NSWC Crane and the DBG are provided in Section 1.0 of the RCRA Corrective Measures Study (CMS) Report (TtNUS, 2005) and in the text below.

The DBG is listed as Solid Waste Management Unit (SWMU) #02/11 in the NSWC's RCRA permit. However, it is commonly referred to as SWMU 2 or the DBG (Figure 2).

PURPOSE OF DOCUMENT

This Statement of Basis:

- Is a mechanism and basis for gathering public comments for selection of a remedy to correct unacceptable environmental conditions that exist at the DBG.
- Summarizes information that can be found in greater detail in the RCRA Facility Investigation (RFI) and CMS reports and other documents contained in the Administrative Record for NSWC Crane.
- Describes DBG contaminants and the proposed RCRA Corrective Action remedy at NSWC Crane. The SB also explains the rationale for selecting this remedy from among other possible remedies.
- Describes all remedies evaluated in the process of selecting the proposed remedy.
- Provides information on how the public can be involved in the remedy selection process.

IMPORTANCE OF PUBLIC COMMENT

The "public" includes the general public, the owner or operator of NSWC Crane, and other parties (e.g., public interest groups and regulatory agencies). Because of a

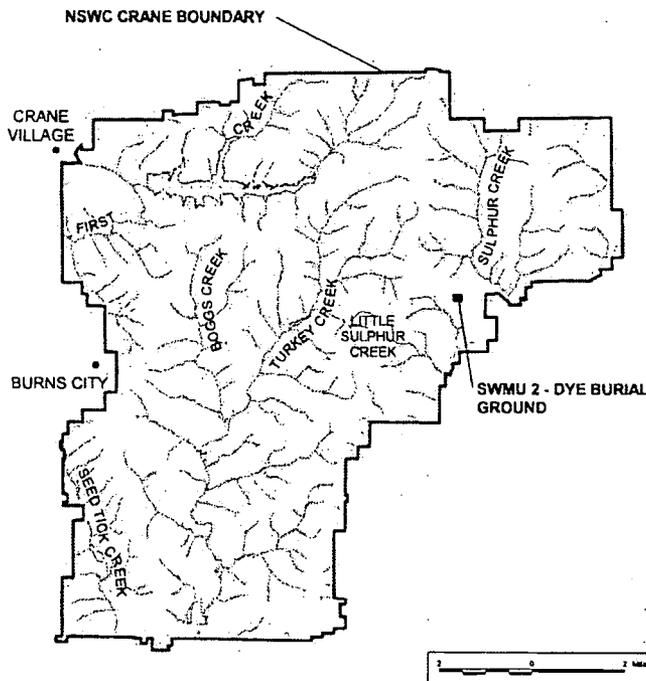


Figure 1: Location of DBG at NSWC Crane

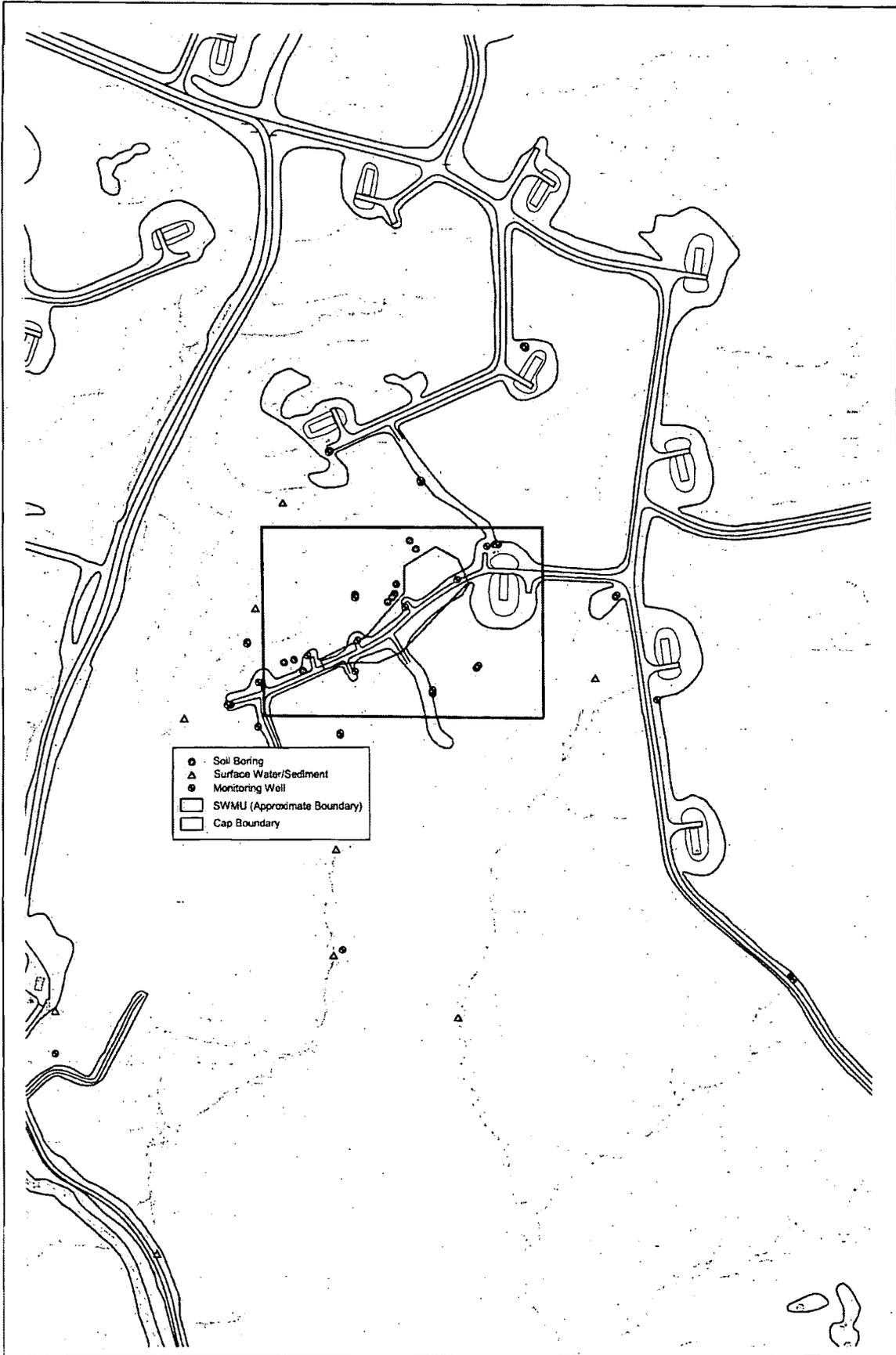


Figure 2: Dye Burial Grounds

slight potential for exposure of the public to DBG contaminants, the public may have an interest in understanding the environmental conditions at the DBG and the relationship of the proposed or alternate remedies to correcting the environmentally unacceptable conditions. The United States Environmental Protection Agency (EPA) may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives.

FACILITY BACKGROUND

DESCRIPTION OF NSWC CRANE DYE BURIAL GROUNDS

Figure 1 shows the location of the DBG, which is approximately 12.4 acres in size and surrounded by hilly terrain. The DBG lies approximately 500 feet southwest of the crest of a north-northwest trending ridge that separates Sulphur Creek from Little Sulphur Creek (LSC). Sulphur Creek and LSC are two of seven primary creeks that carry surface water from the NSWC Crane facility and eventually drain into the East Fork of the White River and then to the Wabash River to the southwest. No aquatic habitats have been identified at SWMU 2. The closest NSWC Crane property boundary is approximately one-half mile to the east of the DBG.

An estimated 25 tons of military smoke dyes and dye-contaminated materials (e.g., magnesium, boxes, and rags contaminated with dyes) were deposited in trenches at the DBG from 1952 to 1964. To prevent the spread of contaminants caused by rain percolating through the buried waste, a 4.2-acre multilayered cap of engineered materials and soil was constructed over the trenched portion of the DBG from 1996 to 1998 as an interim remedial measure.

Natural unconsolidated overburden materials and fill comprise the shallow subsurface at the DBG. Silt and clay mixtures underlie this fill or exist at the ground surface where fill is absent. The maximum fill thickness is approximately 10 feet, and fill extends downward to the bedrock surface. Groundwater at SWMU 2 is not currently being used.

Various species of mammals (e.g., white-tailed deer, coyotes, rabbits, and mice) and various bird species (e.g., ducks, geese, wild turkey, and American robins) live or forage at the DBG. The DBG bird population may include a number of threatened species, endangered species, or species of special concern although direct evidence of these species inhabiting the DBG has not been found to date. These species include the bald eagle, osprey, sharp-shinned hawk, red-shouldered hawk, broad-winged hawk, black and white warbler, hooded warbler, and the worm-eating warbler (TINUS, 2005). The Indiana bat, an endangered

species, may live or forage at SWMU 2.

INVESTIGATIONS CONDUCTED AT THE DBG

Various investigations were conducted at the DBG from 1981 to 1986 as part of multi-SWMU investigations. The Initial Assessment Study (IAS) began in April 1981. The IAS concluded that the DBG did not present an immediate human health or environmental threat; however, further study at the DBG was recommended (NEESA, 1983). An RFI Phase II Groundwater Assessment was performed from 1987 to 1990 (U.S. ACE, 1991). The RFI Phase III groundwater release characterization commenced in October 1990. In 1991, a geophysical investigation was conducted to delineate the boundaries of the dye burial trenches and to identify buried anomalies. These investigations culminated with the installation of the multilayered cap to prevent migration of contaminants caused by infiltrating rain water (Figure 3). During cap construction, outlying disposal trench/waste areas were excavated and placed under the capped area. Figure 4 (page 4) depicts the burial trench locations relative to the approximately 4.2-acre capped area.



Figure 3: Dye Burial Ground Cap

In late 1997 during cap construction, dye-contaminated water was observed in the cap construction area, primarily in the northeastern and northwestern areas. This seepage, caused by inadequate controls for managing precipitation runoff, is no longer a problem now that the cap is in place. The dye-impacted water was determined to be non-toxic and the water was collected and then discharged into a sanitary sewer manhole located in the east central portion of the facility.

In 2001, additional RFI Phase III field activities were conducted at SWMU 2 with objectives as follows:

- To refine estimates of the nature and extent of contamination.
- To evaluate human health risks.

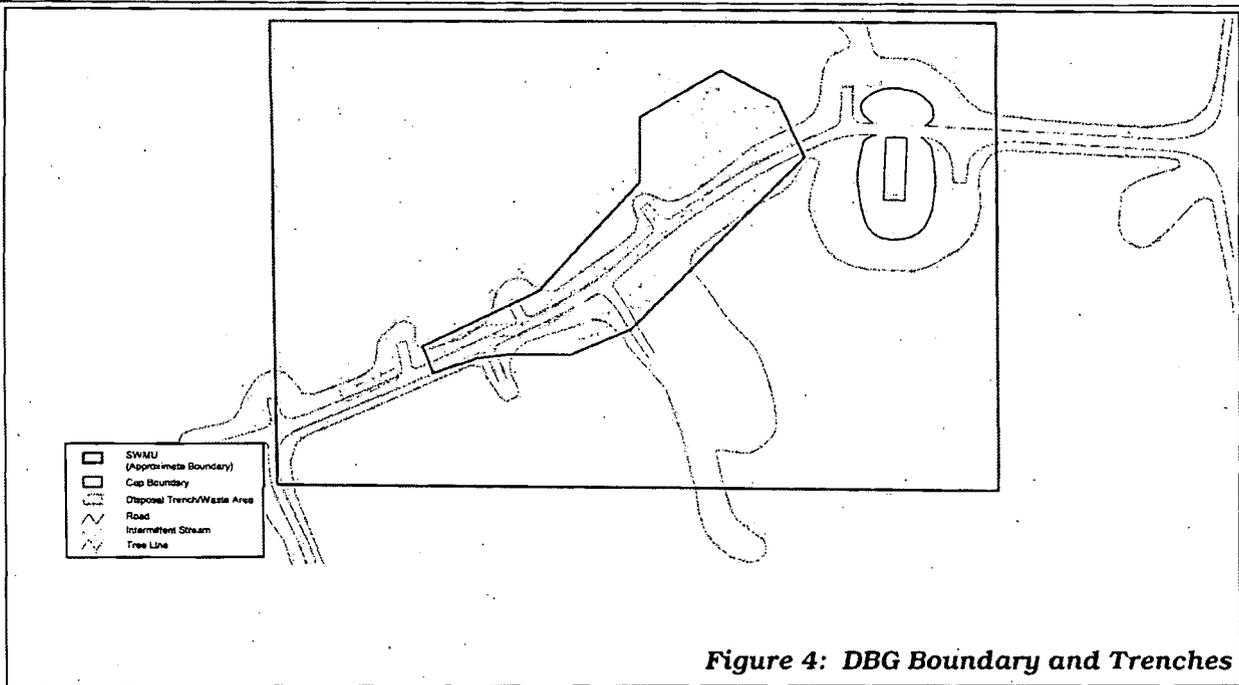


Figure 4: DBG Boundary and Trenches

- To estimate risks to the environment.
- To determine whether the cap placed over the trenches is preventing chemical contaminant migration.

At the outset of the RFI, an analytical method was developed specifically to detect dyes known to have been buried at the DBG and to quantify the dye concentrations in soil and water. Samples of soil, surface water, sediment, and groundwater were collected from outside the perimeter of the cap. Groundwater samples were also collected from below the capped region. An RFI report (TtNUS, 2004) was completed to describe the nature and extent of contamination and the results of the human health and ecological risk assessments. Dyes were not detected in any of the surface soil, groundwater, surface water, or sediment samples collected during RFI Phase III sampling in 2001. Two organic dyes (Acid Orange 10 and Acid Yellow 23) were detected in 6 of 20 subsurface soil samples collected at depths ranging from 3 feet to 11 feet below ground surface (bgs) outside of the capped area. All dye concentrations detected in subsurface soil samples were less than 12 milligrams per kilogram (mg/kg). This is low compared to concentrations that would represent a potential problem, as is described below. The available data indicate that SWMU 2 has had little impact on environmental media with respect to dyes. An absence of dye detections in groundwater samples demonstrates that dyes are not migrating in detectable concentrations from subsurface soils. The cap has evidently prevented migration of dyes from underneath the cap to areas outside the cap by preventing precipitation from percolating through the capped soil.

Metals concentrations in DBG surface and subsurface soil were found to be similar to background concentrations and thus indicate that SWMU 2 operations have not caused metal concentrations in soil to increase. While some elevated metal concentrations were detected in SWMU 2 groundwater (at one well only), the available evidence indicates that groundwater is not contaminated with metals as a result of SWMU 2 operations. Some of this evidence is the lack of physical connection between the elevated groundwater concentrations and the organic dyes that were disposed at SWMU 2. Additional evidence is the knowledge that the highest metals concentrations were observed at the monitoring well that had the lowest pH measurement. The low pH conditions, which were concluded to be naturally occurring, result in dissolution of naturally occurring metals, thus increasing their concentrations. The elevated metal concentrations were therefore not attributed to site operations (TtNUS, 2005).

SUMMARY OF DBG RISKS

Human health and ecological risk assessments were performed to quantify non-cancer and cancer risks posed by site contaminants to humans and other organisms (TtNUS, 2004). No significant cancer-related risk was identified for humans, and no significant risk at all was identified for plants or animals. The cancer-related human health risks were within the EPA acceptable risk range of 1×10^{-6} to 1×10^{-4} incremental lifetime cancer risk. The worst non-cancer-related risks (3.8 for a hypothetical future adult resident and 13 for a hypothetical future child resident) exceeded the EPA acceptable Hazard Index (HI) range of 0.0 to 1.0 but all other non-cancer risks were within the acceptable range. Although dyes were detected in soil, the elevated

Enclosure (2)
Responses to the November 10, 2005 U. S. EPA Comments
on the
Draft Statement of Basis
for the
Dye Burial Grounds
Solid Waste Management Unit 02

**FINAL RESPONSES TO UNITED STATES ENVIRONMENTAL PROTECTION AGENCY COMMENTS
(DATED 10 NOVEMBER 2005) CONCERNING THE STATEMENT OF BASIS (DATED AUGUST, 2005)
FOR NAVAL SURFACE WARFARE CENTER CRANE SOLID WASTE MANAGEMENT UNIT #02/11
(DECEMBER 01, 2005)**

Comment 1)

I think the Proposed Remedy section on page 3 should be combined with the Rational for Selecting the Proposed Remedy on page 7 as they basically contain similar information. For the first bullet under the Proposed Remedy section, it would be good to further explain why residential land use is unlikely for the foreseeable future.

Response to Comment 1)

With minor wording changes, the bulk of the original Proposed Remedy section has been combined with "Rationale for Selecting the Proposed Remedy" section on page 7. That section has been renamed to "Proposed Remedy and Rationale for Selection." The old "Proposed Remedy" section has been deleted.

In addition, the first bullet under the old proposed remedy section (now in the "...Rationale..." section) has been expanded to explain why SMWU 2 is not likely to become residential for the foreseeable future. To accomplish this, the following sentence has been inserted into the first bullet of this revised section as a new second sentence.

"The DBG is part of NSWC Crane, which has a history of more than 50 years as a military base, and is expected to remain a military base for decades into the future."

Comment 2)

2) Page 4 states that Figure 4 depicts the burial trench locations relative the capped area, but I can't see them on my copy.

Response to Comment 2)

Figure 4 has been enlarged to make the burial trenches, and the legend identifying them, easier to see and read, respectively.

Comment 3)

3) The first paragraph at the top of page 5 should be fleshed out more to explain why metals are not a risk in either soil or groundwater.

Response to Comment 3)

The text at the top of page 5 has been reworded and expanded as follows to better explain why metals are not a risk in either soil or groundwater.

"Metals concentrations in DBG surface and subsurface soil were found to be similar to background concentrations and thus indicate that SMWU 2 operations have not caused metal concentrations in soil to increase. While some elevated metal concentrations were detected in SWMU 2 groundwater (at one well only), the available evidence indicates that groundwater is not contaminated with metals as a result of SWMU 2 operations. Some of this evidence is the lack of physical connection between the elevated groundwater concentrations with the organic dyes that were disposed at SWMU 2. Additional evidence is the knowledge that the highest metals concentrations were observed at the monitoring well that had the lowest pH measurement. The low pH conditions, which were concluded to be naturally occurring, result in dissolution of naturally occurring metals,

thus increasing their concentrations. The elevated metal concentrations were therefore not attributed to site operations (TINUS, 2005)."

Comment 4)

4) Summary of DBG risks: call out calculated risk/Hi levels relative to EPA acceptable risk ranges. Referring to the second to last sentence, it may be useful to state elevated metals were found in one well only and that groundwater use restrictions will prevent use.

Response to Comment 4)

The following text now replaces the third and fourth sentences of the "Summary of DBG Risks" section:

"The cancer-related human health risks were within the EPA acceptable risk range of 1×10^{-6} to 1×10^{-4} incremental lifetime cancer risk. The worst non-cancer-related risks (3.8 for a hypothetical future adult resident and 13 for a hypothetical future child resident) exceeded the EPA acceptable Hazard Index (HI) range of 0.0 to 1.0 but all other non-cancer risks were within the acceptable range.

The following text was added as a new second-to last sentence of the "Summary of DBG Risks" section:

Discounting the elevated metal concentrations in the well that had the lowest pH and, especially, preventing domestic groundwater use, would result in acceptable levels of non-cancer risk."

The following text has been added as the last sentence of the "Summary of DBG Risks section" to explain that elevated metals were found in one well only and that groundwater use restrictions will prevent use:

"The implementation of land use controls to prevent exposure to groundwater will ensure that the actual risks are acceptable."

Comment 5)

Referring to the Scope of Corrective Action section, when developing the remedial design, I will want you to include groundwater monitoring for metals to see what is occurring at the SWMU. The need for metals monitoring can be re-evaluated based on observed data.

Response to Comment 5)

EPA Target Analyte list (TAL) metals, except mercury, will be added to the list of analytes in the Corrective Measure implementation Plan. Mercury will be excluded because:

1. it has not historically been a problem at SWMU 2
2. it is not associated with the military dyes
3. mercury analysis is a separate, and therefore, additional analysis from the other 22 TAL metals.

Comment 6)

Under "Rationale for Selecting the Proposed Remedy: for Alternative 3," note that treating and destroying the contamination was evaluated and found to be infeasible/not practical.

Response to Comment 6:

The following text was added to the end of the third paragraph of "Rationale for Selecting the Proposed Remedy" (Now "Proposed Remedy and Rationale for Selection"):

"Treating and destroying the contamination were evaluated as part of Alternative 3 but these options were found to be infeasible or too costly to be of practical value."