**RESPONSES TO U.S. EPA REGION 5 COMMENTS DATED APRIL 26, 2007 REGARDING THE SWMU 12 (MINE FILL A) NAVY RESPONSE TO COMMENTS DATED MARCH 16, 2007**

U.S. EPA comments are shown in bold font. Responses to U.S. EPA comments are shown in regular font. Proposed changes to the SWMU RFI are shown in italic font within parenthesis.

**U.S. EPA Comment Regarding Navy Response 3:**

**This response discusses Phase I investigation information on locations at SWMU 12 where staining and solvent releases may have taken place (B-196; B-155). The response concludes that neither location has been investigated to date. This information contradicts what was presented in the February 2003 QAPP, page 1-13 which stated that there were "no known release pathways for organic solvents to have infiltrated environmental media." The Navy should include these areas for investigation for organics releases. Even with the additional work recently done to investigate the sumps to fill data gaps, this raises a concern that additional areas of potential/known releases have been thus far overlooked at this SWMU. Based on the buildings/structures listed in the new Table 1-3 as having no investigations completed, prepare a summary of known historical operations at those locations, potential for releases, and whether investigation is warranted. Table 1-3 presented in does not include B-196. Confirm all MFA structures are accounted for. Referring to Table 1-3, supplement those entries stating "IMR recommended NFA" with a note on why (e.g., 'because explosives levels were below residential').**

Response:

A summary table (updated version of Table 1-3) of SMWU 12 buildings has been prepared and is enclosed with this response to comment document. B-196 and other new buildings not previously shown in Table 1-3 have been included. Historical operations and the potential releases are summarized based on the best available information. In some cases, there is limited or no documentation regarding historical operations. Please note the following when reviewing the information provided:

- As detailed in Table 1-3, residual contamination (explosives contamination) was left in place at several buildings because infrastructure prevented the excavation of soils in some areas. The Navy is in the process of determining if some of this infrastructure will be removed (i.e., buildings demolished). This will allow access to/remediation of some of the areas that could not be remediated previously.
- As noted in Table 1-3, the Navy is currently evaluating the need for further investigation in the vicinity of Bldg 155 and Bldg 196.

**U.S. EPA Comment Regarding Navy Responses 5 and 40:**

**This is a minor comment, but the original comment was directed at the visible "vein" of very high lead contamination in the area as shown in Photo 5 from TolTest's MFA Battery Site IMR Addendum #1 document dated May 2005. Is the theory that the 'vein' originated from the disposed batteries or does it appear to continue into the hillside at depth and come from some other source?**

Response:

Based on the Toltest MFA Battery Site IMR Addendum #1, two trenches were dug into the hillside. Each trench was approximately two-feet deep and seven feet long. Each trench was dug from the bottom of the slope to the top of the slope. The vein of dark soil was readily apparent in both trenches and was

detected underneath the rubble of the Soil Area. Because the vein of contamination was detected below the rubble, it is assumed the contamination comes from some other unknown source. However, given the proximity of the referenced contamination to the Battery Area, one plausible explanation is that the contamination may be associated with historic battery disposal activities in this area.

**U.S. EPA Comment Regarding Navy Responses 21 and 22:**

**Referring to the discussions of the settling basin, what is the source of the 'influent pipe'? Is it still active/visibly flowing? Are there no MFA historical drawings available which would provide additional information on this (such as were found for SWMU 9, SWMU 16)? Response to comment 22 seems to have tentatively identified the basin discharge point ("appears to be an outfall"); however, is it not possible to visually confirm it as the basin outfall? It may be helpful to forward me the photos of this area. Response 21 states that observations indicate that the basin has held large volumes of water and shows water level staining. This directly contradicts the statement in Response 22: "It...does not show staining from a water level". The text of Response 22 indicates that the "outfall" was sampled prior to dilution and contains metals contamination at levels which would indicate the basin as a source of ongoing metals contamination. This discharge should be eliminated.**

Response:

Pictures of the settling basin and influent pipe are attached to this Response to Comment document.

The response to Comment 22 has been changed to remove the contradictory statement regarding "does not show staining from the water level". The new response is as follows:

*"Similar logic applied to other locations and parameters yields the following conclusions. Surface water at sampling location 12SW/SD35 is contaminated with metals relative to any measure (e.g., upgradient concentrations or SVs). This is evident because this location appears at the top of the rankings in Table 5-1 for every metal except manganese. In several cases, the concentrations of metals at this location were orders of magnitude greater than the next highest concentrations. This location, sampled only in Round 2, appears to be an outfall from the settling basin numbered 3037 in Figure 5-2, but multiple conversations with NSWC Crane facilities managers could not confirm this.*

*Regarding the concrete basin, there is little available history. Verbal communications have led to conflicting statements whether the basin was ever used. Photographs of the basin clearly show horizontal water level lines at various positions between the top rim and bottom of the basin. The most pronounced line appears to be within two feet of the basin bottom but one line appears to be within two feet of the basin rim. The basin outfall was sampled directly, before any dilution of the effluent took place. Locations downgradient of this location also would be expected to exhibit elevated metals concentrations.*

*Location 12SW/SD02, which is within 100 feet of location 12SW/SD35, consistently appeared in the upper half and even the upper fourth of the concentration distributions in Table 5-1. If location 12SW/SD02 represented only background concentrations, some of the results would be expected to fall in the lower half of the concentrations distributions by chance alone. The distribution of 12SWSD02 data indicates that concentrations at this location are comparable to upgradient concentrations even though they are in the upper half of upgradient concentrations. If location 12SW/SD35 is ignored, nearby locations 12SW/SD34 and 12SW/SD36 were frequently the locations of the highest or nearly highest concentrations. Because these locations are nearby 12SW/SD35, if they are contaminated, they should exhibit contaminants similar to those detected at 121SW/SD35. Instead, where as they generally fall in the top fourth of the metal rankings, the metals concentrations at these two locations generally lie within the range of upgradient metal concentrations and are much more consistent with metal concentrations in other SWMU 12 samples. Based on these observations, it is reasonable to conclude that contamination from 12SW/SD35 is bounded in the downgradient direction by metals concentrations representing the*

*upper end of the upgradient concentration distributions. If any metals contamination is present at locations near to 12SW/SD35 it is not clearly discernible from the available data."*

QUESTION FOR THE NAVY: DOES NAVY AGREE TO ELIMINATE THIS DISCHARGE POINT? DOES THE NAVY WANT TO FURTHER INVESTIGATE BY DIGGING TO DETERMINE SOURCE OF INPUT AND CONFIRM CONNECTION BETWEEN OUTFALL AND SETTLING BASIN?

**U.S. EPA Comment Regarding Navy Response 27:**

**Revised text for Section 6.2.1 was not submitted with the responses so I am uncertain as to what the new text says, but since the phrase "the preparation of nitrate and" has been removed, does the new text give the impression that MFA production activities would not be a source of nitrate?**

Response:

No. The first paragraph of Section 6.2.1 references the nitrate containing materials used at SWMU 12 (ammonium nitrate fertilizers). A sentence has been added at the end of the first paragraph indicating that bioremediated soil at SWMU 12 contains chicken manure, which also contains nitrogen compounds.

The first paragraph of Section 6.2.1 has been changed as follows:

*"MFA was used for the production of large mines, depth charges, rocket heads, aerial bombs, and projectiles. Constituents of these explosives are RDX, TNT, aluminum powder, and wax. Fertilizers (ammonium nitrate) were also melted into bombs. TNT, Composition B, H-6, Tritonal, and Minol were used in mine-filling operations. In the past, explosives powders discharged from roof vents and accumulation on building roofs were washed down to the ground, resulting in the contamination of soils. Large quantities of TNT, Composition B, HBX-1, HBX-3, and H-6 were reportedly collected in sumps at MFA (Halliburton NUS, 1992). In the past, these sumps released explosives-contaminated water directly to surface drainage channels that flow into the Turkey Creek Watershed. In addition, chicken manure used in the composting operation, which is present in the replaced bioremediated soil, contains nitrogen compounds."*

**U.S. EPA Comment Regarding Navy Response 33:**

**Similar to the comments made from Response 21/22 above, are there no MFA historical drawings available which would provide additional information on these structures (such as were found for SWMU 9, SWMU 16)? The sumps will need to be addressed to eliminate any continuing releases.**

Response:

The locations of all sumps, downspouts, storm drains, and other drain lines at SWMU 12 are not well known. The drainage point for the sumps is also not known for at least some of the sumps. Additional sump sampling was conducted in the RFI at SWMU 12. In summary, the sump sampling identified that some of the sumps contained explosives at concentrations of significance as shown in Figures 5-1, and 5-24 and 5-25. The presence of explosives in these locations indicates that they could be continuing sources of groundwater contamination. The primary difference in fate and transport between sump contaminants and the same chemical in other media is that the sump contaminants can only migrate beyond the sumps if the sumps leak or overflow. Leaked contamination from the sumps would be detected in surrounding soils and groundwater. Soils and groundwater across the site have been sampled, especially in those locations where contamination is judged to have been most likely to be released.

**New U.S. EPA Comments**

**Comment 1:**

**Page 5-29 of the new text states that nitrate plus nitrite concentrations exceed the 1 mg/L human health screening level. The units of Table 5-3 are listed as mg/L, but the units in Figure 5-23 for surface water are listed as ug/L. If the figure units are correct, there appear to be no exceedences of the human health screening level. Please correct this discrepancy and ensure that correct units are used on all Tables/figures and text is corrected as needed.**

Response:

The units in Figure 5-23 were incorrect and have been changed to mg/L.

**Comment 2:**

**Referring to the first paragraph on page 5-3, please supply databox figures (tag maps) for those chemicals noted as being omitted because nature and extent can be easily described. One figure can show all detected but omitted inorganics and one all detected but omitted organics. It is much easier to interpret nature and extent and see if there is anything significant via figures than pages of text.**

Response:

The Navy agrees that tag maps are often a very useful method for displaying information. Consequently, the Navy has displayed selected environmental data on approximately 50 different figures prepared for the RFI report. However, a plotting of ***all*** of the available data (i.e., positive detections) on tag maps is not recommended because of the volume of the available data and because the understanding gained from a review of the plots of some of the analytical data is considered minimal (i.e., some analytes are detected infrequently and/or are of limited significance in terms of human health or ecological risk). Example explanations (from the RFI text) as to why certain analytes/data were plotted and why others were not, are provided in the following bullets:

- No organic chemical detections in RFI surface and subsurface soil were plotted because the frequencies of detection were generally low or the detected concentrations were generally low in all soil samples. (Selected explosives data for the bioremediation study ***were*** plotted.)
- There was little soil SVOC chemical contamination detected, and the detected contamination appears to be well bounded. Although soil locations 12SB02 through 12SB11 were not analyzed for SVOCs, it is apparent that SVOC contamination is not significant at SWMU 12, except perhaps at the Battery Site. Furthermore, the infrequent exceedances of applicable SVs and the sparse distribution of human health and ecological SV exceedances suggest that these chemicals either are not site-related or that they are of little significance as contaminants. (SVOC parameters were not plotted.)
- Despite the rejected VOC results, it is clear that organic solvents are not significant site-related contaminants. The most frequently detected VOC was the relatively non-toxic dichlorodifluoromethane (SV = 9,400 µg/kg for human health risk and 39,500 µg/kg for ecological risk). Methylene chloride was the only other VOC detected in soil samples. The detected concentrations of dichlorodifluoromethane ranged from 2 to 15 µg/kg; methylene chloride concentrations ranged from 1 to 2 µg/kg in three samples. These concentrations are generally significantly less than human health and ecological SVs; therefore, VOC contamination at SWMU 12 is not significant. (These parameters were not plotted.)
- The data presented in the IMR indicated that only concentrations of arsenic exceeded residential and/or industrial criteria for the protection of human health (TolTest, 2001, 2002, 2005). An analysis of potential risks for the historical metals is presented in this report in the Human Health and Ecological Risk Assessments (Sections 7 and 8, respectively). The

human health risk assessment, for example, indicated that risks from exposure to arsenic and aluminum in the historical soil samples were acceptable. (These parameters were plotted.)

- Several macronutrients (calcium, magnesium, potassium and sodium) are of little environmental significance and are not discussed further. Cobalt, selenium, and vanadium exhibited no surface soil concentrations in excess of their background surface soil concentration 95/95 upper tolerance limits (UTLs) and the maximum subsurface concentrations of these metals were with within about 2 times their subsurface soil 95/95 upper tolerance limits. Iron concentrations exceeded the 37,400 mg/kg surface soil UTL at 11 fairly widely scattered locations by less than a factor of two in the worst case, and one iron concentration (72,600 mg/kg) exceeded the subsurface soil iron background UTL of 60,200 mg/kg at location 12SB76 by about 21 percent. Therefore, cobalt, iron, selenium, and vanadium are considered either to be minor contaminants or insignificant contaminants and are not discussed further. (These parameters were not plotted.)
- The chemical concentrations in **Figures 5-13 and 5-14** represent those explosives detected most frequently and at the highest concentrations in Gully surface waters and sediments.
- Because the SVOC detections were so infrequent and of such low concentrations, these chemicals do not appear to be site-related contaminants in surface water and sediment and are not discussed further. No spatial plots of these chemicals were generated for this report.
- Of the five chemicals that exceeded human health SVs, the most prevalent was RDX. This is consistent with explosives contamination in other environmental media of SWMU 12. Because this chemical is the most prevalent, its concentrations at temporary well locations were plotted on **Figure 5-26**. Figure 5-26 shows that all but one water-bearing temporary had an overburden groundwater RDX concentration in excess of the 0.61 µg/L human health SV.
- Although RDX concentrations accurately depict the extent of explosives contamination at SWMU 12, the concentrations of those explosives that were most frequently detected at the greatest number of locations and at the highest concentrations relative to groundwater SVs are presented in **Figures 5-27 and 5-28**.
- Groundwater metals data are presented for Puz and Pmz wells in **Figures 5-29 through 5-40** for the most significant metals in terms of potential site-related contaminants.

While the Navy does not recommend tag maps for all chemicals detected in an environmental media, please advise if there are any analytes (e.g., risk drivers) of particular concern to the EPA that have not already be plotted on a tag map.

**Comment 3:**

**The text on page 5-11 states that it is reasonable to consider the SWMU 12 ridge to be a mosaic of sparsely distributed areas of residual explosives contamination in soil. Page 5-13 notes that a significant mass of explosives contamination remains in surface soils and is not delineated in directions away from the sumps. Delineation of the extent of explosives contamination above industrial levels at MFA surface and subsurface soils is required to determine whether additional remedial work may be needed to address remaining accessible source areas (hotspots - e.g. 12SB57/12TW012) that continue to contribute to groundwater contamination. A figure should be prepared showing the locations of residual explosives remaining within MFA (based on bioremediation data and RFI data) and color coded for areas above residential and industrial levels.**

Response:

The current version of the RFI already displays much of the information requested. Figures 1-4, 1-6, 1-8, and 1-10 have been revised to summarize the results of the interim measure post-excavation sampling for the Building 152, 153/154, 157, and 158/159 areas, respectively. Soil concentrations (mg/kg) of HMX, RDX, and TNT are shown at various excavation depths and for the bioremediated backfill. The color coding presented on the figures indicates those areas meeting/not meeting residential and/or industrial clean-up goals. RDX concentrations reported for soil samples collected during the External

Sump/Drainage Investigation are plotted on a revised version Figure 5-1; RDX (the primary contaminant of concern) concentrations greater than 4.4 mg/kg (Region 9 soil PRG assuming residential land use) are highlighted. With regard to the RFI soil data, no organic chemical detections in RFI surface and subsurface soil were plotted because the frequencies of detection were generally low or the detected concentrations were generally low in all soil samples. Please note that while the soils in some of the sump areas may not be completely delineated, the major source areas at SWMU 12 are considered well bounded relative to non-detect values and human health screening values. Additionally, a risk evaluation of the explosives concentrations detected soil samples collected during the External Sump/Drainage Investigation (i.e., the sump area soil samples) indicates that risk estimates for the industrial worker would not exceed the 1E-05 cancer risk level or a Hazard Index of 1. Additional data plots may be prepared if it is concluded that additional soils investigations are necessary for SWMU 12 for purposes of delineating areas that may require remediation for purposes of groundwater protection. Revised Figures 1-4, 1-6, 1-8, 1-10, and 5-1 are attached to this response document.

**Comment 4:**

**The first paragraph of Section 5.3.3.2 makes the statement that metals concentrations are indicative of natural conditions and there is no contamination to delineate. This statement should be changed as the text on the following page states that metals contamination exists at 12SW/SD35. Concentrations at that location would not be indicative of natural conditions.**

Response:

The first paragraph of Section 5.3.3.2 (page 5-29) is specifically describing results for the East Tributary and Turkey Creek Main Stream (TCMS). Location 12SW/SD35 is within the gully; surface water and sediment data for that location are described in Section 5.3.3.1.

The last sentence of the first paragraph of Section 5.3.3.2 on Page 5-29 has been changed as follows to be consistent with the text on Page 5-30:

*"The data for these drainage channels are indicative of natural conditions. The upgradient locations are very similar in metals concentration to downgradient locations throughout the sampled area. Therefore, it does not appear that any significant metals contamination is present in these channels. Nevertheless, some metal concentrations exceeded SVs (see Tables 3-48 and 3-49). Risks from exposure to surface waters are evaluated in Sections 7.0 and 8.0. Figures 5-15 through 5-23 identify where exceedances of SVs occurred. With the exception of the water and sediment contamination concentrated at 12SW/SD35, the metals concentrations are indicative of natural conditions."*