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LETTER REGARDING REGULATORY COMMENTS TO THE ECOLOGICAL RISK COMMENTS FOR OPERABLE UNIT 2 (OU 2) REMEDIAL INVESTIGATION NTC ORLANDO FL
8/31/1999
TETRA TECH

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99-E154

August 31, 1999

Ms. Barbara Nwokike (Code 1873) (IRP RPM)
P.O. Box 190010
2155 Eagle Drive
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0024

Subject; Responses to Eco Risk Comments, OU 2 Remedial Investigation,
Naval Training Center, Orlando

Dear Ms. Nwokike:

Enclosed are our responses to comments provided by USEPA and FDEP on the ecological risk section of the Draft RI report for OU 2. The text of the comments (without appendices) was transmitted via email on August 31, 1999. If there are any further questions or comments regarding the eco risk at OU 2, please contact me at (423) 220-4730.

Sincerely,

Steven B. McCoy, P.E.
Task Order Manager

SBM:sml

Enclosure

c: Mr. Michael J. Campbell, Tetra Tech NUS
Mr. David Grabka, FDEP (2)
Mr. Wayne Hansel, SOUTHDIV
Ms. Nancy Rodriguez, EPA (2)
Ms. Barbara Sparks, Tetra Tech NUS
Mr. Kent Cubbage, Tetra Tech NUS
File/Edb

RESPONSE TO EPA COMMENTS – DRAFT OU 2 RI REPORT
NAVAL TRAINING CENTER, ORLANDO

Reference: Letter from Ms. Nancy Rodriguez, USEPA Region 4, to Mr. Wayne J. Hansel, Southern Division NAVFACENGCOM, SUBJ: "Comments on the Remedial Investigation, Operable Unit 2, McCoy Annex Landfill", May 5, 1999.

III. Ecological Risk Comments:

General Comments:

1. Potential impacts to gopher tortoise should be explicitly addressed. Routes of exposure to this receptor should be evaluated, such as burrowing into contaminated soils. Effects for this state-listed species are more appropriately evaluated for individuals. Thus, conclusions regarding widespread population- or community-level effects do not apply to receptors of concern.

Response: The exposure route discussion (Section 7.2.3) includes exposure to soil chemicals, which is applicable to the gopher tortoise. The gopher tortoise will be added as a receptor to the conceptual site model (Figure 7-1). Although it would be helpful to quantitatively assess potential risks to the gopher tortoise, no suitable tools exist to perform such an assessment. Specifically, toxicity data and exposure parameters for reptiles are limited, preventing quantifying the gopher tortoise in the foodchain modeling.

More importantly, the only section of OU 2 that contains suitable habitat for the gopher tortoise (e.g., wiregrass and open, sandy areas) is in the southern section of OU 2. An interim remedial action (IRA) has recently been completed in a portion of this area. The IRA was performed to address inadequate cover thickness over the landfill and PAH contamination in several locations by increasing the soil cover thickness where needed. Prior to the remedial action, a formal gopher tortoise survey was conducted, and a gopher tortoise relocation permit was obtained by Bechtel Environmental, Inc. The purpose of these actions was to ensure that gopher tortoises would not be harmed. The Florida Game and Fresh Water Fish Commission (FGFWFC) and Florida Natural Areas Inventory (FNAI) were consulted prior to and during the survey and verbal concurrence was given regarding the methods and scope of the survey. It should be noted that FGFWFC and FNAI indicated that due to their resource limitations and other factors, management of populations in areas with excellent gopher tortoise habitat has been given a higher priority than management of individuals, especially in areas where habitat is marginal (i.e., OU 2). Although the survey was conducted as part of the risk management action and not the risk assessment, copies of the survey and the permit completion report are provided for information as Attachment 1.

2. The RI report indicates that the National Wetlands Inventory map classified the entire extreme southeastern portion of the central section of OU-2 as a palustrine, forested, intermediate deciduous, seasonally flooded wetland. The RI report indicates that

contractors who went out to the field in the summer did not see water standing except in a small pond, and concluded that the wetland was confined to the pond area. The extent of the wetlands need to be delineated by trained personnel using an appropriate wetlands manual. Absence of water during the site visit does not mean that this area.

Response: The wetlands in the southeastern portion of the central section of OU 2 were determined to most likely be confined to the pond because most of the remainder of this area is obvious upland and golf course fairways/greens.

Cypress forests are a valued ecological resource in Florida. A map should be provided showing the extent of various land cover and habitat types. The map should illustrate the boundaries of the cypress, the NWI mapped wetlands, and the ponds. The location of the gopher tortoise burrow mentioned on Page 7-7 should also be marked on the map.

Response: A wetlands delineation was performed as part of the recently completed IRA and is provided as Attachment 2. An NWI map showing the location of wetlands and ponds is included. Information on the location of gopher tortoise burrows is included in Attachment 1.

3. Several inconsistencies were noted between the ecological risk assessment discussion and the hydrogeology section. A consistent conceptual site model of how the landfill interacts with the surface water is needed. Better data or interpretation of data may be needed to justify this model.

Response: A discussion of how the landfill interacts with surface water will be added to the hydrogeology section.

4. One purpose of the screening-level ecological risk assessment is to provide the scope and focus of the baseline ecological risk assessment. The RI report, however, includes a broad list of assessment endpoints, which cover essentially all receptor guilds. When little information is available to help the risk assessor decide which assessment endpoints are the most sensitive, this approach will work. However, EPA prefers a more focused approach where assessment endpoints are chosen based on the constituents present.

Response: The screening-level ERA presented broad assessment endpoints that are inclusive of all potentially affected ecological receptors and detected analytes. These assessment endpoints are consistent with the types of assessment endpoints previously accepted by Region 4. The EPA guidance document, *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments* (USEPA 1997) (the "Process Document"), suggests using broad and inclusive assessment endpoints at the screening-level stage.

When abiotic screening values are available, assessment endpoints need not be presented until after the screen. At that time the list of chemicals of potential concern will be shorter, allowing the risk assessor to focus on assessment endpoints for these few chemicals.

Response: If additional ecological study was warranted at OU 2, more focused receptor- and chemical-specific assessment endpoints would be developed as part of a baseline ERA. These would have focused on potential risks from some chemicals in southern section soils and on surface water throughout the OU (from groundwater discharge). However, an IRA has been completed to address the soil contamination in the southern section of the OU and additional groundwater study is being conducted. Therefore, it is not anticipated that a baseline ERA and related, more focused assessment endpoints, are warranted.

5. This risk assessment is not following EPA's ERAGS guidance known as the "Process Document," which divides the ecological risk assessment into the screening-level risk assessment and the baseline risk assessment. The first step is the abiotic screen of maximum detected concentrations by environmental medium. Errors in this risk assessment include the elimination of "essential nutrients" and performance of background screen prior to the toxicity screen. The screening-level risk assessment is to be completed prior to refinement of chemicals of potential concern. Note that Steps 1 and 2 of EPA's ERA Process do not include background screening or elimination of essential nutrients. Refinement of COPCs occurs in Step 3. Refinement can involve background screening or consideration of such factors as frequency of detection, pattern of detection, or magnitude of exceedance. Food chain models can be part of COPC refinement.

Response: The elimination of essential nutrients in the screening-level assessment is common practice and has routinely been accepted by Region 4 EPA in ERAs at other sites, including recent ERAs at NTC Orlando (e.g., OU 3). As stated in Section 7.2.4, the ability of most organisms to tolerate high doses of these nutrients is well documented in the literature, and insufficient data are available to quantitatively evaluate them. As a result, their inclusion in the risk assessment will add little value to the assessment and would not affect the conclusions.

A recent Department of the Navy ecorisk memorandum (DON, 1999) has put forth (with national EPA's concurrence) the Navy's interpretation of the 8-step ERA process. The memorandum presents the analysis of such items as frequency of detection and magnitude of exceedances as part of Step 3A, "Refinement of Contaminants of Potential Concern." Prior to initiation of this memorandum, there was no widely accepted place in an ERA to discuss these issues and, therefore, difficulties existed in distinguishing them from the screening-level ERA. Hence, the OU 2 ERA presented these issues in Section 7.7 ("Discussion") after the screen. Section 7.7 will be re-titled "Step 3A, Refinement of Contaminants of Potential Concern" and will be distinguished in the text from the first two screening steps.

Historically no consensus among the regulatory community has been reached regarding the most appropriate place in an ERA to evaluate background concentrations for inorganics. The Process Document is nebulous with regards to this issue. The recent Navy ecorisk memorandum states that it is preferable to evaluate background as part of Step 3A. This memorandum was issued after the draft OU 2 ERA was prepared. The two times average background screening was conducted prior to the toxicity screen to conform to recent Region 4 EPA

acceptance of this practice in ERAs at other sites, including recent ERAs at NTC Orlando (e.g., OU 3). Although it would be preferable to evaluate background as part of Step 3A in the OU 2 ERA, making such a change would not alter the results and conclusions. Only surface soils were screened against background screening values and very few chemicals were "screened out" based on these comparisons. As a result, the conclusions of the ERA would be unaffected by changes in background methodology. However, the surface soil screening tables will be revised to include hazard quotients for all chemicals, including those screened out based on background comparisons. Further, the evaluation of background in the screen in this ERA will be discussed in the uncertainties. It should also be noted that the authors of the Process Document (e.g., David Charters) believe that (conservative) foodchain modeling should be conducted as part of the screen. Modeling can be revised using less conservative input parameters in Step 3A, if desired.

Reference: Department of the Navy (DON), 1999. *Navy Policy for Conducting Ecological Risk Assessment*, Office of the Chief of Naval Operations, Washington, DC.

6. The RI report is not organized according to the ERAGS guidance. The screening-level ERA and the problem formulation refinement of COPCs are blended together rather than broken out in the order specified in the guidance. The ordering has eliminated information that risk managers need to make a decision about this site. The missing pieces that need to be added are: (1) the comparison of "essential nutrient" concentrations to background screening values and (2) the comparison of chemical concentrations that are below background screening values to available ecotoxicity screening values. Either the report should be reorganized to include this information up front in the tables or the missing information should be added to the uncertainties section. Tables could easily be modified to incorporate this information.

Response: The elimination of essential nutrients in the screening-level assessment is common practice and has routinely been accepted by Region 4 EPA in ERAs at other sites, including recent ERAs at NTC Orlando (e.g., OU 3). As stated in Section 7.2.4, the ability of most organisms to tolerate high doses of these nutrients is well documented in the literature, and insufficient data are available to quantitatively evaluate them. As a result, comparison of essential nutrient concentrations to background screening values does not provide significant decision-making information. Inclusion of essential nutrients in the risk assessment will add little value to the assessment and would not affect the conclusions.

Only surface soils were screened against background screening values and very few chemicals were screened out based on these comparisons. However, hazard quotients will be calculated for the surface soil chemicals that were screened out based on comparisons to the background screening concentrations.

7. The RI report puts forth a management goal to evaluate whether the landfill cover is thick enough to burry contaminated soils and prevent surface-water runoff from transporting contaminants to waterbodies. The ecological risk assessment should carry through with this evaluation. Areas of localized contamination should be checked for presence of a thin landfill cap.

Response: Although the management goal mentioned in the comment was stated in the RI report, the intent of the ERA was to objectively assess potential risks based on available information. Risk management alternatives will be assessed in the FS phase.

8. Aluminum, chromium, copper, lead, iron, mercury, and zinc exceed surface water screening values in nearly all three landfill sections. The screening levels are based on ambient water quality criteria, which may be ARARs for this site. Surface water quality may need additional evaluation, perhaps by collection of background data. The variation between samples and their duplicates or re-samples appears great.

Response: In the recent resampling effort during August 1999, six surface water samples were obtained from upstream locations at the boundaries of OU 2. These samples will be used to determine the offsite contribution, if any, to exceedances in OU 2 surface water. In addition, all of the surface water samples for mercury analysis were obtained using ultra-clean techniques and will be analyzed using a Hg-clean laboratory.

Groundwater resampling was also performed in the summer of 1999 with ultra low flow techniques to minimize turbidity and the contribution of solids to the inorganic exceedances. All of the new data from the latest round of sampling will be incorporated into the RI report.

Metals are often detected at elevated concentrations in surface water but are not particularly elevated in sediments. This may indicate that the canals receive their metals primarily from inputs of dissolved metals from ground water versus particulate metals from soil erosion or particulate matter in highway and parking lot runoff. Further investigate why sediments are not sequestering the metals detected in surface water.

Response: Surface water may be receiving chemicals from discharging groundwater; however, sediments appear to contain only low concentrations of chemicals. For the most part sediment chemistry has been adequately characterized and related potential risks are low. That is, a sediment problem does not exist from an ecological standpoint; determining the reasons why a problem does not exist is beyond the scope of an RI.

Address the potential transport of metals to the downstream lake.

Response: Potential transport to downgradient ponds and the lake will be more fully discussed.

9. The sediment data should be examined for grain size and other physical parameters to possibly explain the lack of constituent detection.

Response: As indicated in the response to comment #8, a sediment problem does not exist from an ecological standpoint; determining the reasons why a problem does not exist is beyond the scope of an ecological risk assessment.

10. Vanadium has a hazard quotient above 1 for at least one receptor in each of the landfill sections. However, the RI report quotes a statement by Mailman (1980) that vanadium is of no toxicological consequence in the environment. These statements are contradictory and imply that the Mailman reference may be applied out of context. Please eliminate the statement that vanadium is generally not considered to be toxic in the environment. The statement that vanadium is generally not toxic may be because vanadium is generally not detected at elevated levels like those found at this landfill. This general statement cannot be used to annul a site-specific finding of potential risk.

Response: As discussed in Section 7.5 of the text, a hazard quotient greater than 1.0 implies the *potential* for risk, but does not definitively mean that risks are present. Several common inorganic chemicals, including vanadium, frequently have HQs greater than 1.0 but are found not to pose potential risks. This is generally because the toxicity tests used to develop guidelines for these chemicals maximize exposure and toxicity in the laboratory. They typically use toxic and bioavailable forms of chemicals that are rarely, if ever, found in the environment. It is common practice to use literature-based toxicological information to determine a finding of low potential risk when an HQ greater than 1.0 has been generated from the conservative screening, as discussed in Step 3 in the Process Document.

11. The ecological risk assessment lacks a table summarizing the final COPCs or final conclusions. Instead of summarizing the discussion section, Section 7.9 should present conclusions to the risk manager who wants to know whether the landfill impacts sediment or surface water.

Response: A conclusions section (Section 7.10) will be added following Section 7.9. A table summarizing the conclusions of the ERA will be included.

12. Dividing the site up into three sections may make sense for the selection of COPCs, however, the final summary (Section 7.9) should combine the various sections as a summary for the entire site to be consistent with the rest of the RI report.

Response: We believe it is appropriate to provide a final summary for each of the three sections. We will, however, provide a conclusions section (Section 7.10) for the entire site.

Specific Comments:

1. Page 5-47, Section 5.2.6, Inorganics. The second sentence states that "Calcium, total chromium, magnesium, potassium, and sodium are abundant in natural soils, have a low toxicity to humans, and have no State of Florida SCTLs for Residential Direct Exposure." A similar statement occurs on the bottom of Page 5-110, the section on inorganics in sediment. However, on Page 5-110 a different set of inorganic constituents is described as abundant in natural soils and of low toxicity to humans. These two lists should be examined for consistency and modified appropriately. Chromium should not be classified as having low toxicity to humans. If the form of chromium is unknown, it should be considered the most toxic form, which may differ between human health and ecological risk assessment.

Response: The two lists will be modified to be consistent. Chromium will not be listed as having low toxicity to humans.

2. Page 7-8, Section 7.2.2, Major Chemical Sources and Migration Pathways. The sections on the migration pathways and exposure routes are too general. This section should add a paragraph summarizing the constituents detected in environmental media. Then tailor the discussion of migration pathways specifically to the constituents detected at McCoy Annex Landfill.

Response: Section 7.2.2 is intended to be general to encompass all possible chemical migration pathways that could be present (i.e., nothing is overlooked), because there are large numbers of different chemicals and chemical types detected in OU 2 media, and this assessment is a screening-level ERA only.

3. Page 7-8, Between Sections 7.2.2 and 7.2.3. The risk assessment lacks a section on Ecotoxicity and Potential Receptors. Insert a new section here. Given the particular constituents at the landfill and what you know about their ecotoxicity, describe what ecological receptors are likely to be affected. This section is intended to focus selection of assessment endpoints on the chemicals, their potential ecological effects, exposure pathways, and potential receptors appropriate to the specific situation at McCoy Annex Landfill. This discussion is needed to justify the assessment endpoints chosen for the risk assessment. You must link the ecotoxicity of the site-related constituents to sensitive receptors at the site.

Response: The list of detected analytes and types of receptors present is lengthy and does not allow for a focused, specific, and detailed discussion of these issues at the screening level. These items were discussed appropriately in general terms in this screening-level ERA. If a baseline ERA was to be conducted, these items would be discussed in detail. Nevertheless, a baseline ERA does not appear to be warranted due to the recently conducted soil IRA and proposed FS study of groundwater chemicals at OU 2 (as they relate to impacts on surface water). These actions can and will address the potential risks identified in the ERA.

4 Page 7-8, Section 7.2.3, Exposure Routes. This section is too general and fails to mention exposure to biota that work the soil or inhabit burrows, such as soil invertebrates.

Response: The exposure route discussion (Section 7.2.3) includes exposure to soil chemicals, which is applicable to the gopher tortoise. It should be noted that FGFWFC and FNAI indicated that, due to their resource limitations and other factors, management of populations in areas with excellent gopher tortoise habitat has been given a higher priority than management of individuals, especially in areas where habitat is marginal (i.e., OU 2).

The section does not take into account the specific constituents present when evaluating the routes of exposure. The section should emphasize exposures to the specific constituents detected at McCoy Annex Landfill. Pathways should be site-specific, focusing on those that are reasonably anticipated and are to be evaluated quantitatively. Instead of discussing dermal contact with contaminated media as in human health, discuss direct contact exposure with surface water, sediment, and soils by organisms living within and in close contact with impacted media. Consider exposure through the food chain as indirect exposure. Evaluate whether site-specific constituents will bioaccumulate into forage material or prey items before discussing dietary exposures. Since the gopher tortoise has been identified as a receptor of concern to the State, describe how this important receptor might become exposed to site constituents.

Response: The list of detected analytes and types of receptors present is lengthy and does not allow for a focused, specific, and detailed discussion of these issues at the screening level.

5. Page 7-9, Section 7.2.4, Selection of Analytes to be Investigated. This section eliminates four essential nutrients and chemicals within background ranges. No chemicals should be eliminated prior to the toxicological screen. This type of discussion should be moved to Page 7-54 before the Discussion.

Response: Please refer to the response to General Comment #5.

6. Page 7-11, Section 7.2.6, Conceptual Site Model. The conceptual site model shown in Figure 7-1 does a fairly good job of diagraming constituent fate and transport with movement of constituents to receptors. However, the diagram depicts transport pathways, such as wind erosion and dust, that are negligible. The diagram is inclusive of everything and fails to distinguish pathways that will be quantified from those that theoretically could occur but are not quantified. (Shading did not show up.)

Response: The conceptual model will be revised to highlight the proper shading of pathways that distinguish exposure routes that were quantitatively evaluated from those that were qualitatively evaluated.

Also, the diagram fails to trace the constituents through the ecosystem. Relationships between predator and prey are not depicted by the diagram. It may be helpful to illustrate food chains or food webs with a separate figure.

Response: Although additional illustrations of food chains or foodwebs would surely be helpful, they are beyond the scope of this screening-level ERA.

7. Page 7-11, Section 7.2.6, Conceptual Site Model. Text in Section 7.2.6 is also important. Currently the text describes what a conceptual site model is but does not describe the CSM for McCoy Annex Landfill. The conceptual site model section should summarize the findings of the previous sections on ecotoxicity and potential receptors and complete exposure pathways in a succinct statement, which includes justification for the assessment endpoints.

Response: Additional discussion of the site-specific aspects of the OU 2 conceptual model will be added to Section 7.2.6. Nevertheless, the conceptual model discussion is intended to be relatively general and inclusive for this assessment, which was a screening-level ERA only.

8. Page 7-23, Section 7.4.2, 2nd paragraph. The report states that drinking water exposure represents a minor route of exposure for most receptors. This is true for chemicals that are strongly bound to soils or sediments. However, for some chemicals surface water exposure is significant. This determination cannot be made based on other Navy sites, but must be based on the physical/chemical properties of the chemicals detected at McCoy Annex Landfill. Based on the fact that chemicals are showing up in the surface waters at levels of concern more often than in sediments, surface water may be a significant route of exposure for this site. Better justification is needed for excluding surface water exposure.

Response: The inclusion of surface water in the foodchain modeling would, in retrospect, provide useful information for the ERA. However, as discussed in Section 7.4.2, drinking water exposure for the same or similar receptors have been used at other Navy sites in Florida and has been shown to be negligible despite elevated concentrations. Thus, the inclusion of surface water in the foodchain modeling for OU 2 would probably result in little change in the conclusions but would require substantial revisions to the tables and text. Additional justification for the exclusion of surface water exposure in the ERA for OU 2 will be added to the text.

9. Page 7-25, Section 7.5, Preliminary Risk Calculation, third paragraph. The risk assessment screens COPCs by maximum concentration and average concentration. The text appears to imply that chemicals with a hazard quotient greater than 1 for both the average and the maximum concentrations are more of a concern for remediation than those chemicals that hazard quotients greater than 1 for only the maximum concentration. Comparing the maximum and the average concentration is a measure of the "patchiness" of chemical distribution. An isolated area of elevated concentration may be a logical place to remediate. Chemicals with a hazard quotient less than 1 for the average concentration should not be categorically eliminated, especially for receptors with a small home range.

Response: Chemicals which had a hazard quotient greater than 1.0 for the maximum but not the average were not eliminated from consideration based on this criterion alone. In these instances, other information was used with these comparisons to determine a finding of risk/no risk. When a chemical had a hazard quotient greater than 1.0 for the maximum but not the average at OU 2 it was generally indicative of a hot spot of contamination. Although hot-spot remediation is always an option and should be considered in the FS phase, hot spots often indicated that widespread, population- or community-level effects were not present as they related to the assessment endpoints.

10. Page 7-26, Section 7.6.1.1, Northern Section Surface Water. Iron has a surface-water screening value, as shown in Table 7-5. However, the first sentence in this section leaves iron out. The second sentence lists iron as one of the chemicals lacking a screening value. These discrepancies regarding iron should be corrected.

Response: Section 7.6.1.1 will be revised to include iron as a COPC in northern section surface water based on the maximum detected concentration exceeding the Region 4 screening level.

11. Page 7-29, Section 7.6.1.2, Northern Section Sediment. Heptachlor is shown on Table 7-6 as having being detected in sediment. However, the text does not mention this chemical as a COPC. Text should be revised.

Response: Section 7.6.1.2 will be revised to indicate that heptachlor was a COPC in northern section sediment because no Region 4 screening level was available.

12. Page 7-29, Section 7.6.1.3, Northern Section Surface Soil. The tables for surface soil (Tables 7-7, 7-15, and 7-23) include all detected constituents, which is appreciated. However, the fact that only those constituents that exceed background screening values are discussed in the text is problematic. The sections on the surface soil should start out by listing all of the constituents that exceeded the screening values. Afterwards it can be mentioned that chromium and aluminum were screened out for having concentrations below 2x background. This is necessary to be consistent with the tables and with EPA's approach of not screening for background before toxicity. The same applies with chromium in Section 7.6.2.3 and chromium and vanadium in Section 7.6.3.3.

Response: As discussed earlier, the background screening will be retained but hazard quotients will be calculated for those chemicals whose maximum concentrations did not exceed the background screening concentrations.

13. Tables 7-7, 7-15, and 7-23 show selection of chemicals of potential concern in soils. Currently, the tables do not calculate a hazard quotient for chemicals with concentrations below the background screening value. The hazard quotients should be added to be consistent with EPA's approach of screening for toxicity before screening for background.

Response: Tables 7-7, 7-15, and 7-23 will be revised to include hazard quotients for chemicals with concentrations below the background screening concentrations.

14. Page 7-47, Section 7.6.3.1, Southern Section Surface Water. The first sentence in this section fails to mention that iron was detected in southern section surface water at concentrations greater than Region 4 screening levels (Table 7-21). The second sentence should not list iron as one of the chemicals lacking a screening value. Please correct.

Response: Section 7.6.3.1 will be revised to include iron as a COPC in southern section surface water based on the maximum detected concentration exceeding the Region 4 screening level. Iron will be deleted from the list of chemicals without Region 4 screening levels in the second sentence.

15. Page 7-66, Section 7.7.1, Northern Section Surface Water. The first paragraph describes "upgradient" sources, such as roads and parking lots, which are suggested to transport chemicals in surface-water runoff to the drainage ditch. Section 5.4.8, hydrogeology, however, concludes that the presence of the same metals in surface water as in ground water is consistent with the local hydrogeologic system, because the aquifer discharges to the canal. Section 5.4.6 expresses an opinion that the concentrations in sample SW010 may indicate a local source; because the downstream sample, station SW012, also had elevated concentrations. Highway runoff was indicated to be a potential source for metals detected in sample SW021, but no such conclusion was advanced for SW010. Section 2.2.3, hydrogeology, indicates that the surficial aquifer will discharge water to the canal during baseflow conditions. The report also indicated that no highflow conditions were encountered in the field when net flow from the canal might have been observed. This implies that the surface-water samples were taken during baseflow or hydrograph recession and were, thus, reflective of releases from the surficial aquifer rather than reflective of stormwater runoff inputs from local highways and parking lots. Section 7.7.1 appears inconsistent with the rest of the RI report. The contribution of ground water to elevated concentrations in surface water deserves further attention.

Response: Any inconsistencies between Section 2.2.3, Section 5.4, and the ecological risk assessment will be reconciled. Groundwater contributions of chemicals to surface water will be discussed in greater depth.

16. Page 7-69, Northern Section Surface Soil, first paragraph, last sentence. I agree that widespread population or community level effects are unlikely due to the PAHs in Sample S103. However, given the nature of PAHs not to bioaccumulate, one should consider potential effects to biota inhabiting soil in the immediate vicinity rather than effects to wide-ranging receptors. For rare species, like the gopher tortoise, effects to individuals are all that might be necessary to produce effects of ecological consequence. Moreover, elevated concentrations of PAHs in soils in the Hole 7 area are associated with detections in surface water at levels of concern. PAHs in surface soil may, therefore, be of concern for migration to surface water. The discussion should address these two points.

Response: Additional discussion of PAHs in soils in the Hole 7 area and possible migration of PAHs to surface water will be added to Section 7.7.1.

17. Page 7-72, Central Section Sediment, first sentence. The statement that surface soil is not contributing to central section surface water is contradictory to Section 5.4.2. This inconsistency needs to be reconciled and points to a general deficiency in providing an integrated conceptual site model.

Response: There does not appear to be a contradiction, as Section 5.4.2 implies that surface soil may contribute SVOCs to surface water, while page 7-72 states that it does not appear that surface soil is contributing inorganics to central section surface water.

Reference:

USEPA, 1997. *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments,* U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC, EPA 540-R-97-006.

RESPONSE TO FDEP COMMENTS – DRAFT OU 2 RI REPORT NAVAL TRAINING CENTER, ORLANDO

Reference: Letter from Mr. David P. Grabka to Mr. Wayne Hansel, RE: "Draft Remedial Investigation Report for Operable Unit 2", April 1, 1992.

Ecological Risk Assessment

Section 7.1.3 Region 4 Screening Levels

On page 7-13, TTN indicated that the lowest value of surface soil screening levels among a variety of sources [Friday, 1998; Beyer, 1990; ORNL (Efroymson et al., 1997); the Netherlands (MHSP&E, 1994, etc.] was used to determine chemicals of potential concern. However, TTN did not indicate the source of screening numbers for individual chemicals presented in Table 7-7 (page 7-30). We suggest that the source of the numbers be included in the table, as this would facilitate the review process. In addition, the soil screening numbers for copper, DDE, DDT, and dieldrin in Table 7-7 are higher than those indicated for these chemicals in the new Dutch Soil Cleanup Levels list. There have been changes in the Dutch Soil Cleanup Levels since the Beyer publication. The new Dutch List can be found on the Internet at www.ContaminatedLAND.co.uk. Tetra Tech should use this updated list as a source for its soil screening values.

Response: The most recent (1998) Region 4 EPA recommended screening values for soils were used in the ERA and, therefore, will not be modified. Surface soil screening levels were identified in surface soil screening tables as "Region 4 Screening Levels." The text on page 7-13 explains the derivation of the Region 4 screening levels.

Section 7.4.2 Chemical Doses for Representative Receptors

In estimating chemical intake from food ingestion, TTN reported on page 7-23 that the input parameters used were obtained from USEPA's *Wildlife Exposure Factors Handbook* (WEFH, 1993). However, values of some of the inputs presented on Table 7A (page 7-24) do not match the numbers in WEFH. For example, a body weight of 0.021 kg for deer mice was used as surrogate for the Cotton mouse instead of using the numbers (28-51 g) reported for this species (WEFH 1993) in deriving a mean body weight. Assuming a mean body weight of 0.0395 kg the revised food ingestion rate for the Cotton Mouse would be 0.0048 kg/day (0.0687 $Wt^{0.822}$, instead of 0.0029 kg/day presented in Table 74. The former number is more conservative and should be used in the risk equation. Similarly, the food ingestion rates for other species including the Great Blue Heron, American Woodcock, and Red fox, did not match the numbers presented in Table 7-4. Tetra Tech needs to explain why it did not use the numbers provided.

Response: The input parameters presented on Table 7-4 are the correct values obtained from USEPA's *Wildlife Exposure Factors Handbook*, when available. A recent ERA for another operable unit at NTC Orlando was used as a source for a few of the input parameters for the foodchain modeling. These parameters, including the body weight for deer mice, were accepted by Region 4 EPA, and were used in this

ERA for consistency. Table 7-4 will be modified to correctly reference the source of these parameters. The food ingestion rates presented in USEPA's *Wildlife Exposure Factors Handbook* mentioned in the comment are in units of grams of food consumed per gram of body weight per day , while the food ingestion rate used in the ERA was in units of kilograms of food consumed per day. This explains the discrepancy between the EPA document numbers and Table 7-4 numbers. It should also be noted that alteration of the input parameters would most likely not result in a change in the ERA conclusions.

Other comments

The USEPA Region 4 screening level for arsenic in freshwater surface water is 90 µg/L and not 190 µg/L as indicated in Table 7-5. The HQ should also be adjusted to 0.2.

Response: Table 7.5 will be revised to reflect the correct Region 4 screening level and HQ for arsenic.

ATTACHMENT 1

GOPHER TORTOISE SURVEY AND RELOCATION PERMIT COMPLETION REPORT

BUILDING A CENTURY
1898 BECHTEL 1998

APR 30 1999

Mr. Tim Breen
Florida Game and Fresh Water Fish Commission
1239 SW Tenth Street
Ocala, Florida 34474-2797

SUBJECT: Bechtel Job No. 22567
Department of Navy Contract No. N62467-93-D-0936
McCOY ANNEX LANDFILL COVER IRA
GOPHER TORTOISE SURVEY
DELIVERY ORDER NO. 107
Subject Code: 7550

Dear Mr. Breen:

Enclosed is a copy of the "1999 Gopher Tortoise Survey" for McCoy Annex, Naval Training Center Orlando. As we have previously discussed by phone with Ms. Hovis, Bechtel is a Response Action Contractor for the Southern Division of the Naval Facilities Engineering Command and has been tasked to perform an interim remedial action (IRA) at the McCoy Annex site. The scope of the IRA involves the placement of a 2-ft. thick soil cover over a former landfill location. The landfill site is approximately 25 acres in size and has not been in use since 1978. Therefore, the project area is currently overlain by second growth forest, scrub brush and tall grass. We must clear this area prior to the placement of the soil cover. It is important to note this is not a low permeability landfill cap. We are using soils similar to those now found on site for the cover and will only compact the material using the tracks of the earthmoving equipment.

Bechtel's remediation work plan has been approved by the Florida Department of Environmental Protection and EPA Region IV. We have mobilized to the site and began the site clearing activities and some placement of soil cover on the northern most extent of the site. The Gopher Tortoise burrows (active and inactive) are all located on the southern half of the site. We plan to do some clearing in proximity to the burrows by hand, avoiding the use of any heavy equipment near the burrows. No cover will be placed within 50 ft. of the active burrow locations.

In addition to the report provided to us by Ms. Julea Hovey, with Tetra Tech NUS, we have enclosed a few figures from our work plan to assist you in identifying the location of the project. Tetra Tech NUS is another contractor for Southern Division, and they have the natural resource specialists needed to support these types of surveys. We work closely with them in planning and executing remediation projects for sites at the Naval Training Center and its annexes.

Please review the information provided and we would like to schedule a follow-up conference call with you at your earliest convenience. The purpose of that call would be to discuss any questions you may have about the survey or our project and to determine a specific course of action to take with respect to the burrows impacted by the landfill cover.

If you have any questions about the project or the information provided herein, please do not hesitate to call me at (423) 220-2406.

Sincerely

J. R. Manning

J. Robin Manning
Project Engineer

Enclosures (as stated)

cc: Ms. Nancy Rodriguez, EPA Region IV (w/enclosure)
cc: Mr. Dave Grabka, Florida Department of Environmental Protection (w/enclosure)
cc: Lt. Gary Whipple, Public Work Department, NTC Orlando (w/enclosure)
cc: Mr. Steve McCoy, NUS Tetra-Tech (w/enclosure)
cc: Ms. Barbara Nwokike, SOUTHDIV (w/enclosure)
cc: Mr. Wayne Hansel, SOUTHDIV (w/enclosure)
cc: Mr. Jerry Eggebrecht, REICC, Orlando (w/enclosure)

1999 Gopher Tortoise Survey
McCoy Annex Landfill, Operable Unit 2
NTC Orlando, Florida

Introduction

Tetra Tech NUS conducted a field survey for the presence of gopher tortoises (*Gopherus polyphemus*) on the southern portion of Operable Unit (OU) 2 at the McCoy Annex, NTC Orlando, Florida on April 22, 1999. The survey was conducted to support the interim remedial activities in progress at McCoy Annex. In Florida, the gopher tortoise is listed as a Species of Special Concern by the Florida Game and Fresh Water Fish Commission, and has been observed at the McCoy Annex (NeSmith, 1998). The survey was conducted by Julea B. Hovey, Tetra Tech NUS ecologist, with the assistance of Chris Rewolinski and Charles Raquest of Bechtel.

Background

The McCoy Annex landfill (OU2) is located in the southern portion of McCoy Annex and underlies a large part of the 9-hole golf course and the most of the wooded area to the south of the golf course. The landfill's last reported use was in 1978. As a result of the remedial investigation (TtNUS, 1999), the interim remedial action chosen for the McCoy Annex Landfill by the Orlando Partnering Team (U.S. Department of the Navy – Southern Division, Florida Department of Environmental Protection, the U.S. Environmental Protection Agency Region IV, and other contractors) is placement of an additional 2-foot soil cap over the landfill area in the northern portion of the wooded area where the existing cover material is thin. The wooded area, located south of the golf course, is about 50 acres in size. This area is bordered by a canal and fenced bunker area to the east, wooded areas to the west (separated from the main area by a dirt access road), and Boggy Creek Road to the south. This area is predominantly pine flatwoods, mainly slash pines (*Pinus elliottii*), with an understory of sawtooth palmetto (*Serenoa repens*), muscadine (*Vitus rotundifolia*) vines, and other brushy vegetation.

The interim remedial action for this area will be limited to approximately 25 acres of the 50-acre wooded area (Figure 1). Activities will include clearing, grubbing, grading, and capping with a 2-foot soil cover. The area of soil cover will be re-vegetated with plant species that are compatible with other uses of the property and those that will stabilize the soil in the area. Currently, McCoy Annex is being controlled by the City of Orlando and will eventually be owned fully by the City. Future use of the area has been designated to be recreational in conjunction with a sports complex that will be constructed in the vicinity of this area.

The Florida Natural Areas Inventory (FNAI) has recorded three gopher tortoise burrows (one active) at McCoy Annex in the wooded area south of the golf course, with the last observation in

1992 (NeSmith, 1998). These burrows were observed in an open area near the eastern border of the area of concern. Gopher tortoises live in dry habitats, such as pine-scrub oak savannas, live oak and red oak hammocks, sand pine, wiregrass flatwoods, and coastal dune ecosystems. Three conditions that are basic for healthy tortoise populations are well-drained sandy soils for digging burrows, sufficient low plant growth for food, and open, sunny areas for nesting. The gopher tortoise is generally described as an herbivore, but will consume a wide variety of plant, animal, and organic matter. Broad-leafed grasses, wiregrass, and legumes form the bulk of the diet (Cox et. al, 1987). The southern portion of the OU2 wooded area provides these habitat requirements in a few small areas.

Methods

The survey was conducted in order to determine the presence or absence of gopher tortoise activity (e.g., burrows) in the southern portion of OU2, to estimate the potential population of gopher tortoises on-site, and to determine the number of burrows which exist in the area that could be affected by the remedial activities. A comprehensive survey of the approximate 25-acre parcel was performed on foot. The entire site was surveyed by walking 10 north-south transects that were spaced approximately 100 feet apart. Three surveyors were equally spaced across the 100-foot transects providing thorough coverage of the entire survey area.

Gopher tortoise burrows observed during the survey were marked with orange flagging tape, and classified as active, inactive, or abandoned (old) using the following criteria:

- Active - obvious tortoise tracks or shell scraping signs at the burrow mouth
- Inactive - no tracks or shell scrapings, but recent use apparent, burrow unblocked by debris
- Abandoned - burrow covered with sticks, weeds, grass; burrow collapsed, dilapidated

In addition, the location of the burrows classified as active or inactive were plotted on project maps to show the location of these burrows relative to the area of proposed disturbance.

Results

Two active, one inactive, and thirteen abandoned burrows were observed in the area surveyed. The locations of the active/inactive burrows are shown on the attached figure. One of the active burrows (burrow number 5) is located on the eastern side of the area and outside of the remediation area. This area is fairly open with some grasses and other low growing vegetation. This burrow is believed to be the active burrow noted above that was recorded by FNAI. The other two burrows (burrow numbers 13 and 15) are located on the western side of the area approximately 300 feet apart. These two burrows are located on the margin of an open area that

is vegetated with some wiregrass (*Aristida stricta*) and is dominated by other taller grasses. All of the burrows, the three noted above and the abandoned burrows, were located in the southern portion of the survey area. The vegetation in the northern portion is densely wooded, mainly slash pines, with a thick understory of muscadine vines and other brushy vegetation. Most of this area does not contain suitable gopher tortoise habitat.

A small area to the west of the dirt access road that is located along the western boundary of OU2 was also surveyed. This area is approximately 2 acres in size and is densely wooded with several large earpod trees (*Enterolobium contortisiliquum*). It does not contain suitable gopher tortoise habitat. No burrows were located in this area.

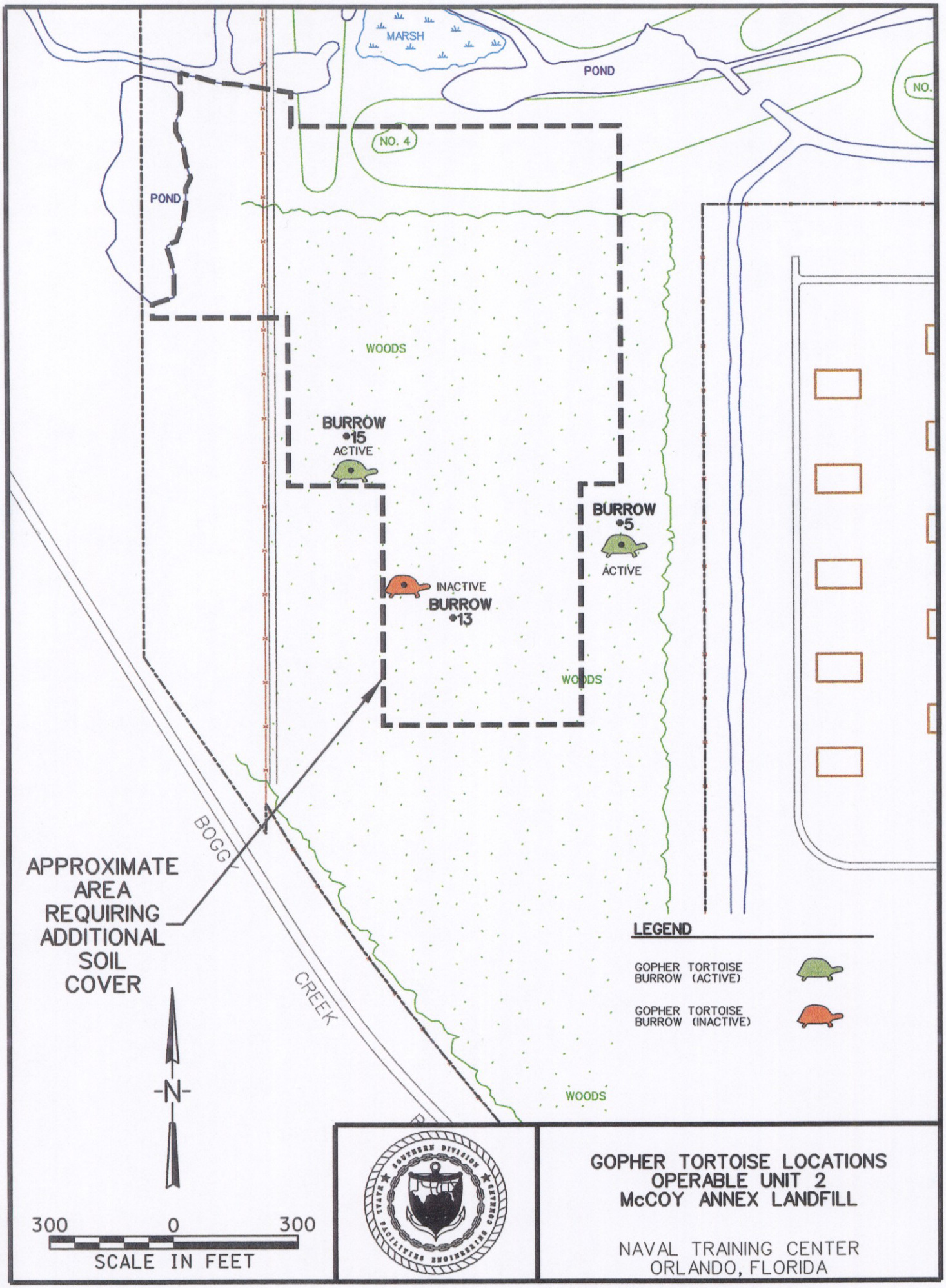
Because the area of interest was thoroughly surveyed, it is believed that the observed burrows constitute all the gopher tortoise burrows that exist within the survey area.

References

NeSmith, K. 1998, Personal communication between Katy NeSmith, Florida Natural Areas Inventory biologist, and K.T. Cubbage, TtNUS ecotoxicologist, regarding rare, threatened, and endangered species on and near the McCoy Annex, November 9.

TtNUS (Tetra Tech NUS), 1999, "Draft Remedial Investigation for Operable Unit 2, McCoy Annex Landfill, Naval Training Center, Orlando, Florida," January.

Cox, J., D. Inkley, and R. Kantz, 1987, "Ecology and Habitat Protection Needs of Gopher Tortoise (*Gopherus Polyphemus*), Populations Found on Lands Slated for Large-Scale Development in Florida," Nongame Wildlife Program Technical Report No. 4, Florida Game and Fresh Fish Commission, December.



GOPHER TORTOISE LOCATIONS
OPERABLE UNIT 2
McCOY ANNEX LANDFILL

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ORLANDO, FLORIDA

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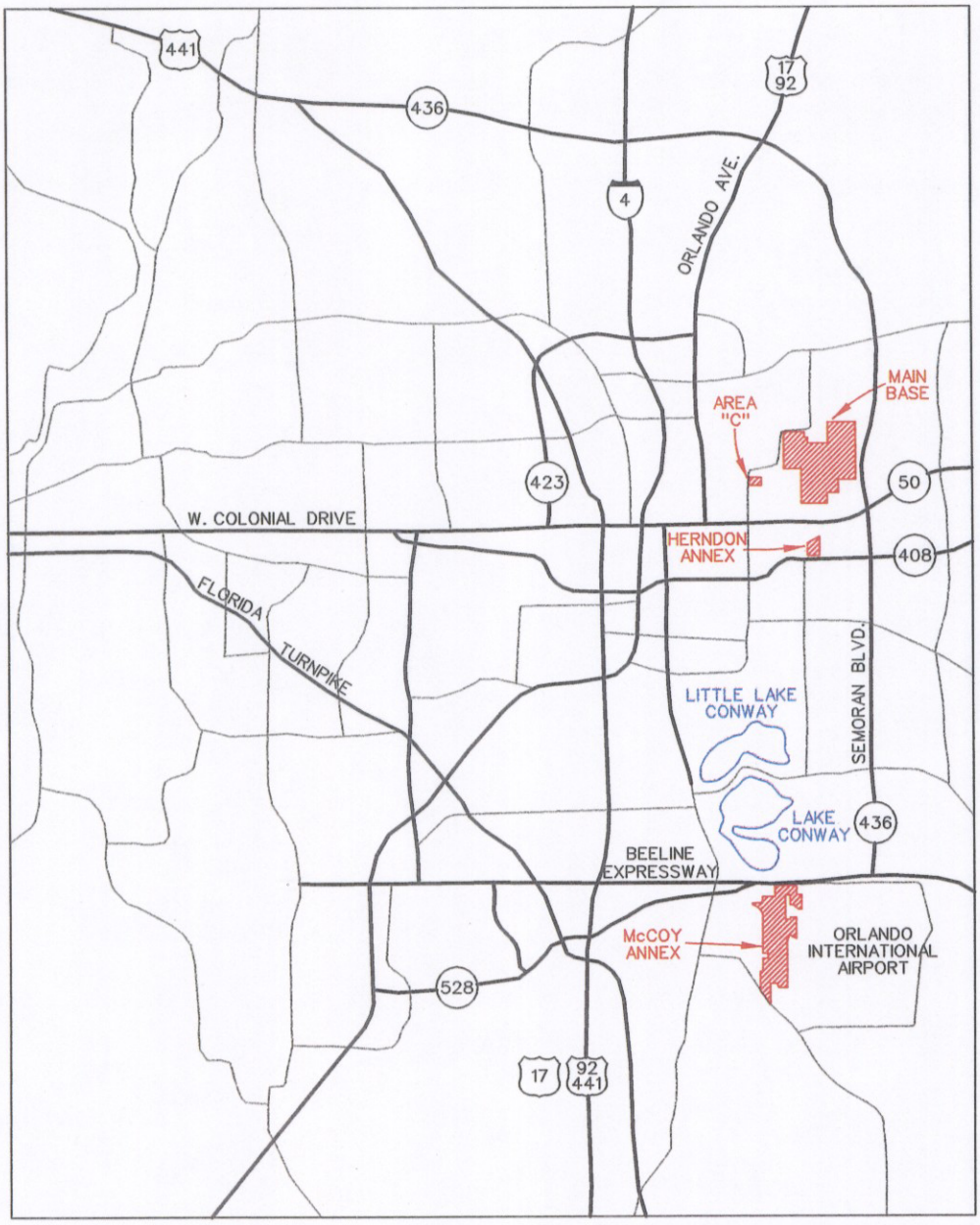

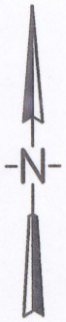

4 0 4

SCALE IN MILES

FIGURE 1-1

FACILITY LOCATIONS
McCOY ANNEX LANDFILL
REMEDIAL INVESTIGATION

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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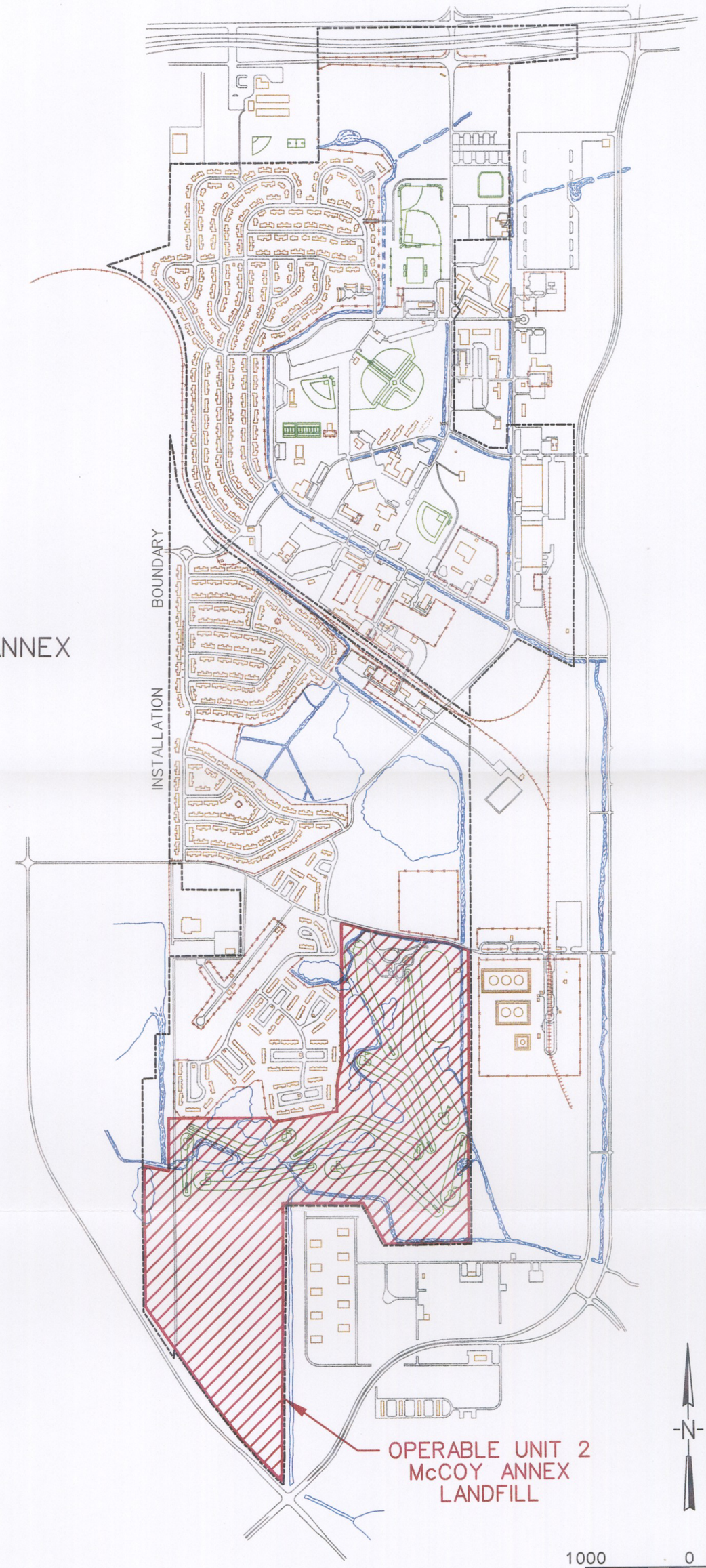

SITE LOCATION MAP
McCOY ANNEX LANDFILL
REMEDIAL INVESTIGATION
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

FIGURE 1-2

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305- 00042

BUILDING A CENTURY
1898 BECHTEL 1998

Mr. Tim Breen
Florida Game and Fresh Water Fish Comission
1239 SW Tenth Street
Ocala, Florida 34474-2797

AUG 16 1999

Subject: Bechtel Job No. 22567
Department of the Navy Contract No. N62467-93-D-0936
McCOY ANNEX LANDFILL COVER IRA
GOPHER TORTOISE RELOCATION PERMIT
COMPLETION REPORT
Delivery Order No. 107
Subject Code: 7550

Dear Mr. Breen:

Bechtel has completed our assigned scope for the interim remedial action at the McCoy Annex Landfill site at the Naval Training Center in Orlando. This letter provides a summary of the field activities that were taken to comply with the Gopher Tortoise Relocation Permit issued by your office May 26, 1999 (Permit No. GTRS5-JH-99-08).

Attachment 1 provides a brief chronology of field activities with particular emphasis on activities affecting and involving the Gopher Tortoise. To summarize the chronology, two tortoise traps were installed on June 1st, inspected daily, and 1 tortoise was found and relocated on June 4th. The traps were removed on June 17th when work activities in areas adjacent to active tortoise burrows were complete.

Attachment 2 to this letter consists of three pages of photographs taken during field activities. A description of the activity in the photos is provided in a caption.

If you have any questions, or if there are any further actions required of Bechtel or the Naval Training Center under the Permit, please call me at (423) 220-2406.

Sincerely,

RLHatwood for J. Robin Manning

J. Robin Manning
Project Engineer

Enclosures: As stated

cc: Ms. Nancy Rodriguez, EPA Region IV
Mr. Dave Grabka, Florida Department of Environmental Protection
Lt. Gary Whipple, Public Works Department, NTC Orlando
Mr. Steve McCoy, NUS Tetra-Tech
Ms. Barbara Nwokike, SOUTHDIV
Mr. Jerry Eggebrecht, REICC, Orlando

BECHTEL ENVIRONMENTAL, INC.
151 Lafayette Drive
Oak Ridge, TN 37830 USA
mailing address: P.O. Box 350
Oak Ridge, TN 37831-0350 USA

ATTACHMENT 1

Chronology of Field Activities Related to Gopher Tortoise
OU2 McCoy Annex Landfill Soil Cover

April 1999

April 15-30, 1999: Bechtel Site Superintendant mobilizes to McCoy Annex to establish field office, identify lay down area, locate utilities, set up silt fence and drainage controls, stake and survey areas to be cleared and covered.

April 21, 22, 1999: Survey conducted for Gopher Tortoise burrows. Installed safety tape with buffer zone around 2 active and 1 inactive tortoise burrows identified during survey.

April 27, 1999: Final Gopher Tortoise Survey, Memo from Tetra-Tech NUS, Corp.

April 30, 1999: Transmittal Letter, J. Robin Manning, Project Engineer, Bechtel to Mr. Tim Breen, Florida Game and Fresh Water Fish Commission, outlining project activities to date and scope of interim remedial action.

May 1999

May 26, 1999: Permit for Special Gopher Tortoise Relocation Issued by Florida Game and Fresh Water Fish Commission.

June 1999

June 1: Two bucket traps installed at surveyed active tortoise burrows
June 2-June 17: Daily inspection of bucket traps
June 4: Found one tortoise in bucket trap, released on site in adjacent area not affected by construction activities.
June 22: Found one tortoise crossing access road used for construction equipment. Tortoise was moved out of the roadway into the adjacent area to prevent injury due to equipment movement on the road.
June 26, 1999: Expiration of Special Gopher Tortoise Relocation Permit

July 1999

July 7, 1999: Project field activities complete.

ATTACHMENT 2

Site Photographs

Walking the site for the Gopher Tortoise Survey

Logging burrow locations on site map during Tortoise Survey

Digging a hole for placement of a bucket trap

Final bucket trap placement

Capture of Gopher Tortoise in bucket trap

Release of Gopher Tortoise in area adjacent to land clearing activities

ATTACHMENT 2

WETLANDS SURVEY

7457-3.1-322

TETRA TECH NUS, INC.

800 Oak Ridge Turnpike
Jackson Plaza, Suite A-600
Oak Ridge, TN 37830

(423) 483-9900
FAX: (423) 483-2014

FILE COPY

98-E452

December 29, 1998

Mr. Bob Cohose
Bechtel Environmental, Inc.
151 Lafayette Drive
Oak Ridge, Tennessee 37831

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0024

Subject: Wetlands Survey of Operable Unit 2, McCoy Annex Landfill,
Naval Training Center, Orlando Florida

Dear Mr. Cohose:

As we discussed previously, Tetra Tech NUS' David Stair performed a wetlands survey in the southern portion of OU 2 as part of the OU 2 remedial investigation. The attached report presents the findings of the survey and identifies the approximate locations of the wetlands. If you have any questions regarding the survey or need additional information, please call me at (423) 220-4730.

Sincerely yours,

Steven B. McCoy

Steven B. McCoy, P.E.
Task Order Manager

Enclosure

SBM/smc

c: Ms. Barbara Nwokike, SOUTHDIV

TETRATECH NUS, INC.
Oak Ridge Office

To: Steve McCoy **Date:** December 29, 1998

From: David Stair MJC for **Phone/Fax:** (423) 220-4767 / (423) 483-2014

Subject: **Wetlands Survey of OU 2, McCoy Annex Landfill, Naval Training Center, Orlando, Florida**

On November 23, 1998, I performed an in-field survey of wetland boundaries at the southern end of the Landfill Area 3 at McCoy Annex, Naval Training Center, in Orlando, Florida. Boundaries were flagged in the field and distances measured from known objects to map the approximate boundaries. Bill Hevrdeys at Bechtel, the Navy Remedial Action Contractor, requested flagging of boundaries to minimize impact from logging activities planned for the rest of the Landfill Area 3.

Florida wetland delineation methodologies described in Chapter 62-340, F.A.C. and in the Florida Unified Wetland Delineation Manual were used in the survey.

The in-field survey confirmed the location of wetland areas as mapped by the National Wetland Inventory (NWI)(Figure 1). The NWI describes the areas as palustrine forested, deciduous, semi-permanently flooded (PF06F). Wetland areas were found in topographic depressions or low areas. This letter report describes the plant community, soil profile and hydrological indicators, observed during the brief field survey.

Soils
The Orange County Soil Survey (U.S. Department of Agriculture, Soil Conservation Service, Soil Survey Series 1957, No. 5) maps the area as Blanton fine sand, level high phase (Ba). The Blanton soil series does not appear on the attached list of Hydric Map Units of Orange County, Florida. The profile description of the upland Blanton soils in the Soil Survey Manual (0-6", dark gray, 10YR 4/1, nearly loose fine sand; 6-10", gray, 10YR 5/1, nearly loose fine sand) matches that described in the field (0-8", dark gray, 10YR 6/1, sand). Soils of the depressions are assumed to be inclusions in the mapped unit. Profiles of the topographic low areas were found to contain a surface layer of mucky organic matter (0-6", black, 5YR 2.5/1, muck; 6-10", dark gray, 10YR 6/1, sand) indicative of wetland soils.

Plant Community
The predominant species of the canopy layer in these wetland depressions is the obligate wetland plant - bald and/or pond cypress, Taxodium distichum (var. nutans). Cypress is a deciduous flood-tolerant conifer, losing its needles by the end of November and flushing again in March. Other species found in the canopy and shrub layers included blackgum (Nyssa sylvatica) and bayberry, probably southern waxmyrtle (Myrica cerifera). In the small wetland surrounding Old-OU2-26C, buttressed trucks characterized the cypress community with no visible knees assumed to indicate saturated soil conditions without standing water. Cypress knees were present in the larger southern wetland area. This plant community is likely best described as Ecological Community No. 16 - Scrub Cypress (USDA, Soil Conservation Service, 26 Ecological Communities of Florida, 1981). Cinnamon or royal fern (Osmunda sp.) and beak rush (Rychospora sp.) were present at both wetland areas.

Hydrology
The presence of plant adaptations to saturated (buttressed trunks) or inundated (cypress knees) conditions are used to indicate the presence of wetland hydrology. In the southern wetland area, plant debris dams, scoured soil surfaces, and water marks are definitive indicators of flooding and/or flowing water conditions. A point source of water for the small wetland area surrounding Old-OU2-26C was not identified however, for the southern wetland area, the main source of water is an overflow culvert under Boggy Creek Road.

Summary

Both areas which were surveyed in the field by Tetra Tech NUS are jurisdictional wetlands due to presence of indicators of wetland hydrology (morphological plant adaptations, drift lines, rafted debris, etc.), hydric soil conditions (accretions of organic matter on surface) and the dominance of the vegetation community by obligate wetland plants (cypress, etc.). Approximate wetland boundaries were marked in the field with orange and pink flagging as requested by Bechtel. The location of the wetlands is mapped on the attached drawing (Figure 2).

Wetlands in the northwest corner of the Landfill Area 3 were not flagged or surveyed in the field by TtNUS but the confidence in their approximate location and existence as mapped by the NWI is great. These areas are described by NWI as palustrine (P), unconsolidated bottom (UB), permanently flooded (H), excavated (x).

Regulatory Obligation

Since no impacts to the wetlands are anticipated, a permit or submittal of a wetland delineation report is not required. However, coordination with regulatory personnel is suggested.

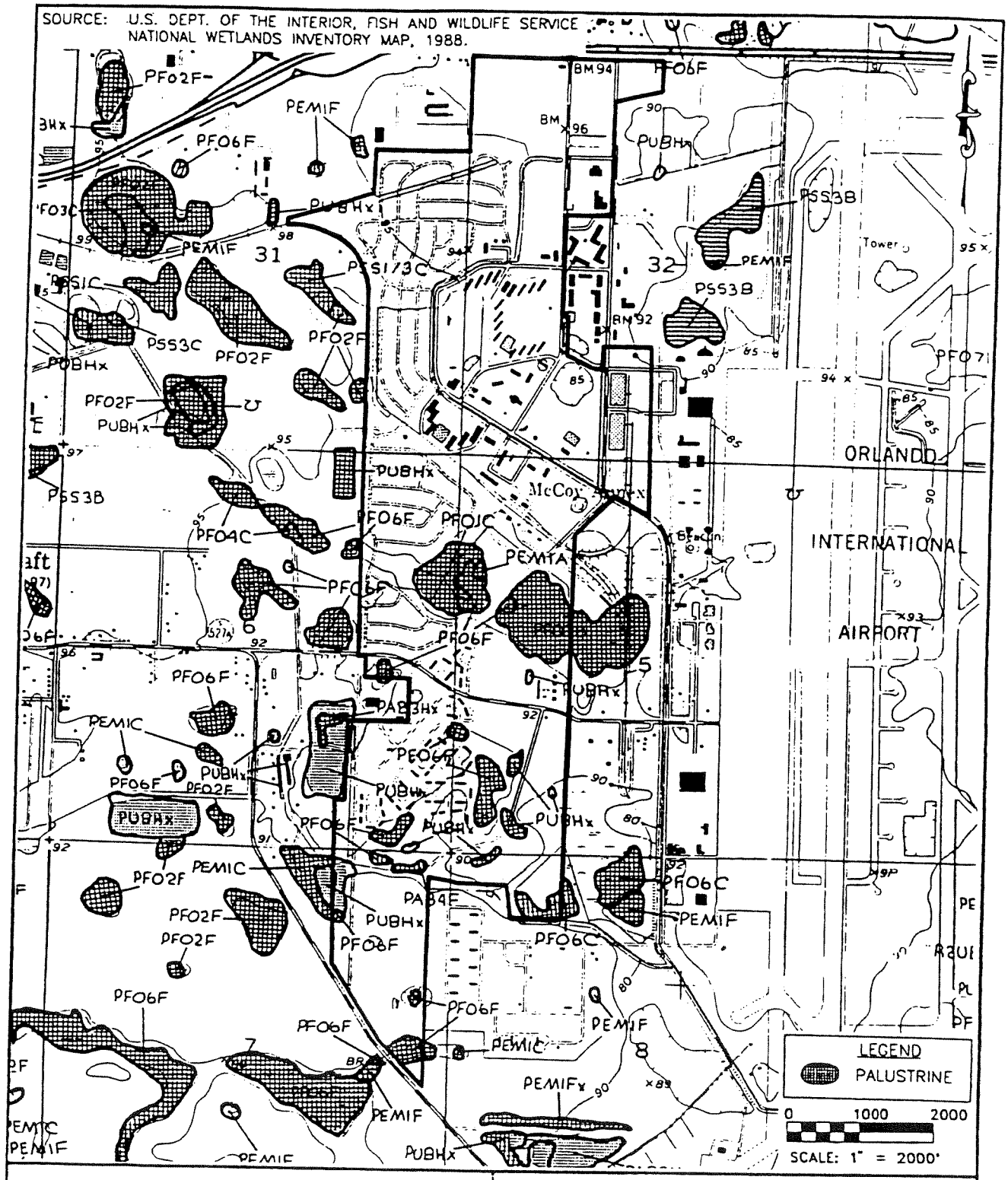

FIGURE 1

LOCATION OF WETLANDS AT McCOY ANNEX

BRAC ENVIRONMENTAL BASELINE SURVEY REPORT

NAVAL TRAINING CENTER ORLANDO, FLORIDA

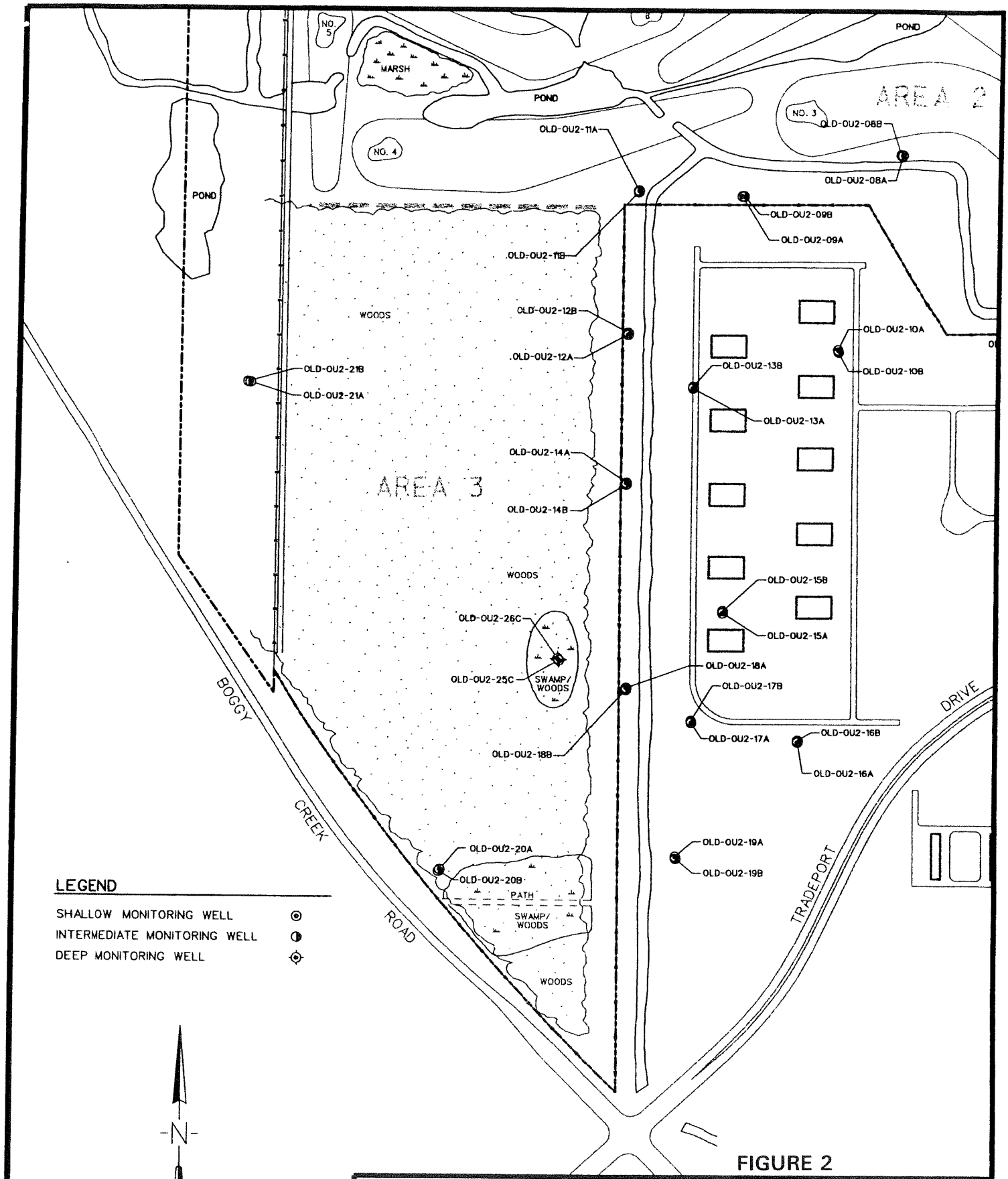

FIGURE 2

FIELD SURVEY OF WETLANDS IN LANDFILL AREA McCOY ANNEX LANDFILL WETLAND SURVEY

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

t8-5x11v.dgn

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