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LETTER REGARDING REGULATORY REVIEW AND COMMENTS ON REMEDIAL ACTION
PLAN FOR FORMER GOLF COURSE NTC ORLANDO FL
4/25/2000
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION



Jeb Bush
Governor

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Department of Environmental Protection

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

April 25, 2000

Mr. David B. Twedell
Vice President/Principal Scientist
Nodarse & Associates, Inc.
1030 North Orlando Avenue, Suite A
Winter Park, Florida 32789

RE: Remedial Action Plan, Former Golf Course at the Orlando
Naval Training Center, Orlando, Orange County, Florida

Dear Mr. Twedell:

I have completed my review of the Remedial Action Plan (RAP) for the former Orlando Naval Training Center Main Base Golf Course. I have attached a memo from Greg Brown, P.E. I have the following comments that should be addressed or incorporated along with Greg Brown's comments into the Final Remedial Action Plan:

- (1) According to the RAP, soil is to be removed for offsite disposal from tee and green areas where concentrations of arsenic greater than 1 ppm were detected. It appears that only data collected by Nodarse was used in determining which greens and tees to excavate. Greens and tees at holes one through nine were listed for removal actions. The Universal Engineering Science (UES) report indicated elevated arsenic concentrations in discrete samples on tees at holes 11, 12, 14 and 17 and on greens at holes 15, 16 and 17. It may be that mixing and blending of soils at these tees and greens will reduce arsenic concentrations to 1 ppm, however, the RAP does not indicate that mixing and blending is to occur at all of these tees and greens.
- (2) The UES report had elevated arsenic concentrations detected in fairways at holes 5, 9, 15 and 18 that are not addressed in the RAP by either soil removal or mixing and blending.
- (3) Several sampling locations, where elevated arsenic concentrations were detected in vertically composited samples from 0 to 2 feet, were not indicated for soil removal. The sample locations were 1CS-7, 4CS-8, 4CS-12, 8CS-6, 9CS-6, 9CS-7 and 10CS-4. It would appear that a strict vertical mixing of soil at these locations would not achieve the desired effect.

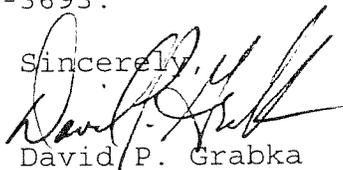
- (4) Elevated arsenic concentrations were detected on the 10th green. However, this green was not identified as an area to be excavated.
- (5) The site plan map incorrectly indicates that elevated arsenic concentrations were detected at sample locations 1CS-6 and 5CS-3.
- (6) The site plan map is not clear as to which greens and tees are to be excavated, which are to be mixed and blended, and which are to be left alone. There should be some specific shading or coloring to indicate what is to be the fate of those areas.
- (7) A statistical comparison was done between the Nodarse, UES and Tetra Tech NUS data. Because of the different sampling strategies used by the consultants, the data was manipulated to provide data that was roughly comparable. Concentrations from the discrete samples collected by UES from the 0 to 6", 6" to 1 foot and 1 foot to 2 foot depths were used to calculate an average concentration for the 0 to 2 foot depth, weighting the value from the 1 to 2 foot depth twice as much as from the 0 to 6" or 6" to 1 foot depths. Because samples were collected by Tetra Tech NUS from only the 0 to 1 foot interval, a default concentration for the 1 to 2 foot interval needed to be derived in order to calculate an average vertically composited sample for the 0 to 2 foot depth. Based on the data collected by UES, a default value of <.5 mg/kg was assumed for the 1 to 2 foot depth. A comparison of the three data sets revealed that the distributions of arsenic concentrations and the maximum concentration detected were very similar. This comparison indicates that arsenic concentrations have not decreased in time due to the natural breakdown of arsenic as is stated in the RAP. Any differences noted between the results of the Nodarse and UES sampling are more likely due to the different sample locations chosen, differences in sampling technique, differences in the analytical laboratory chosen or some redistribution of arsenic within the soil column.
- (8) The in-situ biological treatment alternative discussed in Section 3.2 is not an option for arsenic. Applied biological agents cannot break down elemental arsenic, only redistribute it via allowing arsenic to leach to groundwater, spreading the arsenic through the soil column, changing the valence state of the arsenic, uptake by the microbes or perhaps by volatilizing the arsenic. Phytoremediation using plants to uptake and concentrate arsenic within their foliage for later harvesting has shown some promise.

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- (9) For Post Remediation Testing, it is not specified where and at what density composite confirmation sampling will be taken after completion of the removal of soils for off-site disposal. It is suggested that at a minimum, one vertically composited sample from 0 to 2 feet be taken next to each side wall of the excavation and a grab sample be taken from the bottom of the excavation.
- (10) I recommend a sampling density of approximately one sample per .25 acres be used for resampling activities. One quarter acres has been utilitied in the past as a representative acreage for a residential neighborhood. This density would also correspond to sampling approximately every 100 feet along the boundaries of areas to be excavated or mixed/blended.
- (11) The Tetra Tech NUS report documented several areas that exceeded 1.0 mg/kg arsenic that were not addressed in the RAP for mixing/blending activities or excavation. As these samples were composited from five samples per acre to a depth of one foot, it cannot be determined which part of the acre contributed the arsenic. The Tetra Tech NUS data should be reviewed to determine if there are additional areas that may need to be mixed/blended to meet the remediation goal. If there is data from the UES and Nodarse sampling data that refutes the Tetra Tech NUS data, a discussion of this should be incorporated into the RAP.

If I can be of any further assistance with this matter, please contact me at (850)488-3693.

Sincerely,



David P. Grabka
Remedial Project Manager

cc: Wayne Hansel, Navy SouthDiv
Barbara Nwokike, Navy SouthDiv
Nancy Rodriguez, USEPA Region 4
Richard Allen, HLA, Jacksonville
Steve McCoy, TetraTech NUS, Oak Ridge
Steve Tsangaris, CH2M Hill, Orlando
Bill Bostwick, FDEP Central District

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