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**Site 4 – Proposed Plan
Golf Course Landfill
Naval Construction Battalion Center Gulfport
Gulfport, Mississippi**

Bob Fisher opened the meeting at 5:30 pm:

The intention of this meeting is to present our Proposed Plan for Site 4, the Golf Course Landfill. We are interested in any comments or concerns that you may have about the plan. We encourage you to present any questions or comments in writing so that we can respond to them as part of our final decision-making process.

With that, I would like to introduce Bill Olson, our Tetra Tech Navy Contractor. Bill Olson is a geologist, has been working on the site for several years.

[Bill Olson] The materials available at the meeting are the proposed plan, which describes what the Navy thinks is the best way to approach the site, a fact sheet that briefly describes the site and the proposed plan, and a handout of the slides that I'll be showing. Because we're a small group tonight, I encourage you to feel free to ask questions during the presentation.

The proposed plan summarizes the investigations that we've done, presents the remedies that have been evaluated, explains the recommendation of the Preferred Alternative for cleaning up Site 4, and provides a period for public comment.

Public Comment Period

The public comment period for this plan starts tomorrow and will be open for 30 days. Comments on the plan will be accepted in writing during the public comment period. Copies of the Proposed Plan are available at this meeting and at the Information Repository in the temporary location of the Gulfport Library located off of Pass Road. Also, other Site 4 documents, such as the Remedial Investigation Report and the Feasibility Study, are available at the Information repository.

[Gordon Crane]: I will also be placing copies of the Proposed Plan in the in the Long Beach and Pass Christian libraries.

[Bill Olson]: This is a map of the Seabee Base showing the site located on the west end of the base. Site 4 is approximately 4 acres. It operated as a landfill from 1966 to 1972. Some of the things that were brought there included refuse, solid waste (including debris following Hurricane Camille), and liquid wastes were disposed of at Site 4. Wastes were typically placed in trenches and burned. After waste disposal ended, 4 to 6 feet of fill was placed over the landfill.

The site is currently part of the Pine Bayou Golf Course. This photo of the site shows the well maintained grass with a few land traps. The site is mostly flat with some golf course features, until it drops off into Canal No. 1. This photo shows a Canal No. 1. That's Jason on the bridge collecting a sample and measuring the depth of the canal. This photo show the slope of the land as it dips into the canal.

A little bit of history of the Site 4 investigations. Site 4 was identified in the 1987 as part of the base wide Initial Assessment Study and confirmed as a site in the Confirmation Study, also completed in 1987. The base wide Surface Water/Sediment Delineation Study completed in 1995 showed some possible contamination coming from the groundwater beneath the landfill, so an Interim Remedial Action was completed in 1997 which involved treating the groundwater using carbon filtration. That study was followed with a Groundwater Monitoring Study in 1998, a Remedial Investigation in 2004, and a Groundwater Treatability Study in 2006. So as you can see, this site has been thoroughly investigated over this time.

The investigation that summarized all previous investigations and led to this proposed plan included a geophysical survey, surface soil sampling, subsurface soil sampling, surface water and sediment sampling, groundwater sampling, and shallow aquifer evaluation. This photo shows Bob Fisher using geophysical equipment. This photo shows the rig that was used to collect samples. This photo shows the rig used to inject bacteria into the groundwater as part of our treatability study.

Through the remedial investigation we determined that most of the buried material was in the southwest part of the site. We also found a contaminant plume of dry cleaning solvents and degreasers that exceeded Mississippi Department of Environmental Quality standards.

The chemicals that we found can be summarized as follows: in soil we found Polynuclear Aromatic Hydrocarbons (PAHs); in sediment we found PAHs, dioxins, insecticides, polychlorinated biphenyls (PCBs), and lead; in groundwater we found chlorinated volatile organic compounds (CVOCs), dioxins, iron and manganese; and in surface water we found dioxins and lead.

Once we found out what contaminants were there, we conducted a risk assessment. The human health risk assessment determined that occupational workers and hypothetical future residents would have unacceptable cancer risk due to due to CVOCs and dioxins in soil. Also, hypothetical future residents would have unacceptable non-cancer risks due to CVOCs in groundwater. The ecological risk assessment showed no risk to ecological due to a lack of natural habitat at the site.

The Site 4 Feasibility Study was the next step in the process. The Feasibility Study evaluated cleanup alternatives for site. The first step in the Feasibility Study is to determine the objectives of the remedy. These Remedial Action Objectives included preventing direct exposure to landfill contents to eliminate human health risk; minimizing infiltration of rainwater to keep the contaminants beneath the site from dissolving and moving into the groundwater; preventing human contact with the groundwater; preventing human and ecological receptors from coming into contact with the surface water and sediment; and preventing erosion and transportation of contaminants into Canal 1.

The USEPA has developed standardized approaches for cleanups for common types of environmental sites. Presumptive remedies allow for consistency in remedy selection and reduce the cost and time for evaluation. Municipal landfills are one of the common types of sites. Site 4 has characteristics consistent with municipal landfills and therefore the presumptive remedy approach has been applied. Also, it has been shown that site risks are low, except for hot spots, wastes are generally household, commercial or industrial

solid wastes, hazardous wastes, if any, are present in lesser quantities, and no military-specific wastes are present. The goal of the presumptive remedy is to break the link between the contaminants and the people.

The components of this presumptive remedy are:

- A cover to minimize rainfall passing through the landfill;
- A cover to prevent contact with buried waste and to prevent exposure and movement by wind and water;
- A system to manage gases generated in the landfill.

These landfills generate methane and other gases if covered, so you need to figure out how to deal with the gases.

Part of the benefit of using the presumptive remedy approach is to reduce the number of alternatives to be evaluated during the Feasibility Study. We evaluated two alternatives. Alternative 1, No Action, don't do anything to change site conditions; and, Alternative 2, Comprehensive Action including waste containment and isolation, surface water and sediment controls, groundwater monitoring, landfill gas management, and land use controls.

Alternative 1, No Action, is not the alternative of choice. This alternative is always used as a baseline for comparison. It assumes that no changes would be made to the existing conditions at the site. The Navy uses this alternative to justify expenditures to clean up the site.

Alternative 2, Comprehensive Action, the recommended alternative, includes a surface cover (cap) designed to meet MDEQ solid waste regulations, prevent direct exposure to waste, minimize infiltration of groundwater through buried waste, and prevent erosion and transport of contaminated media and sediment removal from Canal 1 to prevent direct exposure and install an erosion barrier on the landfill side of Canal 1 to protect the cap. Alternative 2 also includes land use controls to prevent development at the site, especially digging or groundwater use, inspections to maintain integrity of the cover and erosion barrier, and periodic sample collection from selected monitoring wells to evaluate groundwater quality and contaminant concentrations.

A detailed and comparative analysis of alternatives was completed to assess the

alternatives. It was determined that Alternative 1 does not meet the Remedial Action Objectives because it does not remove the risk of human exposure at the site. On the other hand, Alternative 2 meets the Remedial Action Objectives. The Feasibility Study assessment includes evaluation of several criteria. The first criteria evaluated are called “Threshold Criteria.”

Threshold criteria include an assessment of overall protectiveness of human Health and the environment. Alternative 2 would provide the highest level of protection because contaminated soil would be removed from Canal No. 1, and would be transported to an approved TSDF. Groundwater would be treated and the landfill would be properly capped, as required by MDEQ. The second threshold criteria are compliance with Applicable, Relevant, or Appropriate Regulations referred to as ARARs. Alternative 2 meet all legal requirements.

Next, the alternative is measured against the balancing criteria of long-term effectiveness and permanence, reduction of toxicity, mobility, or volume of contaminants through treatment, short-term effectiveness, and implementability. This remedy would achieve reduction of toxicity and volume of contaminated media through containment and treatment. Also, the volume of the sediment contaminated with PAHs, dioxins/furans, and ecological contaminants would decrease significantly due to the excavation for proper grading and lining of the canal. Alternative 2 would also reduce movement of contaminants beneath the landfill by capping the site and eliminating infiltration of groundwater through the landfill. The remedy would be effective short-term because it would be implemented quickly, and we have experience that it is implementable because we’ve recently successfully implemented this remedy at another site, Site 5. The last balancing criterion is cost, and we’ll discuss that more in a few moments.

The last two criteria to be evaluated are called Modifying Criteria. These criteria include regulatory support and acceptance and community acceptance. The MDEQ and EPA have been involved and have approved all documents and this proposal. The last step in the process is to solicit public comments through this public comment period.

So again, the Preferred Alternative for Site 4 is Alternative 2 – Comprehensive Action. The Navy believes Alternative 2 will adequately protect human health and the environment, attain all federal and state requirements, and is cost effective, implementable, and effective.

Components of the Preferred Alternative include restructuring the site, installing an erosion barrier on the canal, installing a gas collection system, developing restrictions to protect the cover, and re-grading the site to control surface water runoff.

An engineered cap would be installed to meet infiltration control and landfill gas management requirements. Sediment would be excavated from an estimated 700 feet of Canal 1 and placed in the landfill area to be capped. An erosion barrier would be installed on the landfill side of Canal and site controls would prevent residential development or groundwater use and signs would be posted to warn against unauthorized digging. Periodic inspections would be ensure that the cover and erosion barrier are in good condition and seven monitoring wells would be periodically sampled to evaluate groundwater quality.

This diagram of the site shows where the cap will be installed trench will be installed. Sediment will be excavated from the Canal and placed on the landfill. The sides of the canal will be armored with rock and monitoring wells will be sampled to track changes in the groundwater plume.

The cost of Alternative 1 is zero. The cost of Alternative 2 is \$1,938,000 in capital costs and \$2,405,000 for monitoring.

Are there any questions?

[David Marshall] How long will the monitoring continue?

[Bill Olson] We would be complying with the state of Mississippi requirements of 30 years.

[Bob Fisher] The landfill sites will be monitored at some frequency based on the results that we get.

[David Marshall] Will there be any permitted use? Could this site be used for golf?

[Bill Olson] That is my understanding. It's a good use for the site.

[Phillip Shaw] What if they build an irrigation system?

[Bob Fisher] That's a good question, and something that has already come up as a question. Yes, this remedy can work with an irrigation system if done carefully. Most of the irrigation systems last 8 to 10 years then will need to be replaced. Tetra Tech will make it very clear what can and cannot be done at the site as they develop the Remedial Design. The use would be very restricted. No training or driving of heavy equipment would be allowed. We anticipate that the site would be either a golf course or a grassy field

[David Marshall] Typically how thick is that cap?

[Bob Fisher] The compacted clay layer about 18 inches and would be about 2.5 feet by the time you get the sod on top of it. The soil above the cap would be between three and four feet deep and there would be three to four feet of soil beneath the cap. The total thickness of soil between the waste and the surface would be approximately eight feet.

I would like to add that it's very difficult to explain a feasibility study. The process is here to make sure that we look at the best remedies, so that we don't get a big "oops" at the end. We expect a number of Proposed Plans in the next few years.

[David Marshall] Would you mind going back to that slide where you showed the thickness of the clay? How deep is that layer?

[Bill Olson] The green silt is 50 to several hundred feet thick. That layer stops the contaminants from moving any deeper.

[David Marshall] How deep were the trenches?

[Bob Fisher] The trenches were pretty much at the level of the groundwater.

[David Marshall] So the gray silt layer is below that?

[Bill Olson] Yes, the silt layer is below the trenches which helps to contain the contamination.

[David Marshall] The groundwater plume that you found earlier, is it moving towards the southwest?

[Bill Olson] Yes, the blue line in this diagram estimates where the vinyl chloride concentrations are higher than the Mississippi drinking water standards. At one place it is more than 100 times the drinking water standard.

[Bob Fisher] Yes, and I would like to add that the gradient is so low there that it is almost flat. Another thing that I would like to mention is that we expect the natural attenuation to be working, so we expect that the concentrations of contaminants in the groundwater will be dropping.

[David Marshall] Is Site 4 the only place we've done the enhanced natural attenuation?

[Bob Fisher] Yes, we'll probably look at it for Site 3. However, we don't expect it to work as well there.

Well, that brings us to the end of our presentation. Please feel free to submit any written comments on our proposed plan, and we very much appreciate you for coming tonight.

[The meeting closed at 6:30 pm]