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28TH STREET ACTION MEMORANDUM

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

Unit Identification Number: N62604
Contract No. N62467-89-D-0317/096

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January 1997

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RE: Draft 28th Street Action Memorandum, NCBC Gulfport, Mississippi
Contract No. N62467-89-D-0317/092

Attached you will find two copies of the above-mentioned memorandum. These copies are for your review and comments. Once you give us the go ahead, we will make this a final document and we can process it for Adminstrative Records.

Sincerely,

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Enclosure

[8504-033]

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CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/096 are complete, accurate, and comply with all requirements of this contract.

DATE: January 31, 1997

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(DFAR 252.227-7036)

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Gulfport, Mississippi

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GLOSSARY

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EE/CA	Engineering Evaluation and Cost Analysis
HDPE	high density polyethylene
MSDEQ	State of Mississippi Department of Environmental Quality
NCBC	Naval Construction Battalion Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priority List
OSHA	Occupational Safety and Health Administration
ppt	parts per trillion
SHA	sediment-handling area
SRT	sediment recovery trap
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ	toxicity equivalence
TOC	total organic carbon
USEPA	U.S. Environmental Protection Agency

I. PURPOSE

This action memorandum documents the Navy's decision to perform a time-critical removal of dioxin-containing soils and sediments along 28th Street at the Naval Construction Battalion Center (NCBC) in Gulfport, Mississippi. The Navy is funding this time-critical removal action in advance of road construction scheduled to occur on 28th Street. This action was undertaken to prevent the road construction workers from coming into physical contact with dioxin-containing soil and sediment. The intent of this action was to reduce dioxin levels in the soil and sediment below a State of Mississippi Department of Environmental Quality (MSDEQ) mandated level of 4.7 parts per trillion (ppt). The area along 28th Street selected for this removal action is located immediately north of the base boundary. The area receives drainage directly from an area of the base formerly used to store dioxin-containing herbicide orange. This action memorandum was prepared following Engineering Evaluation/Cost Analysis (EE/CA) structure (U.S. Environmental Protection Agency [USEPA], 1991).

II. SITE CONDITIONS AND BACKGROUND

MSDEQ has established an action level of 4.7 ppt for dioxin-containing soil and sediment, based on a one in a million lifetime residential exposure scenario for developing cancer. Soil and sediment samples collected along the northern boundary of the base in late 1994 (ABB Environmental Services Inc. [ABB-ES], 1995a) indicated the presence of dioxins up to 150 ppt at one of the base outfalls (surface water drainage outlets). In January 1995, additional samples were collected just outside the northern base boundary in the ditches to confirm the release of dioxin-containing sediments off base. These samples confirmed that dioxin-containing sediments had indeed left the base at levels above the MSDEQ action level of 4.7 ppt. In February 1995, it was learned that road widening and construction activities were planned to take place from May through July along 28th Street in the same area that was confirmed to contain dioxin above MSDEQ action levels. At that time, the Navy decided to rapidly delineate and remove sediments and soils that may contain dioxin in the proposed area of construction activities along 28th Street. A sampling strategy was developed (ABB-ES, 1995b) to delineate the sediment and soil above 4.7 ppt in the planned area of sampling activities. The following paragraphs describe the conditions that support the need for a time-critical removal action along 28th Street.

A. Site Description

1. Removal Site Evaluation

NCBC Gulfport is located in the city of Gulfport, which is situated in Harrison County in the southeastern corner of the State of Mississippi (Figure 1, Attachment A). The facility occupies approximately 1,100 acres of land in the western part of Gulfport immediately south of 28th Street. The primary functions of NCBC Gulfport are to provide support to four battalions of the Naval Construction Force and to store and maintain prepositioned war reserve material stock.

It was through the storage and maintenance mission that NCBC stored reserve herbicide orange at a location that has since become known as Site 8. Herbicide orange is a mixture of 2,4-dichlorophenoxy-acetic acid and 2,4,5-trichlorophenoxyacetic acid, the latter of which contains up to 2 parts per million dioxin. The herbicide was stored from 1968 to 1977 at the site before being removed and destroyed in 1977. Approximately 850,000 gallons of herbicide were stored during that period in 55-gallon drums. Subsequent investigations (EG&G, 1987 and 1988) determined that the herbicide had leaked from the drums resulting in dioxin contamination of the soil at Site 8 and the sediment in the ditches leading away from the site (Figure 2, Attachment A). The arrows on Figure 2 show the surface water flow directions in the ditches that drain away from Site 8. It is in these ditches that dioxin-containing sediment has been transported to the area of concern along 28th Street (Figure 3, Attachment A).

2. The Toxicity Equivalency of Dioxins and Furans

The dioxin numbers listed in this report represent the toxicity equivalence (TEQ) of 17 polychlorinated dibenzodioxins and dibinzofurans. Each of the dioxin and furan congeners, which have chlorine atoms at the 2, 3, 7, and 8 positions (2,3,7,8-substituted compounds), can mimic the toxic properties of the most toxic congener, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The USEPA (USEPA, 1989) developed a method of analysis that relates each of the other congeners to 2,3,7,8-TCDD by a given factor. This factor, known as the toxicity equivalence factor, is multiplied by the sample result for that congener to give the toxicity equivalence for that specific congener. To determine the "dioxin" result for that sample, we simply add all of the toxicity equivalencies for all 17 congeners. The result is reported as the "dioxin" amount.

3. Site Characteristics

The area along 28th Street considered for the removal action (Figure 3, Attachment A) is in a residential and commercial area just north of the NCBC. The planned construction activities will involve widening 28th Street from Canal Road to 53rd Avenue. With that area, the main east-west trending ditch will have soil and sediments either moved or disturbed in some manner by the workers. Also between Canal Road and 53rd Avenue, three culverts will be removed and replaced at Outfalls 1, 3, and 4 (Figure 3). It is in the ditch segments described above that dioxin-containing sediment has been detected and quantified through sampling (ABB-ES, 1995c). The removal action removed all dioxin-containing sediments to a level below 4.7 ppt. Additionally, deposition of sediment outside the banks of the ditch at Outfall 3 (Figure 4, Attachment A) was observed and quantified through sampling. The removal action addressed these soils as well.

The ditches in the described area were constructed and maintained by the city of Gulfport. They are generally 4 to 6 feet deep, except Canal No. 1 which is up to 12 feet deep. The ditches were excavated into fine to medium silty sand. Over time, however, a fine-grained organic muck has deposited on the firm sands of these ditches in lower energy environments. It is this organic-rich muck that contains much of the dioxin that has been detected (ABB-ES, 1995c).

All of the surface water flow is to the north or the west, ending up in Canal No.1, either through the ditch along the south side of 28th Street or through the swampy area north of Outfall 3 (Figure 3). From Canal No.1, the surface flows to Turkey Creek (Figure 3) and eventually into Bernard Bayou.

4. Release or Threatened Release into the Environment and Potential Exposure of Workers if the Contaminant is not Removed

This section summarizes the sampling activities in April 1995 reported in the "Letter Report: Removal Action Technical Support Sampling" (ABB-ES, 1995c). The field investigation was undertaken to determine the extent of dioxin contamination in the sediment and soil in the planned road construction area and included the following tasks:

- collection of 34 ditch sediment samples from 27 individual locations in 4 areas of concern;

- collection of 13 surface soil samples from areas where ditches overflow their banks along 28th Street;
- analysis of all samples by high resolution 8290 Dioxin/Furan Method; and
- organic carbon analysis for all samples and grain size for 19 samples.

The samples for dioxin and furan (dioxin) analysis were collected to determine the horizontal and vertical extent of dioxin contamination above 4.7 ppt in the identified areas of concern shown in Figure 4. Organic carbon and grain size analysis were collected and analyzed to characterize the depositional environments favorable to dioxin accumulation. It was observed in earlier sampling that organic rich samples resulted in the highest dioxin results. Therefore, the grain size and organic carbon samples were taken to quantify these visual observations with dioxin results. The correlation we were looking to identify were areas of low energy (fine-grain size) deposits containing organic material. The highest dioxin results were consistent with this correlation and supported this visual determination of the limits of excavation. This expedited process was important to this time-critical activity because laboratory results take a minimum of 3 days to receive, and the ditches have to be dewatered during excavation.

The results of the delineation sampling indicated that three areas contained dioxin above 4.7 ppt and were within the boundaries of the planned road construction activities. These areas, shown with sample results and proposed excavation limits, are presented in Figure 4, which represent areas surrounding Outfalls 1, 3, and 4. The dioxin results ranged from below the detection limit to 91 ppt (Table 1, Attachment B). Surface soils near Outfall 3 contained dioxin above 4.7 ppt, likely the result of overflow bank deposits, and required excavation. The total amount of material proposed for removal, as shown on Figure 5, was estimated to be between 300 and 500 cubic yards. The actual amount removed was approximately 300 yards.

As previously stated, dioxin has an affinity toward organic carbon. A relationship between organic carbon and dioxin levels detected in sediments was observed when plotting the two values against each other. As shown in Figure 6, dioxin and total organic carbon (TOC) exhibit an exponential relationship with one another. These results indicate that organic carbon may be a good indicator as a predictive tool for dioxin results. This relationship can be exploited in two ways. First, it can be used as a predictive qualitative tool for determining the limits of excavation in the field. This approach was applied to the

final limits of excavation during the removal action. Two, a qualitative measurement of TOC can be obtained in areas where high density sampling is required to limit the number of expensive dioxin-analysis samples. The second use of this relationship will be employed during large-scale delineation activities in the base ditch system.

With the pending road construction along 28th Street, the Navy decided the best option to prevent worker exposure in those areas would be to excavate sediment and soil containing dioxin above the MSDEQ action level of 4.7 ppt. According to the plan approved by the MSDEQ (ABB-ES, 1995b), the soil and sediment excavated along 28th Street was to be brought back onto the presumed, originating source (Site 8) on the base and stored in a holding area specifically designed for that purpose.

5. National Priority List (NPL) Status

At the present time, NCBC Gulfport is not listed on the NPL under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by Superfund Amendments and Reauthorization Act. However, future NPL status may change due to pending investigations and final rulings by the regulatory authority. Since the removal action has taken place, the base has been placed under an Administrative Order by MSDEQ. The order requests the delineation and remediation of dioxin and dioxin-related constituents that potentially have been released to the environment by Site 8.

B. Other Actions to Date

1. Previous Actions

Incineration of soils containing herbicide orange at Site 8 was conducted in 1987. No other remedial action of soils, eroded soils, or transported sediment has been performed until April 1995.

In conjunction with the soil and sediment sampling in April 1995, sediment recovery traps (SRTs) were installed at 12 locations in the ditch drainage system. The SRTs reduce the transport of sediment in ditches by filtering surface water as it passes and by causing sediment to settle out in the low energy pool upstream of the trap. The SRTs are constructed by folding a nonwoven filter fabric inside a small embankment, or check dam constructed of gravel. The overall structure was secured with wire fencing material draped over the SRT to reduce erosion of the gravel. The SRTs were installed as part of a pilot-

scale program to mitigate sediment transportation. The efficiency of the SRTs is being evaluated by sampling sediment up and downstream of selected SRTs.

2. Current Actions

Ongoing maintenance and sampling of the SRTs is the only current action taking place in regards to sediment erosion and transport. SRT maintenance includes replacing eroded gravel and mending the stabilizing wire mesh that has been occasionally damaged caused by high flows during large rainfall events.

C. State and Local Authorities' Role

1. State and Local Actions to Date

The U.S. Department of the Navy is undertaking this removal action of the sediment and soil along 28th Street on behalf of NCBC Gulfport. By June 1995, no emergency response actions have been taken or requested by MSDEQ. The Navy initiated the removal of the soil and sediment and MSDEQ concurred of this recommendation.

On February 14, 1996, the MSDEQ issued an Administrative Order requiring the delineation and remediation of dioxin and dioxin-related constituents both on and off base property. This order included action on soil, sediment, surface water, and groundwater. The removal action on 28th Street was completed before the order was issued.

2. Potential for Continued State and Local Action

The MSDEQ concurred with the Navy's decision to remove the dioxin-containing sediment and soil in advance of the road construction to prevent the potential exposure of workers. Subsequent to this removal, the Sampling and Removal Strategy Letter Report was developed and presented to the MSDEQ on April 5, 1995 (ABB-ES, 1995c). The approach presented in the strategy letter report called for using a proven method for removing dioxin-contaminated soil and sediment: excavation and disposal/storage. Excavation and removal of dioxin-containing sediment and soil is effective because of the natural affinity of dioxin to soil particles. Once bound to soil/sediment particles, dioxin is extremely difficult to remove.

Therefore, excavation and removal of dioxin-containing soils can be accomplished without the risk of volatilization and at relatively low cost. MSDEQ approval of the plan was granted before any action took place. All funding for this action was provided by the Navy. MSDEQ monitored the progress of the removal action and continues to serve as the regulatory authority for NCBC Gulfport.

The issuance of the Administrative Order provides for continued oversight and regulatory authority for MSDEQ. To date, the workplans for dioxin delineation on and off the base and the interim corrective measures to address post 28th Street removal sediment mitigation have been written and accepted by MSDEQ.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT AND STATUTORY AND REGULATORY AUTHORITIES

Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) outlines factors to be considered in establishing the appropriateness of a removal action. This section addresses factors associated with the 28th Street removal action.

A. Threats to Public Health or Welfare

1. Actual or Potential Exposure to Hazardous Substances or Pollutants or Contaminants by Nearby Populations or the Food Chain

At this time, an exposure assessment is being conducted for the population within 1-mile radius of the base. A human health and ecological assessment is planned in 1997. However, toxicity factors related to dioxins and furans are well documented. The toxicity of dioxins has led the USEPA and MSDEQ to place their lowest actions levels on this substance. In the case of soil and sediment, MSDEQ has primary authority and has determined that 4.7 ppt dioxin TEQ would be the action level for this action. This risk-based action level was based on cancer risk slope factors using a lifetime residential scenario. Based on the sample results from Removal Action Technical Support Letter Report (ABB-ES, 1995b) (Table 1) and the action levels set by MSDEQ, the potential risks posed by contaminants present in the soil and ditches may include the following.

- Risk of human exposure (dermal) to dioxin-containing soil and sediment especially during excavation. Dioxin has a high affinity for fat and oils present in human skin.

- Risk of human exposure to airborne particulate containing dioxin that would be generated during road construction. Careful removal before construction eliminates the potential for dioxin-containing soil and sediment from getting deposits on roadways and drying out and having dioxin-containing dust blown off the site.

- The three areas identified for removal have the highest yet detected levels of dioxin. Removing the sediment and soil from these areas would greatly reduce the exposure of wildlife (fish, turtles, and crawfish) that are also locally used as sources of food.

- The three areas identified are also in residential locations. Removing the dioxin-containing soil and sediment would reduce the risk of having casual human exposure when fishing in or playing in these ditches.

- Removing these areas of elevated levels of dioxin (hot spots) would reduce the potential impact to sensitive downstream ecological receptors in Turkey Creek, Bernard Bayou, and a large swampy area north of Outfall 3. These hot spots could act as secondary sources during periods of heavy rainfall.

2. Actual or Potential Contamination of Drinking Water Supplies

Although more than 150 water supply wells are located within a 2-mile radius of NCBC Gulfport (ABB-ES, 1993), the presence of dioxin in surface soils or ditch sediment does not pose a large risk to groundwater supplies for two reasons. First, the high affinity dioxin has for organic carbon and soil particles prevents it from having a vertical mobility more than several feet. This lack of mobility was demonstrated during groundwater sampling at Site 8 (ABB-ES, 1995d); and, second, the shallowest potable water supply is found nearly 90 feet below land surface in this area (Shows, 1970).

3. Hazardous Substances, Pollutants, or Contaminants in Drums, Tanks, or Other Bulk Storage Container That May Pose a Threat

Although the herbicide orange that was the original source for the dioxin contamination in the ditches was stored in drums at Site 8, the drums have since been removed and no longer pose any threat.

4. High Levels of Hazardous Substances or Pollutants in Soils Largely at or Near the Surface That May Migrate

This is one of the main concerns with having dioxin contamination in the sediments of the ditches at Outfalls 1, 3, and 4 and the proposed 28th Street roadway construction operations. The ditches sustain a year-round flow of water that causes the migration of the dioxin-containing bed load from Site 8 to the Outfalls 1, 3, and 4. During periods of heavy rainfall, the ditches often spill over their banks (especially around Outfall 3), which causes the deposition of dioxin-containing sediment directly on the surface soils. This mechanism of contaminant transport was observed and verified during sampling activities in April 1995 (ABB-ES, 1995c).

5. Weather Conditions That May Cause Hazardous Substances or Pollutants to Migrate or be Released

As stated above, the primary route for migration of dioxin-containing soils or sediments is through the ditch system on and near the base. Periods of heavy rainfall that commonly occur in this region result in much higher surface water flow rates that scour and transport the bed load of the ditches. Following these high flow periods, many low areas around the ditches have thin deposits of potentially dioxin-containing sediment from the ditches. In general, large rainfall events could potentially scour and transport the sediment located in the identified hot spots at Outfalls 1, 3, and 4.

6. Threat of Fire or Explosion

Dioxin is a nonvolatile, nonflammable substance that is extremely stable even in the presence of high temperatures. Dioxin-containing soil and sediment is not considered flammable or explosive.

B. Threats to the Environment

1. Actual or Potential Exposure to Hazardous Substances or Pollutants by Nearby Populations or the Food Chain

As stated in III.A.1., the primary concern to the environment is the transportation of dioxin-containing sediment in the ditch system through Outfalls 1, 3, and 4. From these outfalls, the potentially contaminated sediment migrates to Turkey Creek, Bernard Bayou, and the swamp directly north of Outfall 3. The continued migration of dioxin from these outfalls poses a large threat to the food chain. Dioxin levels in fauna can exponentially increase up the food chain through a process known as biomagnification. In some studies, the magnification has been as great as 25,000 times from the bottom of the food chain up into the higher species.

2. Actual or Potential Contamination of Sensitive Ecosystems

The potential contamination of nearby ecosystems includes the ditch system along and near 28th Street, Turkey Creek, Bernard Bayou, and the swamp north of Outfall 3. Dioxin-containing sediment may be deposited in the bedloads of the ditch systems and onto surface soil in overflow areas in the above-mentioned locations.

3. Hazardous Substances, Pollutants, or Contaminants in Drums, Tanks, or Other Bulk Storage Container That May Pose a Threat

Although the herbicide orange that was the original source for the dioxin contamination in the ditches was stored in drums at Site 8, the drums have since been removed and no longer pose any threat.

4. High Levels of Hazardous Substances or Pollutants in Soils Largely at or Near the Surface That May Migrate

As stated earlier, migrating dioxin-containing sediment in the ditches is one of the main concerns at Outfalls 1, 3, and 4 and the proposed 28th Street roadway construction activities. This mechanism of contamination was observed and verified during sampling activities in April 1995 (ABB-ES, 1995c).

5. Weather Conditions That May Cause Hazardous Substances or Pollutants to Migrate or be Released

As stated earlier, the primary route for migration of dioxin-containing soils or sediments is through the ditch system on and near the base. Periods of heavy rainfall that commonly occur in this region resulting in much higher surface water flow rates that scour and transport the bed load in the ditches.

6. Threat of Fire or Explosion

Dioxin-containing soil and sediment is not considered flammable or explosive.

IV. ENDANGERMENT DETERMINATION

A time-critical removal action to eliminate the dioxin-containing "hot spots" at Outfalls 1, 3, 4, and the area within the limits of the proposed roadway construction activities has been identified and assessed. If the outlined response action was not implemented, the potential results could have been:

- the exposure of road construction workers and the nearby population as construction activities disturbed the contaminated sediments;
- expensive delays to the road construction project while Occupational Safety and Health Administration-trained workers were hired and elaborate containment systems were built to prevent perturbance of the sediments;
- the identified hot spots would have remained behind, which could potentially act as a secondary source for downstream contamination; and
- the continued exposure of the local fauna to the elevated levels of dioxin in the sediment at each of the outfalls, and the potential for human consumption of these contaminated organisms.

It should be noted again here that this action was limited to the area potentially impacted by the road construction activities. The identification and removal of these sediments does not extend to Site 8, where other potential hot spots of dioxin may exist.

V. REMOVAL ACTION AND ASSOCIATED COSTS

This section describes the removal action that took place in July 1995 and the costs associated with that activity.

A. Removal Action

1. Removal Action Description

The removal action described in this section was proposed and implemented following the Removal Action Technical Support (ABB-ES, 1995c) sample results and associated Sampling Strategy and Removal Action Letter Report (ABB-ES, 1995b). MSDEQ concurred with the recommendation to remove the dioxin-containing sediment and soil to a level of 4.7 ppt in advance of the road widening and construction work that was underway on 28th Street.

The removal action consisted of dewatering the ditches prior to excavation, excavation of potentially dioxin-containing sediments using visual observations of organic-rich deposition, moving the excavated soil and sediment to the sediment-handling area, and collecting confirmation samples in the areas of excavation to ensure that the MSDEQ-defined dioxin cleanup levels had been achieved.

2. Surface Water Diversion and Dewatering of the Ditches

Before any sediments could be removed, the baseline flow of the surface water in the ditches needed to be stopped or diverted before it reached the proposed excavation area. This was required to minimize the amount of excavation from the ditches and to allow for observation and inspection of the sediment as it was removed. Again, the predictive levels or organic carbon observed and quantified during the interim removal sampling process were applied during the excavation to minimize "over excavation."

To prepare each area for excavation, surface water flow was diverted beyond the outfall by placing impermeable barriers in the culverts on the upgradient side. This prevented surface water from exiting the base at that outfall and allowed the remaining surface water downgradient from that outfall to be pumped back to the base and discharged between SRTs along 11th Street. The SRTs immobilized potential dioxin contamination present in the fluids generated by the dewatering operations.

3. The Sediment-Handling Area (SHA)

The SHA was constructed to temporarily store the sediment excavated from the outfalls located on 28th Street. The SHA is located on the southern boundary of Site 8 (Figure 2). The SHA was constructed by first excavating a shallow, V-shaped trench that sloped to one end. The approximate depth at the axis of the SHA was 3 feet at one end, sloping down to 5 feet at the other end. The dimensions of the trench were 60 feet wide by 85 feet long. The edge was bermed 3 feet above grade to allow for extra storage capacity without unnecessarily deepening the trench. The bottom of the trench was lined with 40-mil high density polyethylene (HDPE). Perforated piping wrapped in a nonwoven geotextile was installed along the bottom of the trench to allow dewatering of the sediments.

A second piece of HDPE was used to cover the entire SHA to keep rainwater or surface water from entering the trench and to prevent the sediment from migrating off the site. The nearly saturated sediment was dewatered, and the fluids were containerized in a 21,000-gallon-capacity tank on Site 8. Approximately 11,000 gallons of fluid was removed from the SHA.

4. Excavation of Contaminated Sediment

Outfall 1 (Canal No. 1). The sampling efforts at Outfall 1 revealed that contamination above 4.7 ppt associated with this outfall and in the area of the roadway construction activities was limited to the sediment north of 28th Street. Samples collected as far north from the outfall as the easement (75 feet) indicated sediment contamination above 4.7 ppt. The depths of contamination ranged from as shallow as 1 foot on the western side of the ditch to a depth of 2 feet on the east side. The depth of excavation was determined based on previous sampling and geologic observations, such as organic content and lithologic character. Outfall 1 was much larger than the other two outfalls outlined in this report. The ditch is nearly 75 feet long by 25 feet wide and 12 feet deep in the area of investigation.

The final limits of excavation were determined in the field by noting the last occurrence of organic-rich silt and sand. The excavation revealed a gray, fine sand with little silt in the ditch profile. In total, 114 cubic yards of sediment were removed from the ditch at this location and transferred to the SHA. Confirmation samples were collected from three locations (Figure 6) and analyzed for dioxins (USEPA Method 8290).

Outfall 3. Excavation at Outfall 3 commenced on July 14 on the north side of 28th Street. This outfall had consistently exhibited the highest levels and the deepest extent of dioxin contamination as determined by sediment samples collected in April 1995. Surface water was a particularly difficult issue at this location because Outfall 3 is the confluence of three drainage ditches. Sheet piling was erected to cut off flow from two ditches north of 28th Street, and the drainage ditch along 11th Street was cut off using expanding plugs in the culvert piping leading to this outfall. The remaining flow was directed along 11th Street through two SRTs before it joined Canal No. 1 to the west.

The size of the area of investigation at this outfall was 80 feet long by 30 feet wide. Excavation began on the north side of 28th Street bounded within the area of proposed roadway construction (Figure 5). At this location, the distinction between the organic-rich sediments that have accumulated in the ditch and the white and gray sands of the Pleistocene was readily apparent. Delineation and characterization samples indicated that dioxin contamination at levels above 4.7 ppt extended approximately 1.5 feet below grade. Excavation confirmed this level, as gray, silty sand was encountered nearly uniformly at 1.5 feet below grade. The dark gray and brown silt and sand that constituted the deposited load were removed as well as the top 0.5 to 1.0 foot of gray, silty sand that was in direct contact with the contaminated sediment. Total excavation at Outfall 3 north of 28th Street was estimated at 47 cubic yards.

South of 28th Street and within limits of the proposed roadway construction, the sediment was excavated 2.0 to 3.0 feet below grade. This was necessary because the entire area was originally lower than other areas of the ditch and tended to accumulate contaminated sediment. Again, the excavation continued until the gray, silty sand was encountered and the soil with high organic content had been removed. Forty-nine cubic yards of sediment were excavated from the south side of Outfall 3 and placed in the SHA. Two confirmation samples were collected from each side of the outfall and analyzed for dioxins (USEPA Method 8290).

Surface soil samples collected in April 1995 indicated the presence of dioxin contamination in surface soil adjacent to Outfall 3 on the south side of 28th Street. Conceptually, this soil may have been contaminated during periods of heavy rainfall when the ditch would overflow its banks onto the surface soil, carrying with it contaminated dioxin sediment. The contamination was limited to the surface soil (less than 1 foot). This soil was excavated and transported to the handling area on July 17 and July 18, 1995. A total of 60 cubic yards of surface soil was excavated and transported to the handling area. Two confirmation surface soil samples were collected (Figure 5) and analyzed for dioxins.

Outfall 4. Excavation of the contaminated sediment at Outfall 4 (Figure 5) and bounded by the limits of the proposed roadway construction commenced on July 13. The depth of excavation was determined based on previous sampling and geologic observations, such as organic content and lithologic character. The size of this ditch, including the culvert in the area of excavation, was 75 feet long by 22 feet wide. At Outfall 4, there was not a clear lithologic distinction between material that had filled the ditch in and the native Pleistocene sand. Here, the final depth of excavation was determined by noting the last occurrence of organic-rich materials that had been previously identified as generally having the highest concentrations of dioxin. This occurred at between 1.5 and 2.0 feet below the existing grade of the ditch. The excavation was continued somewhat deeper south of 28th Street in an area that was identified during previous sampling as having contamination above 4.7 ppt to nearly 2.0 feet below grade. At this location, the excavation was completed to 3.0 feet below grade. A total of 17 cubic yards of sediment were excavated from the north and south sides of 28th Street at this outfall. Three confirmation samples were collected at Outfall 4 and sent to an offsite laboratory for analysis for dioxins (USEPA Method 8290) (Figure 5). Excavation was completed on July 13.

This sediment was transported to the SHA by roll-off trucks with plastic-lined beds to prevent accidental spillage of sediment or the fluids associated with the saturated sediment.

5. Confirmation Sampling Results

A total of 14 confirmation samples were collected from the 3 areas of excavation: Outfalls 1, 3, and 4. The confirmation sampling locations for each of these areas are shown on Figure 5. The sample results ranged from a low of 0.023 ppt to a high of 4.0 ppt. Table 1 summarizes the confirmation sample results.

B. Removal Performance

1. Contribution to Long-Term Remedy

The removal of dioxin-containing soil and sediment from the proposed construction areas along 28th Street reduced the potential for worker exposure and greatly decreased the risk to the nearby general public to exposure of dioxin-containing dust generated by construction. The removal of nearly 300 cubic yards of dioxin-containing soil and sediment at these outfalls also reduced the immediate threat to nearby sensitive receptors. However, without long-term remedial actions to remove and abate the dioxin-containing soil and sediment on the base, these three outfalls and associated ditches will become contaminated again. This action also proved that excavation of these dioxin-containing sediments and soils could be an effective low-technology remedial option. The other remedial options considered are discussed below.

2. Description of Alternative Technologies

Other actions considered included soil washing and ditch diversion and sediment stabilization with cement or asphalt. Three factors weighed heavily on the final decision: (1) construction activities were scheduled to be in the areas of Outfalls 1, 3, and 4 within 2 months; (2) the risk of exposure to construction workers and the nearby public must be reduced without mobilizing dioxin-containing sediment in the ditches; and (3) only $200,000 was available to initiate and complete this action by the end of July.

Based on these three factors, only excavation and placement of materials (sediment) to a handling area met all three requirements. Soil washing was far too expensive, and sediment stabilization was not selected because the road widening excavation would impact the stabilized areas.

3. Engineering Evaluation and Cost Analysis

Because a time-critical removal action using proven technology was selected as the appropriate response action for 28th Street, an EE/CA was not performed. In addition, the Navy has assumed responsibility for this removal action and funded the necessary assessments, personnel, and equipment to perform the action as described in Section V.

VI. EXPECTED CHANGE SHOULD ACTION BE DELAYED OR NOT TAKEN

The removal action was initiated and completed in July 1995.

VII. OUTSTANDING POLICY ISSUES

None are currently identified.

VIII. ENFORCEMENT

The U.S. Department of the Navy has assumed responsibility for and has completed the described removal action. Therefore, enforcement policies or issues do not apply to this action.

IX. RECOMMENDATION

This document presented a site description and the initiation of a removal action to excavate and remove dioxin-containing soil and sediment from proposed road construction areas along the north side of NCBC Gulfport. In addition, the action was intended to remove the immediate risk of dioxin-containing sediments to workers and the general public and is not intended to be the final remedial action taken in this situation. This document was prepared in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the Administrative Record for the facility.

Conditions along 28th Street met the NCP Section 300.416(b)(2) criteria for a removal action. The incorporation of this document into the Administrative Record is recommended.

_____ _____

Installation Commander Date

ATTACHMENT A

FIGURES

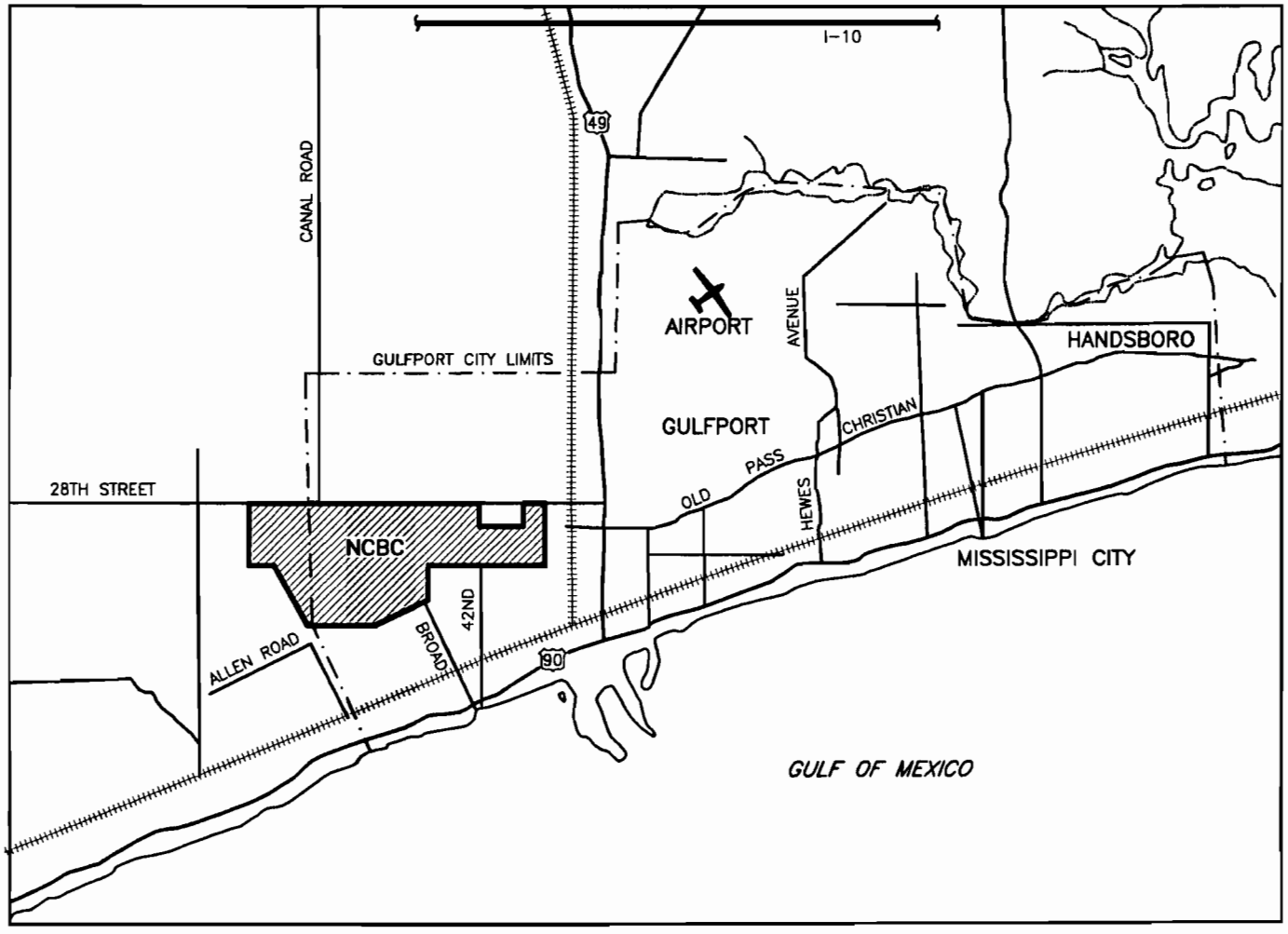


FIGURE 1

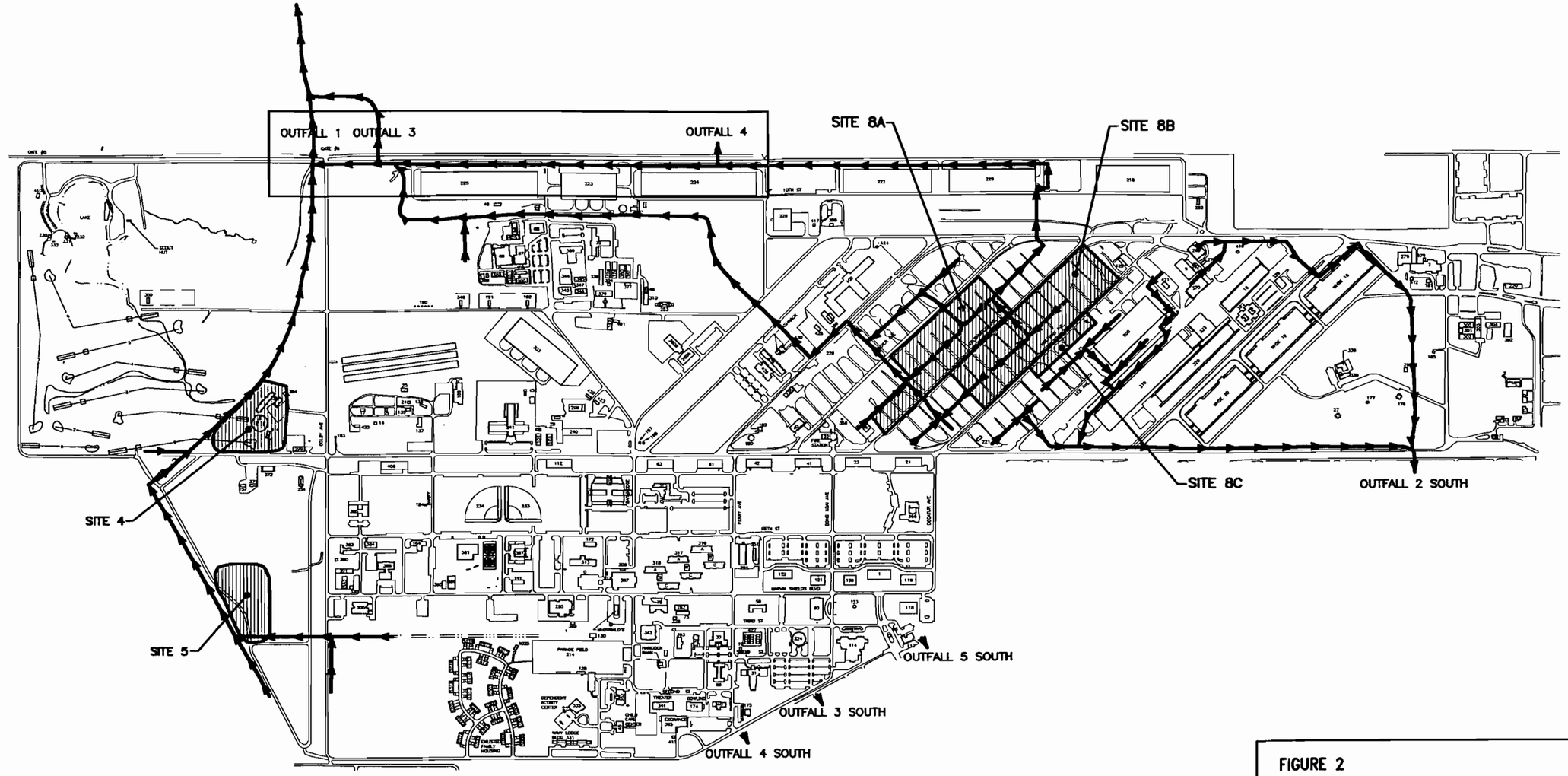
VICINITY MAP

NOT TO SCALE

28th STREET
ACTION MEMORANDUM

NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

D:\DWG\ABB\08505-34\28TH_ST\FIG_1\DMF\960930



LEGEND

SURFACE WATER FLOW DIRECTION

0 500 1000
SCALE: 1" = 1000'

FIGURE 2

BASE DRAINAGE TO OUTFALLS
1, 3 AND 4

28th STREET
ACTION MEMORANDUM

NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

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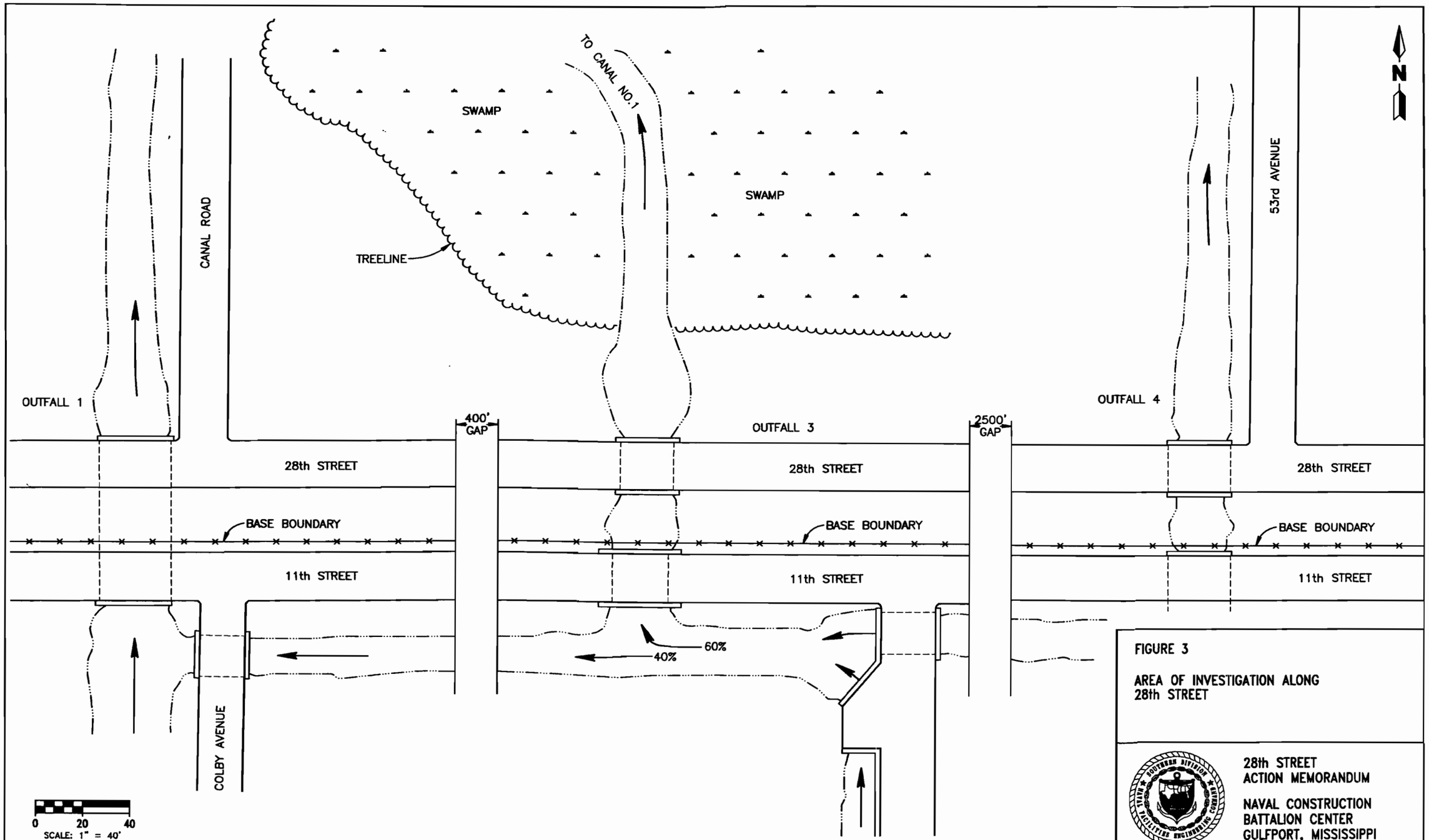

FIGURE 3

AREA OF INVESTIGATION ALONG
28th STREET

28th STREET
ACTION MEMORANDUM

NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

D:\DWG\ABB\08505-34\28TH_ST\FIG_3\DMF\961007

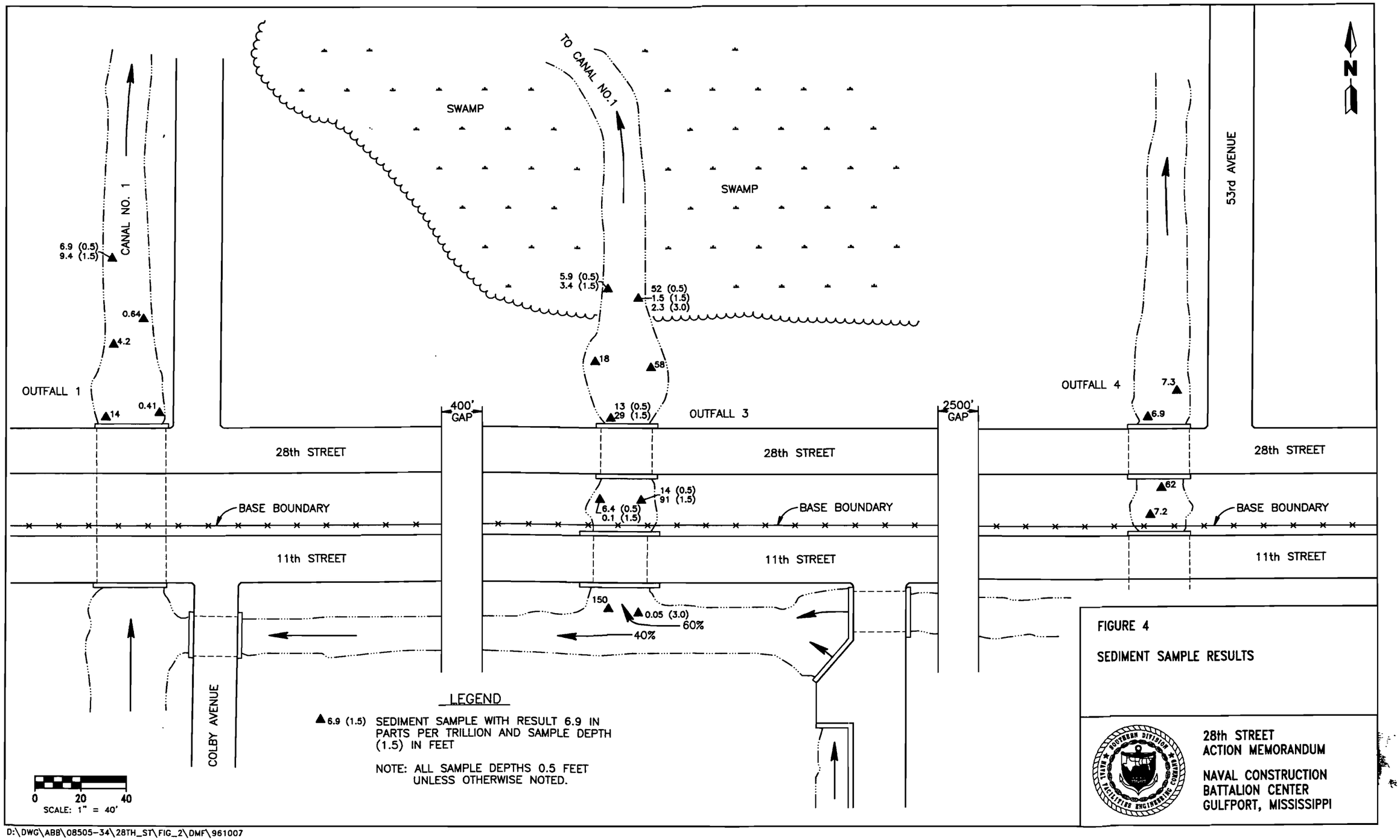

FIGURE 4

SEDIMENT SAMPLE RESULTS

28th STREET
ACTION MEMORANDUM

NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

D:\DWG\ABB\08505-34\28TH_ST\FIG_2\DMF\961007

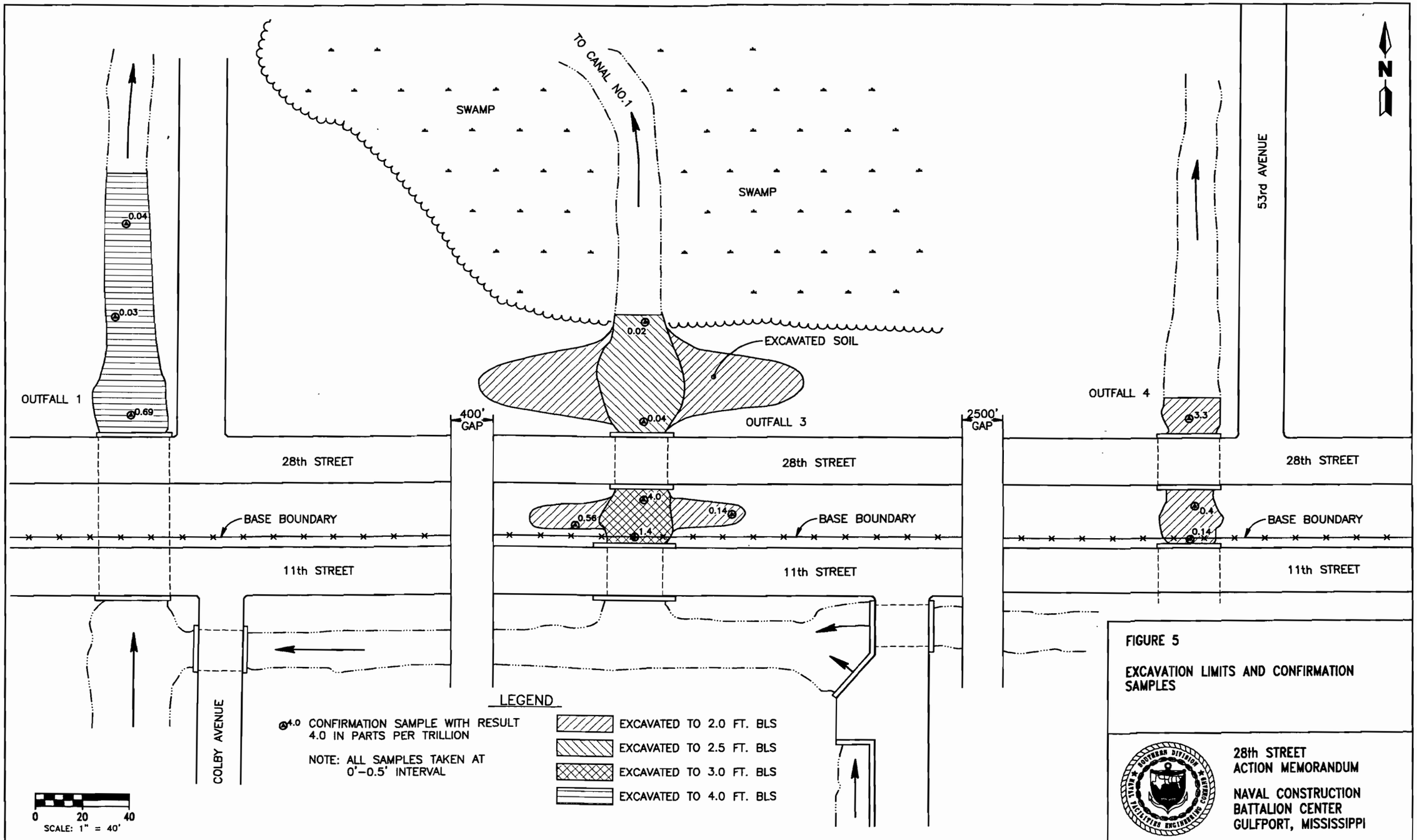

FIGURE 5

EXCAVATION LIMITS AND CONFIRMATION SAMPLES

28th STREET
ACTION MEMORANDUM

NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

D:\DWG\ABB\08505-34\28TH_ST\FIG_5\DMF\961007

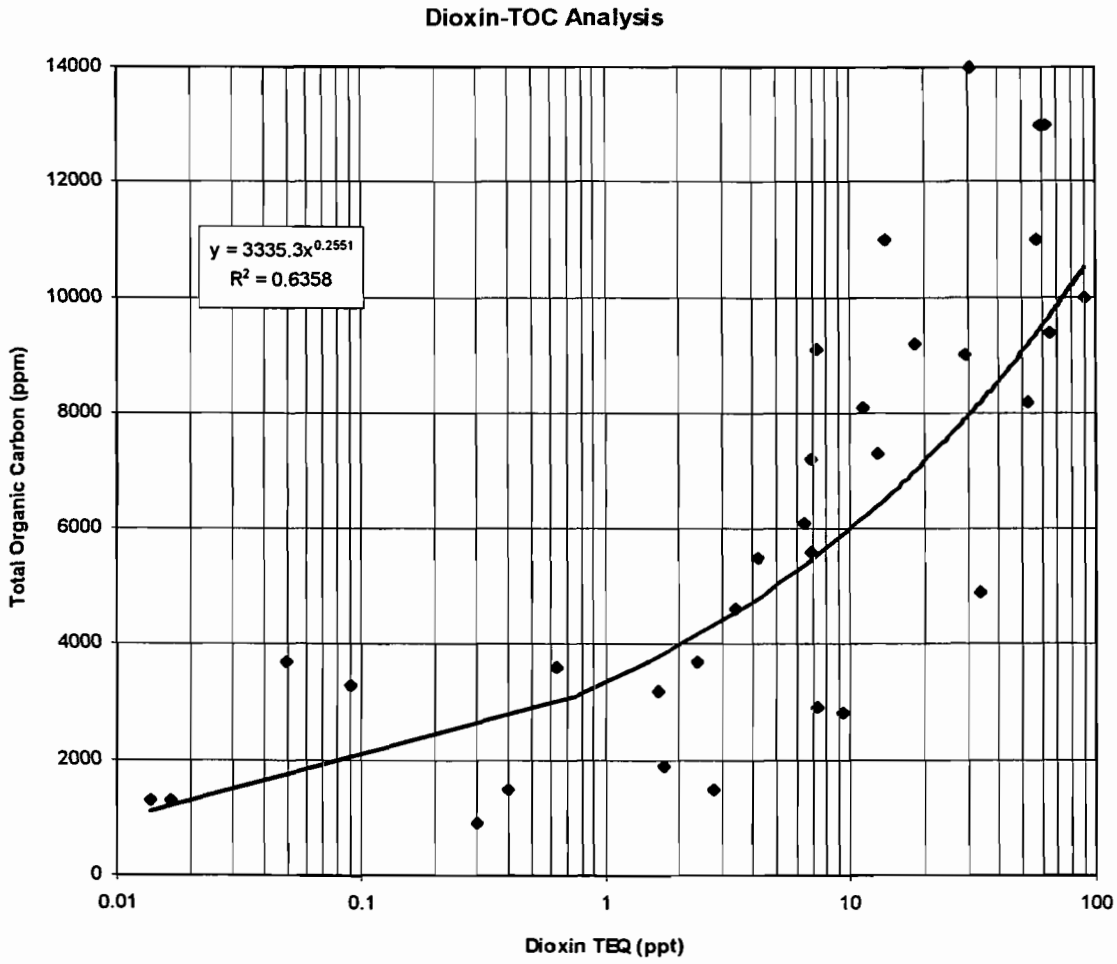

FIGURE 6

DIOXIN AND TOTAL ORGANIC CARBON ANALYSIS

28TH STREET ACTION MEMORANDUM

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

ATTACHMENT B

TABLES

Table 1
Confirmation Sample Results

Letter Report
Interim Removal Action – 28th Street Road Construction
Naval Construction Battalion Center
Gulfport, Mississippi

Sample Number	Outfall	TCDD	TEQ Dioxin
G5D001	4	2.6	3.3
G5D002	4	ND	0.41
G5D003	4	ND	0.14
G5D004	3	ND	0.23 J
G5D004D	3	2.2	2.2 J
G5D005	3	ND	0.43 J
G5D006	3	3.4	4.0
G5D007	3	ND	1.4
G5D008	1	ND	0.91
G5D009	1	ND	1.1
G5D010	1	ND	2.4
G5S001	3	ND	0.071
G5S001D	3	ND	0.14
G5S002	3	ND	0.65

Notes: All concentrations are reported in parts per trillion.

TCDD = 2,3,7,8-tetrachlorodibenzo-p-dioxin.
TEQ = toxicity equivalent.
ND = no data.
J = estimated value.

ATTACHMENT C

REFERENCES

REFERENCES

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