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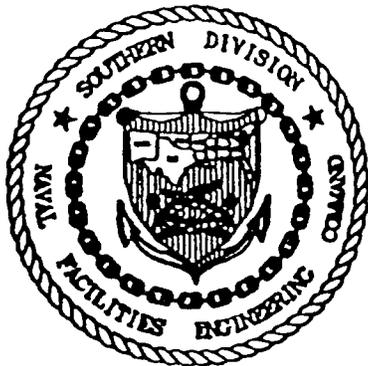
FINAL



**PHASE I
ENVIRONMENTAL PROPERTY
ASSESSMENT**

**DAVID TAYLOR RESEARCH CENTER
MEMPHIS, TENNESSEE**

**CONTRACT N62467-89-D-0318
CTO - 021**



submitted to
SOUTHNAVFACENGCOM

submitted by
**EnSafe/Allen & Hoshall
Memphis, Tennessee**

January 23, 1992

FINAL

DAVID TAYLOR RESEARCH CENTER ENVIRONMENTAL PROPERTY ASSESSMENT

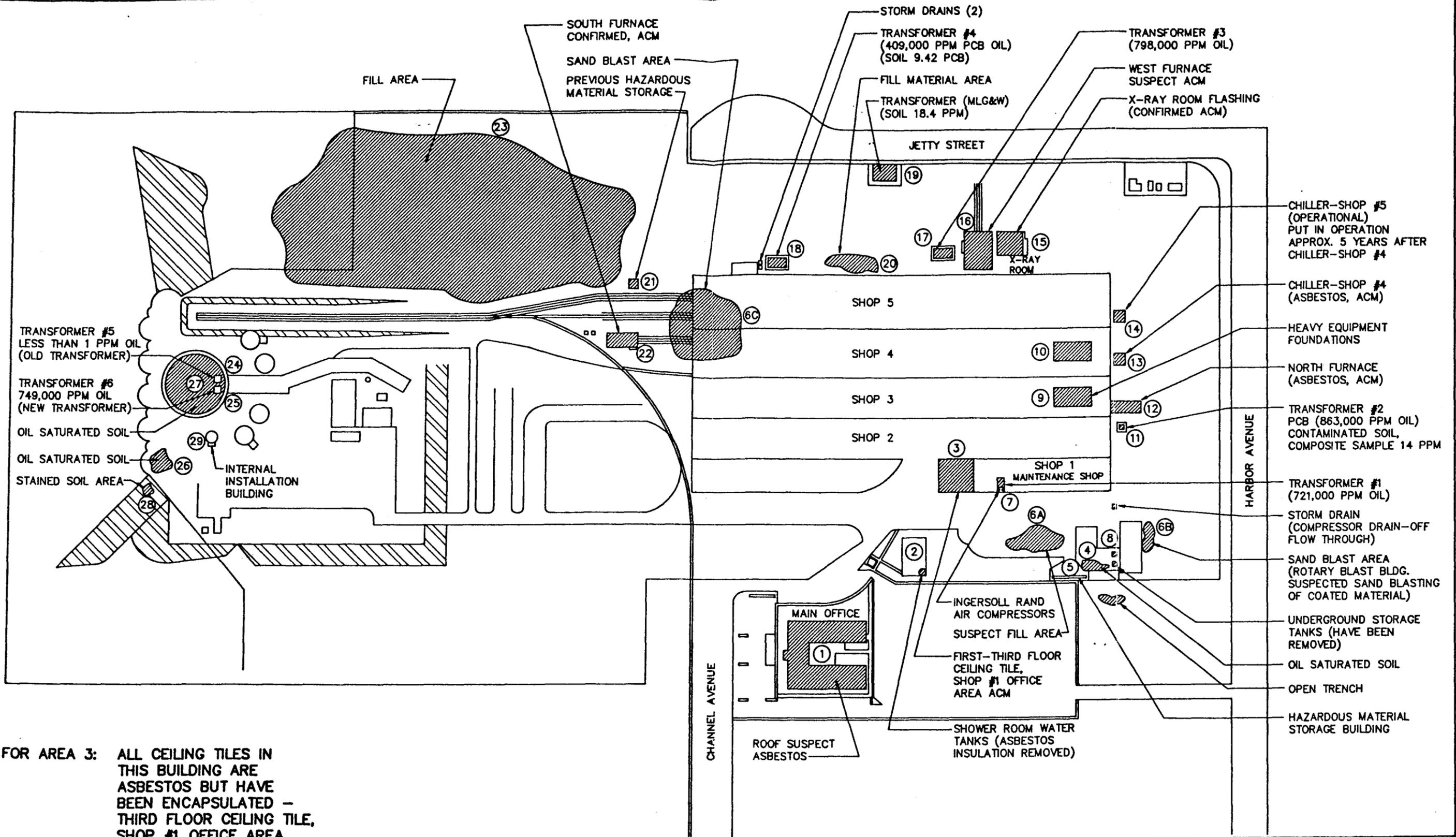
1.0 GENERAL INFORMATION

1.1 Executive Summary

The CBI Na-Con site, herein referred to as CBI, has been investigated for contamination under CERCLA. CERCLA is an environmental law enacted in 1980 by which a system was provided to the federal and state governments for identifying and initiating clean up procedures for hazardous substances released into the environment, whether intentional or accidental and whether one-time or continuing. During the initial stages of CERCLA, sites requiring a preliminary assessment (PA) by the EPA were identified. In many cases, such as the case with the CBI Na-Con site, documentation relating to the listing of the site under CERCLA is deficient. The EPA, after performing a PA at the site determines whether to retain or relinquish control over the site to the state in which it is located. This site is now the responsibility of the Tennessee Division of Superfund. Representatives of this division stated at the time of the interview that another visit to the site is currently considered a low priority because of the enormous backlog of sites requiring site visits. Division records do not show any evidence of contamination or cause contributing to the site investigation. Lack of adequate notes from the initial investigation combined with language in the 1986 act, SARA, are factors that have resulted in this investigation remaining open. The site had been scheduled for an investigation in 1991, but telephone interviews with representatives of the state Superfund division revealed that a re-inspection of the site will probably until postponed to at least mid-1992. Internal memos recording the content of those conversations are included as Appendix A.

This section outlines areas at the CBI Na-Con site that are of environmental concern and require further investigation or testing. Those areas can be located on Figure 1.

Area 4 and 8, the concrete pad and formerly located USTs storing diesel and gasoline have been reported by CBI to contain elevated levels of contaminants. CBI is currently conducting further investigation in this area through an outside consulting firm. E/A&H recommends conducting both soil and groundwater sampling in this general area to determine nature and extent of contamination. Previous tank removal documentation is provided as Appendix B.



NOTE FOR AREA 3: ALL CEILING TILES IN THIS BUILDING ARE ASBESTOS BUT HAVE BEEN ENCAPSULATED - THIRD FLOOR CEILING TILE, SHOP #1 OFFICE AREA HAS BEEN REMOVED. FLOOR TILE ON ALL 3 FLOORS IN THIS AREA IS SUSPECT ACM FLOOR TILE.

LEGEND
 NUMBERED AREAS 1-29 ARE LOCATIONS OF THE SITE INVESTIGATION FOCUS

 DAVID TAYLOR RESEARCH CENTER / CBI NUCLEAR CO. PRESIDENT'S ISLAND MEMPHIS, TN.

FIGURE - 1
FACILITY LAYOUT MAP
 DATE: 12/13/91 DWG. NAME: CLNCBI

CONFIDENTIAL

Area 5, the drum storage areas which were used for storage of solvents, petroleum products and hazardous waste, are areas at significant risk of contamination from spills and warrant further study. EnSafe/Allen & Hoshall (E/A&H) recommends that both soil and groundwater sampling be conducted to determine the full nature and extent of contamination in this area; analytical parameters should include total petroleum hydrocarbons (TPH), volatiles, and semi-volatiles.

Areas 9 and 10 are areas of large metal processing equipment foundations, with subsurface access to allow for maintenance of the machinery. E/A&H observed substantial leaking that had occurred from the Area 9 machine. E/A&H recommends that wipe samples be obtained from the walls and floors of these subsurface areas and analyzed for TPH and semi-volatiles.

Area 21 is the former site of a wooden building used to store hazardous materials according to facility maintenance personnel. This is an area with a risk factor for soil contamination due to incidental spills that may have occurred. Because the specific materials stored in this building are unknown, E/A&H recommends conducting limited sampling, obtaining soil and groundwater samples to be analyzed for TPH, volatiles and semi-volatiles.

Area 27, which is on the interior track area of the crane located at the south end of the property, has visible signs of soil staining. Site maintenance personnel reported to E/A&H during the site investigation that the crane uses hydraulic fluid that leaks from the equipment and drains to this interior track area. E/A&H recommends soil sampling be conducted in this area, and in other areas where oil staining or contamination is suspected to determine nature and extent of contamination; samples should be analyzed for TPH and semi-volatiles.

Area 26 and 28, also contain visible surface stains. The stains were again reported by facility maintenance personnel to have appeared after painting subcontractors had positioned a mobile air compressor in the immediate vicinity. Because the stains are suspected to be from oil leaking from

machinery, E/A&H recommends obtaining soil samples to determine the type and extent of contamination in these two areas; samples should be analyzed for TPH and semi-volatiles.

Areas 7, 11, 17, 18, 24 and 25, are transformers owned by CBI Na-Con located at the site. Four of these transformers have been documented as having contained polychlorinated biphenyls (PCBs); transformer #5 has been tested by CBI Na-Con and documented as not containing PCBs. Three of the on-site transformers (Areas 11, 18, 24) are either suspected or known to have leaked PCBs onto the soil and/or the concrete pads supporting the transformers. Limited remedial action has occurred at these areas and supporting documentation from CBI Na-Con is supplied in Appendix C. E/A&H recommends obtaining soil samples from areas surrounding the pads of transformers #2 (Area 11), #4 (Area 18) which are known to have had previous leaks. Although transformer #5 (Area 24) has been tested and documented as not containing PCBs it has been recorded as having previously leaked. Therefore, E/A&H recommends sampling of the area surrounding this transformer to confirm that the transformer did not at one time contain PCBs which may have leaked causing contamination. E/A&H further recommends that soil samples be obtained from the areas surrounding transformers #2, #4, and #5; these samples should be analyzed for PCBs and TPH.

Areas 1-3,12-13,15-16,22, 29, 31, are areas throughout the facility which are either confirmed or suspected areas of having asbestos containing materials (ACM). Portions of the areas with confirmed ACM have had abatement of the ACM performed, while other areas or certain materials in previously surveyed areas have not been adequately surveyed. All available documentation from CBI Na-Con is provided in Appendix D. E/A&H recommends conducting a detailed asbestos visual survey of the complete facility and bulk sampling of homogeneous areas suspected of containing ACM. E/A&H further recommends having the asbestos contractor provide recommendations on corrective action in ACM areas.

Areas 6A-C, where sandblasting operations occurred or where the spent sandblast material was disposed, are at a significant risk of being contaminated with metals. Therefore, E/A&H recommends obtaining

both soil and groundwater samples in these areas to identify and determine nature and extent of any contamination; samples should be analyzed for metals.

Areas 32, identifies all storm drains located around the exterior grounds of the CBI Na-Con property.. Due to the previous manufacturing activities at the site and known wastewater discharges at the facility during operation, E/A&H recommends conducting limited sampling at these locations by obtaining sediment samples from all storm drains located on the CBI Na-Con property. E/A&H further recommends analyzing these samples for TPH and metals.

Area 19 A and B, are areas where suspected creosote coated railroad ties have been stored. These railroad ties were removed from the railroad on the site property and have not been disposed. Although leaching of constituents from the ties is possible, this possibility is regarded as remote. Sampling conducted in this area would need to be accomplished in close proximity to the ties, due to the lack of horizontal migration associated with creosote constituents. E/A&H recommends performing only limited sampling in these areas, analyzing samples obtained for semi-volatiles.

Area 30 A-E, are silos used for testing the pressure vessels once fabricated at the site. During the fabrication of these vessels, processing included the use of lubricants and processing oils, cleaners, sandblasting and paints. Therefore, E/A&H recommends sampling the sediment remaining in the silos to ascertain the level of any contamination. These samples should be analyzed for metals, TPH and semi-volatiles. The age of these silos would also suggest that they had been painted at some point with lead based paint. E/A&h recommends obtaining a bulk sample of paint from the silos to analyze for leachable lead.

Area 31, is the building in which demineralization of water used during testing was performed. This process consisted of two demineralizing tanks and a boiler. The process used heat exchange and filtering to remove minerals from the water, the pH of this water was then adjusted by adding caustic solution. Thus returning the water to an approximate pH level of 7 (neutral). This operation ceased in 1980 at

which time the two tanks, reported by CBI Na-Con, were flushed and cleaned. The process boiler includes associated insulation which has not been tested to determine if it is ACM. Therefore, E/A&H recommends sampling boiler insulation to determine if it is ACM. E/A&H further recommends inspecting the boiler and the two associated demineralizing tanks for residual sediment. Furthermore, if sediment is found samples should be obtained and analyzed for metals and semi-volatiles.

Additional areas were surveyed by E/A&H personnel but reviewed as areas not requiring further investigation or testing. Area 14, the shop #5 chiller was placed in service approximately five years after the chiller used by shop #4 (Area 13) and is not expected of containing ACM insulation. Area 20 and 23 are areas where material removed during the LCC construction was placed awaiting the decision by CBI Na-Con on the need of the material for backfill in sections of the LCC channel.

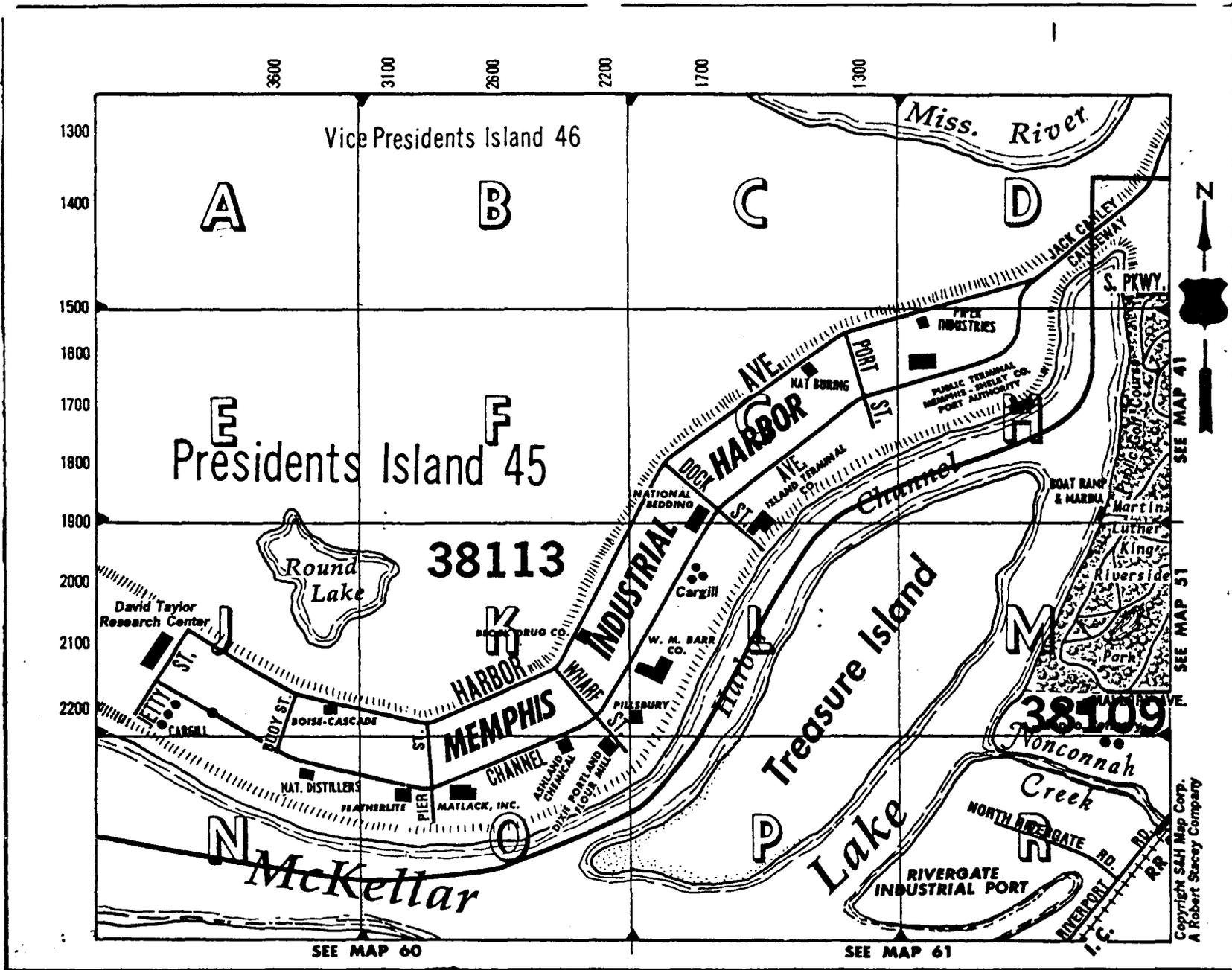
Each of the above areas of concern are addressed in further detail in the body of the report. This report is a compilation and analysis of observations made and documents reviewed, along with recommended actions for the areas of concern.

1.2 Purpose and Scope of Work

1.2.1 Purpose

During September 1991, representatives of E/A&H visited the David Taylor Research Center (DTRC), which is located on Presidents Island in Memphis, Tennessee, as seen on Figure 2. The US Navy operates a testing facility on the property and is considering purchase of the property. E/A&H has been contracted by the Navy to conduct a Phase I environmental property assessment (EPRA) of the facility.

This report is based on information gathered during site visits and from reviews of documents. Information was gathered from local, state and federal agencies with jurisdictional over the facility.



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DAVID TAYLOR
RESEARCH CENTER
/ CBI NUCLEAR CO.
PRESIDENT'S ISLAND
MEMPHIS. TN.

FIGURE - 2
FACILITY LOCATION MAP

DATE: 12/17/91

DWG. NAME: C1000

1.2.2 Scope of Work

The scope of the EPRA was to assess the possibility of on-site contamination that may exist at the facility. As part of the Phase I EPRA, a visual inspection of the facility was made, site personnel were interviewed in person and by telephone, historical and environmental records at the facility were reviewed, regulatory agencies were contacted for information, and a search of environmental computer databases was completed from these investigations. Potentially contaminated areas were identified.

The EPRA was not to include an assessment of regulatory compliance. However, regulatory compliance documents, such as permits and monitoring reports, were reviewed as part of the overall effort to locate potential sources of contamination. Copies of these support documents have been obtained and submitted as appendices to this report.

This report is based on information received from regulatory agencies and private outside sources. The accuracy of information obtained from these sources cannot be affirmed by E/A&H. This report represents a prudent and reasonable evaluation of on-site contamination at the facility. E/A&H assumes no responsibility for conditions that are not currently recognized by regulatory agencies as environmentally unacceptable.

1.3 Facility General Information

1.3.1 Facility Name/Address

David Taylor Research Center
2700 Channel Avenue
Memphis, Tennessee 38113

1.3.2 Nature of Business

The facility and property is owned by the CBI/General Electric joint venture and is currently leased through CBI Na-Con to the Navy. The Navy's David Taylor Research Center is the research facility for the large cavitation channel (LCC) research equipment. The equipment is used to test the power, efficiency, and noise of propulsors for ships and submarines in a realistic but controlled environment.

1.3.3 Key Contacts

CWO Steve Teeple, US Navy

Gary Sheridan, CBI Na-Con, Inc.

Kendrall Flessas, CBI Na-Con, Inc.

1.3.4 Site Background

The site, which consists of approximately 88 acres, is referred to as Parcel 1, and contains lots 456 through 464 of Jetty Subdivision and recorded in Plat Book 32, page 37 in the Registrar's office of Shelby County, Tennessee. The legal description for this property is included as Appendix A, and the utilities maps for the facility and subject property are included in Appendix L. This site further consist of office and manufacturing facilities totaling approximately 300,000 square feet.

The original property owners were Mary M. Hill, et al., who sold the property to Hill and Fontaine Land Company in 1915. Hill and Fontaine Land Company retained possession of the then vacant property for approximately 45 years, then sold it to the city of Memphis in 1950. At that time, the city wanted to develop this area for industry. In 1967, the city of Memphis (Figure 2) sold the property to Chicago Bridge and Iron Company, who sold the property to CBI Nuclear Company in approximately 1972. The facility layout can be seen on Figure 1.

Chicago Bridge and Iron Company was a job shop involved in the design, fabrication and construction of large metal plate products, structures and related items for other industries, utilities and government bodies. The company's principal products were process and pressure or vacuum vessels for the petroleum

and petrochemical industry. The company also manufactured, repaired and ship-mounted marine structures, hydroelectric penstocks, tunnel liners and surge tanks, along with tank sand bins for granular storage and wastewater treatment systems. The pressure vessels were tested with high-pressure water in silo-shaped structures near the south end of the property. The test water was drained directly into the river. When the property was sold to CBI Nuclear, a joint venture between Chicago Bridge and Iron and General Electric in 1972, the company added the fabrication and design of large pressure (vacuum) vessels for the nuclear power industry to its product line.

The processes which were operated by Chicago Bridge and Iron were limited to metal fabrication, welding, sandblasting and heat-treating. The process buildings are typical of such operations in that they have contained large heavy-equipment devices for moving the vessels, and they have several storage areas surrounding the outside areas adjacent to the production buildings one at the northeast area of the property; the other is at the southwest area. There is also a former shower building as well as an office building at the site.

After 1984, the facility remained largely inactive until a proposal was made to lease the facility to the Navy for use as a test facility. The LCC was constructed by CBI National Construction, Inc. (CBI Na-Con), for David Taylor Research Center at Presidents Island.

The facility is located on Presidents Island in Memphis, Tennessee, an area of heavy industry. Many of the other facilities on Presidents Island are known to be the sources of significant environmental contamination. During a recent drought when the Mississippi River was at historically low levels, regulatory agencies saw significant seepage of contamination from other facilities along the banks of the island. A more extensive investigation of overall contamination is reportedly being conducted by the Memphis Port Authority. Contamination at the island has been reported in local newspapers as well as Tennessee Environmental Law newsletter. E/A&H personnel researched local periodicals obtained copies of news clippings which have been supplied as Appendix F.

A search of computerized regulatory agency databases was conducted on the subject property and other facilities within one-half mile radius of the site (Appendix G). The search revealed that the facility, as well as two additional properties within the half-mile radius search, have been investigated under CERCLA. CERCLA is an environmental law enacted in 1980 by which a system was provided to the federal and state governments for identifying and investigating accidental or intentional spills to the environment; whether intentional or accidental and whether one-time or continuous. This law allows government agencies to perform a Preliminary Assessment (PA) of a site suspected of having a release of a hazardous substance to the environment. After a PA has been completed subsequent investigations may also be conducted at the site. However, the additional investigation can be assigned to the state in which the site is located. Subsequent investigation by the state would determine the priority of the site, and whether corrective action is required. The investigating agencies have recommended that no further action be taken on the two other properties. However, the CBI property is still open to further investigation.

The site is now the responsibility of the Tennessee Division of Superfund. Representatives of the division stated that the site has a low priority rating. The division's records do not contain any evidence of contamination or cause for the initial site and subsequent investigation. This lack of adequate documentation from the initial investigation combined with language in the 1986 act, SARA, have contributed to this investigative file remaining open. The site had been scheduled for an investigation in 1991, but a revisit by state officials to the site has been postponed until at least mid-1992.

The Environmental Database, Inc. report (Appendix G) further demonstrates that the neighboring facilities are users of hazardous materials, generators of hazardous waste, and in some cases, known to have released hazardous materials into the environment. It is not clear from the site investigation by E/A&H personnel whether or not these releases have affected the property.

Aerial photographs covering the site were reviewed in approximate increments of five years from the date aerials were first available for the site (1958) until 1990. These aerial photographs reveal that the

property remained vacant until 1964 or 1965. At that time, the city of Memphis sold the subject property to CBI for construction of a manufacturing and fabrication facility. The aerial photographs (Appendix H) reveal the transition of the vacant property to the sited manufacturing facility, along with the development of Presidents Island itself.

1.4 Geology and Climate

CBI Na-Con is located in Memphis, Tennessee. A soil survey for the Memphis/Shelby County region has been performed and the data compiled by the United States Department of Agricultural, Soil Conservation Service. A review of this data by E/A&H personnel revealed that the soil in the area of Presidents Island on which the site is located consists of the Falaya Series. Also associated with this soil series are both the Robinsonville-Crevasse-Commerce and the Tunica-Sharkey-Boudre soils. These soils are characterized as poorly drained, loamy and sandy soils with clay soils on low floodplains of the Mississippi River.

Furthermore, the Falaya series consists of somewhat poorly drained, strongly acid, nearly level, silty soils on bottom lands. As seen on Appendix L, the site is located in an area consisting of soils classified as Filled Land, Sandy (Fy) soils. This land type is normally dredge material from the bottom of the Mississippi River and has been moved for the purpose of leveling and building up sites for industrial and commercial development. The largest single tract is the industrial site known as Presidents Island, which is the general location on which the subject property is located (Appendix L).

The climate of Memphis and Shelby County, as noted in the Shelby County Soil Survey, is characterized by relatively mild winters, hot summers, and abundant rainfall. Extreme and frequent changes in the weather are common from one day to the next or one season to the next. The area is also known for sudden, local rainstorms, which frequently result in precipitation in excess of 4 inches. Furthermore, available soil moisture for this area is assumed to be 4 inches per foot of soil. However, this amount

drastically decreases to thirty-seven hundredths of an inch of moisture per foot of soil in the fall, again increasing in early spring.

1.5 Natural Hazards

E/A&H personnel contacted Memphis State University Center for Earthquake Research and Information (ERI) and the National Weather Service for information on natural hazards associated with the Memphis and Shelby County region. A review of the information (Appendix I) revealed that the area lies on a known source zone for earthquakes referred to as the *New Madrid Fault* or seismic zone. The *New Madrid Fault* zone begins approximately 35 miles from Memphis in Marked Tree, Arkansas. According to the information received from ERI, earthquakes in the magnitude 4.0 range can be widely felt in the region due to local ground conditions.

Studies performed on behalf of ERI to determine the probability of a locally destructive earthquake initiated by a shift in the New Madrid Fault would be of medium probability (40 to 63 percent) within the next 15 years and high to very high (63 to 97 percent) within the next 50 years.

Data submitted by the National Weather Service (Appendix I) revealed that tornadoes can be considered a constant natural hazard in Tennessee. A review of the data from the weather service further revealed that the frequency of tornadoes has decreased from approximately 60 percent in the mid 70s to between 10 and 15 percent in 1990. The frequency of tornados appears to increase seasonally from April through the end of July before tapering off.

1.6 Ecology and Wildlife

The ecological setting at the site consists of vegetated low-lying areas with a wide variety of trees, mainly

water-tolerant oaks, sycamore, willow, gum and maple trees. The site, which is located in a secluded area of Presidents Island is a highly industrialized area of Memphis. The site's surrounding filled and low-lying areas offer suitable habitat for terrestrial and aquatic flora and fauna.

The site (Appendix L) is bounded by a fresh water lake on the south, industry on the east, and heavily vegetated low-lying areas on the north and west. The fresh water lake bounding the property on the south flow to the Mississippi River. This lake and occasionally flooded low-lying areas provide habitat for various species of aquatic biota as well as sources of food for terrestrial organisms.

The US Fish and Wildlife Service's publication *Endangered and Threatened Wildlife* lists the following terrestrial and aquatic endangered wildlife which may be present in this region of Tennessee:

<u>SCIENTIFIC NAME</u>	<u>COMMON NAME</u>
Invertebrates	
Epioblasma Turgidula	Turgid-Blossom
Triodopsis Multilineata	Striped Whitelip
Vertebrates	
Ambystoma Talpoideum	Mole Salamander
Amocrypta Beani	Naked Sand Darter
Ammodramus Savannarum	Grasshopper Sparrow
Chondestes Grammacus	Lark Sparrow
Cnemidophorus Sexlineatus	Six-Lined RaceRunner *
Cycleptus Elongatus	Blue Sucker
Hyla Gratiiosa	Barking Treefrog
Ictinia Mississipiensis	Mississippi Kite *
Limnothlypis Swainsonii	Swainson's Warbler
Lutra Canadensis	River Otter

Melanerpes Erythrocephalus	Red-Headed Woodpecker *
Neotoma Floridana	Eastern Woodrat
Nyctanassa Biolacea	Yellow-Crowned Night-Heron *
Pituophis Melanoleucus	Pine Snake
Sorex Longirostris	Southeastern Shrew
Sterna Anitllarum Athalassos	Interior Least Tern
Sylvilagus Aquaticus	Swamp Rabbit
Thryomanes Bewickii	Bewick's Wren *
Vireo Bellii	Bell's Vireo

Plants

Hydrastis Canadensis	Golden Seal
Ophioglossum Crotalophoroides	Bulbous Adder's-Tongue
Panax Quinquefolius	American Ginseng
Prenanthes Crepidinea	Nooding Rattlesnake-Root
Silene Ovata	Catchfly
Ulmus Crassifolia	Cedar Elm

Other

Heron Rookery	*
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According to *Endangered and Threatened Wildlife*, six of the federally listed endangered species may be present in the area of the site. These species are designated with an asterisk.

2.0 SITE SPECIFIC INFORMATION

2.1 Air Emissions

Status. A site visit did not reveal any current manufacturing operations or air emission sources that would require air permitting. Nor did review of previous permitted sources, such as furnaces, reveal operations at the facility effecting the site.

Should operations or conditions at the site change due to facility modifications, variation in operating procedures, or equipment, the issue of air emissions and permitting would need to be reviewed to determine the applicability of the Memphis-Shelby County Air Pollution Code.

Follow-up. At this time, no further action is required.

2.2 Storm Water Runoff

Status. The buildings at the site have downspouts from the roof and areas of patterned runoff located around the exterior of the facility (Appendix L). These areas apparently empty into the storm drainage system with the areas' outfalls addressed in the facility's current National Pollutant Discharge Elimination System (NPDES) permit (Appendix J). Facility Management have reported on this situation. These storm sewer outfalls discharge to McKellar Lake. The facility's current NPDES permit for discharges from the facility are outlined in the permit (TN0000116), effective from January 31, 1989, through January 30, 1994. However, the facility does not possess a permit for storm water runoff and a permit application for this runoff has not been completed. These applications must be completed and filed with the state no later than October 1992, under the requirements of the Clean Water Act.

The storm water runoff permit is required for storm water discharges associated with municipal and industrial activity, and were effective as of December 17, 1990 (40 CFR 122.21 and 122.26).

Furthermore, storm water permitting regulations require permitting of facilities classified as standard industrial classifications (SIC) 24 through 29, 311, 32 and 33, 3411 and 373.

There are exemptions to the permitting requirements addressed in greater detail in the 40 CFR 122.21 and 122.26, which may exempt the facility from permitting requirements. The operation will need further examination and study to determine the applicability of these permitting regulations as required under the Clean Water Act.

Follow-up. Permit applications were previously required to be filed by November 15, 1991. However, this application deadline has been extended until October 1992. E/A&H recommends that facility management have the determination made on the applicability of storm water permit requirements as required by the Division of Water Quality or Tennessee Department of Health and Environment, Division of Water Pollution Control.

2.3 Waste Water Discharges

Status. The property owners currently hold a valid NPDES permit (Appendix J) for the discharge of industrial wastewater and cooling water to a storm sewer discharging into McKellar Lake and the city of Memphis storm sewer discharging to McKellar Lake. This permit (TN0000116) is required for industrial wastewater discharges under the Federal Clean Water Act and Tennessee Water Quality Control Act (T.C.A. 69-3-101 et al.).

NPDES Permit TN0000116 presently permits discharge from three outfalls. Outfall 001 permits the discharge of hydrostatic pressure test water, and groundwater pumped from beneath the construction site. The flow rate allowed is 4.7 million gallons of test water per year (MGY) over a 16 day period, and 5.1 million gallons per day (MGD) of groundwater for three days per month. No pretreatment is required for this outfall.

Outfall 002 permits the discharge of air compressor cooling water at a rate of 7200 gallons per day (gpd) with no pretreatment required prior to discharge. Outfall 003 permits the discharge of hydrostatic pressure test water at a rate of 1.2 MGY over a 16-day period with no pretreatment required.

The permit requires sampling the effluent discharge twice a month and monitoring for pH, solids, temperature, oil and grease and effluent flow. Data from the sampling must be recorded on the NPDES Discharge Monitoring Report and submitted to the Tennessee Division of Water Pollution Control. Additional conditions require the absence of distinctly visible floating scum, oil, or other matter in the wastewater discharge. Furthermore, the wastewater cannot discharge other materials into streams in concentrations high enough to be hazardous to humans, livestock, wildlife, plants or fish and other aquatic life.

CBI Na-Con had been granted an NPDES permit (TN0000116) in 1983 (Appendix J), which allowed for discharges to surface water through three outfalls. This permit approved the discharge of industrial wastewater and cooling water to McKellar Lake, but required bi-monthly monitoring for oil, grease, pH and temperature; all data collected was submitted to the state on a monthly basis. This permit expired in November of 1988.

Follow-up. E/A&H recommends that DTRC management keep TDHE informed of progress toward eliminating the present permitted discharges at the facility.

2.4 Hazardous Material Usage and Storage

2.4.1 Hazardous Material Usage

Status. The facility operating as David Taylor Research Center did use and store materials considered hazardous during the facility's operation. Degreasers such as 1,1,1-trichloroethane and mineral spirits have been recorded as used on-site by CBI and contractors that performed various task at the facility.

Paints and thinners were used on-site over the years for maintenance purposes and product coating when required. Acids, bases and mixtures were reported to be used as metal etching aides. Other organic solvents and non-halogenated materials are recorded as used and stored on-site but the specific uses of these materials was unable to be determined.

Hazardous materials are used by DTRC at the CBI Na-Con site in cleaning and maintenance activities. DTRC uses parts washers that are serviced by Safety Kleen and are used for cleaning and degreasing of small parts and tools. Containers of paints and thinners used on-site by facility personnel are used mainly for touch-up jobs at the plant. These materials are maintained in a flammable storage locker on-site.

2.4.2 Hazardous Material Storage

Status. During operation of the facility by CBI materials classified as hazardous had been used. These products were stored in areas throughout the plant with the bulk of the material stored in an area on the exterior northeast of shop #1 (Area 5, Figure 1). Virgin and used oil were stored on a diked concrete pad not protected from the weather, along with being stored in an open front covered hazardous material storage building. Previous CBI personnel reported that oils along with paints, solvent and thinners used at the plant were stored on horizontal drum racks, which made the dispensing of the materials easier. However, a conflicting report on drum storage procedures was received from current CBI personnel.

The hazardous materials storage building was a block building set on a sloped and channeled concrete pad. The concrete pad was designed and constructed with drainage channels leading to the rear of the building. These channels then drained through small holes in the rear of the building and ultimately onto the ground in the rear of the building. This area was overgrown, therefore observing visible soil stains was difficult. There is a possibility that inadvertent spills have occurred in this area and drained to the rear of this building.

Follow-up. E/A&H recommends obtaining samples from the rear area of the hazardous materials storage building to determine the nature and extent of any existing contamination. Based on the types of

materials reportedly stored in this area, we further recommend that the samples be analyzed for TPH, volatiles and semi-volatiles.

2.5 Hazardous Waste

Status. CBI was listed as a small quantity generator of hazardous waste (Appendix G -RCRA facility report) with the State. Furthermore, the facility disposed of its' hazardous waste through hazardous waste disposal companies, the most recent being Earth Industrial Waste Management, under the EPA identification number TND061662391. Copies of available hazardous waste manifests and related hazardous waste documentation have been supplied in Appendix K. Polychlorinated Biphenyls (PCB's) addressed in Section 2.7.1, contaminated items were discovered on-site and disposed of through PCB disposal firms.

According to previous company personnel, hazardous waste accumulated in the hazardous materials storage building occasionally on the diked concrete pad. The building and the pad are located on the northeast exterior side of shop #1 (Area 4 and 5, Figure 1). This general area is where the USTs were located (Area 8) and is an area of reported contamination. contamination in area 8, figure 1 will be addressed in the underground storage tank section of this report. E/A&H personnel did not observe any containers labeled as hazardous waste during the site survey. However, several drums of used oils were labeled as non-hazardous.

The company disposed of several drums of non-hazardous and hazardous materials while going through facility closure, as outlined in their closure plan submitted to the state in 1984. This material was disposed of through Earth Industrial Waste Management in 1985 on manifest document number 02009 (Appendix K). Hazardous waste disposal and closure plan compliance was verified by Environmental Testing and Consulting through a letter to the state's Division of Solid Waste in June of 1987 (Appendix K).

Follow-up. E/A&H recommends obtaining soil samples from the area in the rear of the hazardous material storage building, stained areas adjacent to the concrete storage pad and the area of the previous USTs. Sampling should be conducted to determine the type of contamination, and the nature and extent of such contamination. E/A&H further recommends having the samples analyzed for TPH, volatiles and semi-volatiles. Samples taken in the area of the previous USTs should also be analyzed for metals, due to the lack of documentation on back-fill used in the excavated area.

2.6 Other Regulated Waste

2.6.1 Polychlorinated Biphenyls

Status. The facility's six on-site transformers have been tested for PCB contamination. The results are included in Appendix C, as follows:

<u>Transformer #</u>	<u>PCB's-ppm</u>	<u>Figure 1, Area #</u>
#1	721,000	7
#2	863,000	11
#3	798,000	17
#4	409,000	18
#5	< than 1 ppm	24
#6	749,000	25

The company reportedly monitored the transformers on a periodic basis by checking fluid levels and the area surrounding the transformers for leaks or stains. Three transformers have been documented as having previous problems. Transformers #2 and #4 (Areas 11 & 18, Figure 1) were recorded as having leaked and caused soil contamination around the transformers. The soil suspected of being contaminated was sampled by Environmental Testing and Consulting in 1989 and again in 1990 by Agricultural Laboratories of Memphis. Both sets of analyticals confirmed that the levels of PCBs in the soil were below regulatory limits of 50 ppm (Appendix C).

Transformer #5 (Area 24, Figure 1) was recorded as loosing fluid with no visible signs of leakage from the transformer upon inspection by personnel. Although this loss or fluctuation could be partially explained by an expansion and contraction of the fluid, it does not fully explain the 29.6 gallon fluctuation, as reported by CBI. CBI's property manager contacted Tri-State Armature and Electrical Works to assist in determining the reason for the lower fluid level measurement. Upon inspection of the transformer, Tri-State observed and reported a leaking gasket and proceeded to replace the gasket in question. The gasket leak and subsequent replacement were reported to CBI's property manager as documented in Appendix C.

CBI reported to E/A&H personnel that the capacitors in all the transformers having PCB contamination had been replaced Appendix C).

Follow-up. E/A&H recommends soil sampling to confirm that contamination of the pad and/or surrounding soil has not occurred from the reported PCB oil leaks at transformers #2 (Area 11) and #4 (Area 18). Although transformer #5 (Area 24) is not documented as current PCB contaminated transformer, soil sampling is recommended to ensure that the transformer did not at one time contain PCBs.

2.6.2 Asbestos

Status. The facility has surveyed selected areas and confirmed asbestos containing materials on-site. Areas of confirmed ACM have been recorded as the offices located in shop #1 (Area 1, Figure 1), water tank insulation in the shower room (Area 2), some piping throughout the facility, the flashing surrounding the exterior of the x-ray room (Area 15), and the south furnace (Area 22) Available sampling and support documentation have been provided as Appendix D. The roofing material on the main administration building is suspect, due to the conflicting laboratory results received on this material from Environmental Testing and Consulting and Resolution, Inc. Several areas remain only suspect due to the lack of a full ACM survey being performed at the facility.

The facility's management is required to inform workers and contractors of suspect ACM before to repair or abatement of the suspect material. Conforming individuals of suspect ACM allows for the protection of employees as regulated in 29 CFR.

Follow-up. E/A&H recommends a visual survey of the facility should be performed to determine suspect areas of ACM. Upon identifying these areas during the survey the contracted firm shall obtain bulk samples from all homogeneous areas of the suspect ACM. E/A&H further recommends having a the contractor submit recommendations on the maintenance and repair of ACM in poor repair. Repair or abatement of ACM should be performed by a licensed asbestos contractor familiar with all levels of asbestos abatement and management, or properly trained personnel.

2.7 Underground Storage Tanks

Status. The site previously had two underground storage tanks located on-site until removal in early 1986; the location of the USTs can be seen on Figure 1, Area 8. A visual survey of this area did not reveal any evidence of surface staining, nor were additional USTs suspected at this site.

Documentation provided by the company (Appendix B) confirms the removal of the two USTs. As reported by management and as seen on the invoice from The Southern Company, Inc., two tanks were removed from the site. The invoice indicates that a 1,000 gallon and 10,000 gallon tank were removed in early 1985 at a cost of \$2,586. These tanks reportedly contained diesel and gasoline.

Management reported that no visible stains of the soil or odor were detected in the excavated area. Therefore, post-excavation sampling was not performed to verify that contamination did not exist. The excavated area was then backfilled with soil from the site property. This material was not sampled and certified as clean-fill.

Management has confirmed through recent sampling that contamination has been discovered in the immediate area where the USTs were removed, the concrete storage pad and hazardous material storage building. The preliminary investigation performed by Environmental Testing and Consulting revealed elevated levels of TPH and xylene. The company has contracted with the consulting firm AWARE, Inc. to determine the nature and extent of the contamination.

Follow-up. Sampling in the area of which the USTs were located is recommended to determine nature and extent of contamination, if such sampling is not included in the sampling plan for the subsequent investigation to be performed by AWARE. Although most of the piping was removed at the time the USTs were removed, some remains. We recommend that this piping be purged and removed or capped to alleviate the possibility of future contamination stemming from the below-grade piping.

2.8 WETLANDS

Status. The site was constructed on a filled area that was developed by the Port Authority using dredge material from the Mississippi River and McKellar Lake. The property was filled to 20 feet above the existing elevation of approximately 200 to 215 feet above mean sea level (msl). The current elevation for the site is 225 feet above msl on the north side and 220 feet above msl on the south end of the property as recorded on the topographical map for the area (Appendix L).

The site is abutted on the north and west sides by low lying areas that appear to have the potential for occasional flooding (Appendix L). A trench has been constructed along these two sides as well to decrease flooding of adjacent property and channel flow of waters from the facility's LCC operation to McKellar Lake. The adjacent property appeared to be hard wood bottom lands that did not seem to exhibit the characteristics of wetlands by supporting normally associated wetlands flora, fauna and wildlife. Although the property abutting the site did not presently appear to be saturated, a 5 to 10-acre area north of the facility was flooded at the time of the site visit.

Currently, the Corp of Engineers has not identified any area of Presidents Island or of the CBI Na-Con site as jurisdictional wetlands. However, to make an accurate determination of the applicability of wetlands regulations to bordering areas, a wetlands delineation would have to be performed as outlined in the federal *Wetlands Delineation Manual*. Moreover, the definition presently being used for the listing of lands as wetlands, is presently in the process of being modified, thus changing the criteria for making determinations. This change will likely cause areas formerly designated as wetlands to be recharacterized.

Follow-up. Due to the current developments in wetlands determination E/A&H does not recommend having a wetlands delineation performed on the adjacent properties at this time. Once the new wetlands definition and delineation manual have been fully developed a proper determination of this property can be conducted.

2.9 Environmental Data Search Summary

Status. At the request of E/A&H a site specific data search was conducted by Environmental Data Base, Inc. (Appendix G) for the site known as David Taylor Research Center and which is located at:

2700 Channel Avenue
Memphis, Tennessee 38113

As a result of the environmental data base search, it was found that the site has been investigated under CERCLA by both the USEPA and the Tennessee Division of Superfund. The site was discovered in 1980 by the USEPA and was later investigated in 1984 by the State's Division of Superfund. Currently, this site investigation has not been officially closed, due to the lack of state investigative documentation on file. Also, Tennessee is still in the process of conducting site inspection screenings on discovered sites. However, discussions with state (Appendix A) representatives revealed that a follow-up site visit will be scheduled for 1992, but is not currently considered a priority item.

This search also found that the facility is regulated by the Resource Conservation and Recovery Act (RCRA), which regulates the generation and disposal of hazardous waste (40CFR, parts 240-271). Furthermore, the company has continued to maintain an active USEPA hazardous waste generator identification number (TND061662391), and is listed as a *small quantity generator* (100 kg - 1000 kg) of hazardous waste.

The data search revealed that several spills of hazardous materials had been recorded for facilities in the immediate vicinity of the subject property. Several facilities located on Presidents Island are under investigation (Appendix F) for soil and groundwater contamination, along with improperly disposing of hazardous waste on-site at some previous time.

Follow-up. Due to the information revealed in the environmental data search and additional records search performed by E/A&H personnel, E/A&H recommends that additional studies of the site to include soil and groundwater studies be performed. These studies would better define the possibility of off-site contamination migrating to the subject property.

2.10 Areas of Suspected Contamination

Status. Due to the type of operation once existing at the DTRC site (CBI Nuclear Company), certain exterior areas appear or are suspected of having some level of contamination. This supposition is supported by visible surface staining in areas of the site and through the collected knowledge of previous site activities. All areas addressed below can be referenced on Figure 1 of this report.

Surface staining was noticed in the drum storage pad area (Area 4 and 5), as well as in two locations to the southeast of the crane area (Area 26 & 28). The areas were not large and did not appear to extend beneath the first 6 inches of top soil. However, sampling would confirm the extent of any contamination.

Through interviewing past CBI shop personnel, it was discovered that a wood building had been used to store hazardous materials (i.e. paints and thinners) approximately 25-50 yards from the south end of shop #5 (Area 21).

Waste from sandblasting operations was reported by facility maintenance personnel as having been stored or used for fill material in an area outside the east side of shop #1 (Area 6A). The rotary blast building (Area 6B) located off the northeast corner of shop #1 and the south ends of shops #3, #4 and #5 (Area 6C) are areas where dry and wet sandblasting was performed. As a result of these activities the soil in these area may possibly contain elevated levels of metals, organics and inorganic contaminants.

This waste sandblast material is suspected of being disposed of on-site. The exterior east side of shop #1 (Area 6A) and area on the north side of the rotary blast building (Area 6B), and in the rear of shops #3, #4 and #5 (Area 6C), appear to be areas where disposal may have occurred due to noticeable discoloration of the surface soils.

The exterior area of shop #5 (Area 20 and 23) has been reported as the locations where excavated material was temporarily stored from the LCC construction. The material was reportedly placed in the large vacant area off the southwest corner of shop #5, in case it was later needed to refill areas of the channel. This was the case and a portion of the material was used as refill.

CBI Na-Con was permitted under NPDES permit (TN0000116) to discharge wastewaters from hydrostatic pressure testing operations and coolant waters from operating air compressors to McKellar Lake. Although the facility's 1983 permit does not state by which route the waters will flow, the 1989 permit states that these waters are discharged to the storm sewer system and then to McKellar Lake. Due to the fabrication operations conducted at this facility wash down waters and miscellaneous materials may have entered the storm sewer system. Therefore, E/A&H recommends further investigation through sampling of the sediment in the storm drains (Areas 32).

Area 19 A & B, are areas where railroad ties suspected of being coated with creosote are stored. Although the possibility of creosote run-off contaminating the soil beneath is remote soil sampling in these areas is recommended. Since the main concern is contamination from creosote and associated constituents, soil samples obtained should be analyzed for semi-volatiles.

The silos (Area 30A-E) located on the south end of the subject property have been painted for protection of the underlying metal over the previous years. The age of this facility and associated structures suggest that the silos were possible painted with lead based paint at some point during the operation of the facility. Since the leachability of lead based paint has not been confirmed, it is of concern. Therefore, E/A&H recommends obtaining a composite sample of the paint on the silos for lead testing to determine if lead could leach from the paint contaminating the soil surrounding the silos. Furthermore, processing of pressure vessels at the site would include the use of petroleum products, sandblasting and possibly paints. Therefore, E/A&H recommends sampling the sediment on the floor of the silos to assess the level of residual materials remaining and requiring clean-up.

CBI Na-Con used demineralized water in its testing of the vessels constructed at the facility. This demineralizing operation took place in a building (Area 31) adjacent to the silos. The process consisted of a boiler for the heating of the water and two demineralizing tanks. This operation was stopped in 1980 and the two demineralizing tanks were cleaned. However, the boiler was not cleaned, nor had the insulation in or around the boiler ever been tested for ACM. E/A&H recommends checking the two demineralizing tanks for residual sediment and sampling this sediment, along with sediment found in the boiler. The sediment samples should be analyzed for metals and semi-volatiles. E/A&H further recommends having the insulation on the boiler and tanks sampled for ACM.

The metal turning machinery located in Shops #3 and #4 are supported by foundations with subsurface access ways that allow for easier maintenance and repair of the machinery. The equipment was observed by E/A&H as having previously leaked into the subsurface areas, with the machine at Area 9 leaking and mixing with water that had entered this subsurface area. Therefore, E/A&H recommends sampling these

areas by wipe sampling the wall and floor along with any visible or standing oil/water. Furthermore, E/A&H recommends having the equipment foundations inspected for cracks where the water may be both entering and then possible exiting once it has been contaminated with the machine's oil.

Follow-up. E/A&H recommends further study of these areas through soil and groundwater sampling. The sampling method and laboratory analysis will be tailored for each site-specific area. Sampling methodology and laboratory analyticals would be based on activities that occurred in each specific area and suspected contaminants associated with the area operators.