56343

DECLARATION FOR THE RECORD OF DECISION

56343

SITE NAME AND LOCATION

Kin-Buc Landfill

Edison Township, Middlesex County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the **Kin-Buc Landfill** site, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision document explains the factual and legal basis for selecting the remedy for this site.

The New Jersey Department of Environmental Protection and Energy concurs with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for this site.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Kin-Buc site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected response action represents the second of two planned operable units for the Kin-Buc site. A landfill containment system including a slurry wall, extension of the existing cap, and leachate collection and treatment will be implemented as part of the first operable unit, in accordance with the Record of Decision signed in 1988. This second action will address contamination found outside of the containment system, in particular, sediments contaminated by polychlorinated biphenyls (PCBs) in the Edmonds Creek wetlands located to the east of the landfill mounds. These sediments have been found to pose unacceptable threats to human health and the environment.

The major components of the selected remedy for the second operable unit include the following:

- excavation of approximately 2200 cubic yards of sediments containing PCBs at levels greater than 5 parts per million;
- consolidation of the excavated sediments within the Operable Unit 1 containment system;
- restoration of wetlands areas impacted by the excavation of contaminated sediments; and
- long-term monitoring of ground and surface water to ensure the effectiveness of the remedy.

The selected remedy will reduce ecological and human health risks caused by the uptake of PCBs from sediments into local aquatic species such as fish and crabs. However, because this remedy will involve on-site containment of contaminated sediments, long-term management and controls will be necessary.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate, and is cost-effective. It utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this site. However, treatment of the principal threats of the site was not found to be practicable, since the small volume of sediments which exceeded the remediation goal of 5 ppm could not be cost-effectively treated. Therefore, this remedy does not satisfy the statutory preference for treatment as a principal element.

Because this remedy will result in hazardous substances remaining on the site within the first operable unit containment system, a review will be conducted within five years after commencement of the first operable unit remedial action to ensure that the selected remedies continue to provide adequate protection of human health and the environment.

Constantine Sidamon-Eristoff
Regional Administrator

September 28, 1990
Date

ROD FACT SHEET

SITE

Site name: Kin-Buc Landfill

Site location: Edison Township, Middlesex County, New Jersey

HRS score: 50.64

ROD

Selected remedy: Sediment Removal and Consolidation in On-Site Containment

Capital cost: $3,537,000

O & M cost: $67,100 (annual)

Present-worth cost: $4,314,900

LEAD

USEPA

Primary Contact: Alison Barry, (212) 264-8678

Secondary Contact: Janet Feldstein, (212) 264-0613

Main PRPs: Kin-Buc, Inc. (Transtech)
SCA Services (Waste Management NA)

WASTE

Waste type: PCBs

Waste origin: landfill leachate

Estimated waste quantity: 2200 cubic yards

Contaminated medium: wetlands sediment

RECORD OF DECISION
DECISION SUMMARY

Kin-Buc Landfill

Edison Township, Middlesex County, New Jersey

United States Environmental Protection Agency
Region II
New York, New York

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ATTACHMENTS

SITE NAME, LOCATION AND DESCRIPTION

The Kin-Buc Landfill, located at the end of Meadow Road, Edison Township, Middlesex County, consists of several inactive disposal areas which cover approximately 200 acres. The Kin-Buc site is located within an industrial and commercial area of Edison Township, Middlesex County, which is zoned for light industry. Figure 1 indicates the site location. The site is bordered on the south by the Edison Landfill, on the east by the wetlands and the inactive ILR Landfill, on the west by the Raritan River, and on the north by the Edison Salvage Yard and a chemical manufacturing plant. The Edgeboro Landfill is located across the river from the Kin-Buc and Edison landfills. The Heller Industrial Park, a light-industrial and commercial complex, is located approximately one-half mile to the northeast of Kin-Buc. Some residences are located approximately between one and a half and two miles to the north of the site. No drinking water supply wells, municipal or private, are located within a two-mile radius of the site. Upstream of the site, the City of New Brunswick withdraws water from the Lawrence Brook, a tributary of the Raritan River which enters the river from the west.

The site includes three landfill mounds, the 14-acre Low-Lying Area situated in between Kin-Buc I and the Edison Township Landfill, as well as the Edmonds Creek/Marsh area. Kin-Buc I is the largest of the landfill areas, covering 30 acres with a maximum elevation of 93 feet. Kin-Buc II, the smaller mound immediately north of Kin-Buc I, covers 12 acres at a maximum elevation of 51 feet. Mound B is located along the shoreline of the Raritan River to the west of Kin-Buc I, and consists of approximately nine acres at an average elevation of 15 feet. The 14-acre Low-Lying Area in between Kin-Buc I and the Edison Landfill has an elevation ranging between 10 and 25 feet, of which approximately 10 feet is fill material and refuse. The locations of these features are illustrated in Figure 2. Portions of the site, including the Edmonds Creek wetlands, the Pool C area, the eastern end of the Low-Lying Area, the mouth of Martins Creek, and the southern end of the Mound B area fall within the 100- or 500-year floodplain.

The Edmonds Creek wetlands consist of approximately 50 acres of tidal wetlands which border the landfill mounds on the east. The wetlands are drained by Edmonds Creek, which discharges to the Raritan River southeast of the Edison Landfill. A small channel connects Pool C, a tidal pool on the southeastern edge of Kin-Buc I into which oily leachate from Kin-Buc drains, to Edmonds Creek, and allows contaminants from the landfill to discharge into the creek and the surrounding wetlands. Because the marsh and Edmonds Creek are tidally influenced, with a maximum elevation of 4 feet above mean sea level, contaminants and sediments are regularly redistributed in response to tidal fluctuations and storm events. Edmonds Creek also receives drainage from the ditch between the Low-Lying Area and the Edison Landfill. On the northwestern side of Kin-Buc I and II, the Mill Brook/Martins Creek system flows past the site and discharges to the Raritan River at Mound B. This stream system receives runoff from the Kin-Buc mounds as well as upgradient sources, and is tidally influenced in the vicinity of Mound B.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Kin-Buc Landfill began operating as early as 1947, accepting municipal, industrial, and hazardous waste. Between 1971 and July 1976, Kin-Buc Inc. operated the site as a state-approved landfill for industrial (solid and liquid) and municipal wastes. Hazardous wastes were disposed in the main landfill mound, Kin-Buc I, as well as in Kin-Buc II. The Environmental Protection Agency (EPA) estimates, on the basis of owner-operator records, that approximately 70 million gallons of liquid waste and at least one million tons of solid waste were disposed of at Kin-Buc between 1973 and 1976. However, in 1976, the New Jersey Department of Environmental Protection and Energy (NJDEPE) revoked Kin-Buc's permit to operate because of violations of both state and federal environmental statutes.

EPA's involvement with the site began in 1976 during investigation of an oil spill at the site which revealed discharge of hazardous substances from the facility. EPA filed initial charges against the owner-operators in 1979, under such statutes as the Water Pollution Control Act, and the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA). Under a 1980 partial settlement, Kin-Buc Inc. (and not the other defendants) agreed to install a landfill cap and initiate a long-term monitoring program, but not to remediate the site or control the further migration of contaminants in the area. Therefore, in 1980, EPA began cleanup activities under Section 311(k) of the Clean Water Act, collecting aqueous and oily leachate from the Pool C area for treatment and disposal. In 1981, the site was placed on the Superfund National Priorities List.

When negotiations with the owner-operators for additional remediation failed, EPA issued a Unilateral Administrative Order (UAO) pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended (CERCLA), requiring a removal program, a remedial investigation and feasibility study (RI/FS), implementation of a remedial action, and operation and maintenance of that selected remedy. Between 1982 and 1988, an RI/FS was conducted by the owner-operators for the site. This investigation determined that the Kin-Buc I and II landfill mounds were the source of hazardous constituents in the surrounding environment. In 1984, EPA also sent information request letters under CERCLA Section 104(e) to over 400 potentially responsible parties (PRPs) identified on the basis of Kin-Buc records as generators of wastes disposed of at Kin-Buc. Under a 1987 Consent Decree, EPA recovered $5,000,000 in past oversight and response costs from approximately half of these generators.

On the basis of the RI/FS conducted by the owner-operators, a remedy for the site was selected in a Record of Decision signed in 1988. The Record of Decision divided the site into two remedial phases known as operable units: Operable Unit 1 consists of the Kin-Buc I and II mounds, as well as portions of the Low-Lying Area and Pool C, while Operable Unit 2 includes adjacent areas impacted by contaminant migration from the landfill. The Operable Unit 1 selected remedy was intended to provide source control for the landfill mounds and includes:

- maintenance and upgrading of the Kin-Buc I cap, and installation of a RCRA Subtitle C cap on the remainder of the source area, consisting of Kin-Buc II, the Pool C area, and portions of the low-lying area between Kin-Buc I, the Edison Landfill and Pool C;

- installation of a circumferential slurry wall to bedrock on all sides of the source area;

- collection and off-site incineration of oily phase leachate;

- collection and on-site treatment of aqueous phase leachate and ground water from within the slurry wall, in order to ensure the integrity of the slurry wall containment system, with discharge of treated water to the Raritan River;

- periodic monitoring;

- operation and maintenance; and

- an additional RI/FS to determine the nature and extent of off-site contamination associated with the site (Operable Unit 2).

The owner-operators are currently performing the design of this remedy. EPA anticipates that construction of this remedy will begin during the summer of 1993.

The additional RI/FS was conducted by the owner-operators under amendments to the initial Unilateral Administrative Order issued in 1986 and 1990.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS report and the Proposed Plan for the second operable unit were released to the public for comment on July 15, 1992. These documents were made available to the public in the administrative record file at the Superfund Records Center at EPA's Region II office in New York City, and the information repository at the Edison Free Public Library, 340 Plainfield Avenue, Edison, New Jersey. The notice of availability for the above-referenced documents was published in the Home News on July 15, 1992. The public comment period on these documents was held from July 15, 1992 to August 14, 1992.

On August 4, 1992, EPA and the New Jersey Department of Environmental Protection and Energy conducted a public meeting at the Edison Township Municipal Building, to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the site, and to respond to any questions from area residents and other attendees.

Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF OPERABLE UNIT

This is the second of two operable units planned for the Kin-Buc site. The Record of Decision issued in September 1988 for Operable Unit 1 selected source control measures intended to prevent the further migration of contaminants from Kin-Buc I and II landfill mounds, the Pool C area, and adjacent portions of the Low-Lying Area between Kin-Buc I and the Edison Landfill. The ROD also called for a second supplemental investigation of surface-water and ground-water contamination emanating from the site, as well as in the wetlands adjacent to the landfills, and Mound B. This investigation, Operable Unit 2, has focused on evaluating the nature and extent of

- ground-water contamination in the Low-Lying Area and Mound B,
- wetlands contamination in the Edmonds Creek/Marsh system, and
- surface-water contamination in Edmonds Creek and Mill Brook/Martins Creek.

The second operable unit remedy, as described in this document, is intended to address the contaminated sediments found in the Edmonds Creek marsh area. The primary goal of this remedy is to reduce the risks to human health and the environment caused by the uptake of contaminants from sediment into the aquatic food chain. The selected alternative for the second operable unit, in conjunction with the first operable unit containment system, will address all remaining concerns associated with the migration of contaminants from the landfill. Long-term monitoring of the ground water in the Operable Unit 2 study area, and of the Raritan River, will be conducted to confirm the expected performance of the Operable Unit 1 containment system.

EPA is the lead governmental agency for the Kin-Buc site, and NJDEPE is the support agency.

SUMMARY OF SITE CHARACTERISTICS

Wehran Engineering Corporation performed the second Remedial Investigation for the owner-operators between August 1989 and July 1990. The following section describes the results of the RI.

Environmental Setting

The Operable Unit 2 study area consists of Mound B, the Low-Lying Area, Edmonds Creek, Mill Brook/Martins Creek, and the wetlands associated with Edmonds Creek. Both Mound B and the Low-Lying Area are known to contain refuse; however, no additional information regarding the nature or origin of the refuse is available. Boring logs indicate that the primary components of the fill are municipal and household refuse and debris. Mound B received a cap in 1982, which consisted of clay and sand layers. The Mound B area includes a variety of dense grasses, as well as Phragmites communis and eastern red cedar, although portions of the Mound B cap are barren of vegetation. Cover soils were placed over the Low-Lying Area during the landfilling operation. The Low-Lying Area supports a scrub-shrub vegetative community, including sumac, eastern red cedar, and black cherry shrubs. The wetlands vegetative community is dominated by Phragmites communis, with Spartina alterniflora, commonly found along drainage channels and in areas of lower elevation. Narrow-leaved cattails (Typha angustifolia) dominate the less saline reaches of the marsh. Although no areas of the Operable Unit 2 study area support extensive forest communities, a variety of deciduous forest species are found in the Mill Brook/Martins Creek area, and along a former railroad bed which constitutes the upper bound of the Edmonds Creek marsh.

Wildlife identified at the site include invertebrates, fish, amphibians, reptiles, birds, and mammals. Fiddler crabs were the most abundant species of invertebrate, although blue crabs and grass shrimp were also observed. Mummichogs were the most frequently observed species of fish in Edmonds Creek and Martins Creek, although the type of sampling equipment used did not permit collection of larger species of fish from these streams. Turtles and terrapins were observed in Edmonds Creek and the Raritan River. Numerous bird species were observed at the site. A large community of muskrats is supported by the Edmonds Creek marsh area, and were also observed in Mill Brook/Martins Creek. Smaller mammals in the Edmonds Creek marsh consist largely of the house mouse and the Norway rat. No federal endangered or threatened species were observed at Kin-Buc, although several New Jersey threatened and endangered species were observed either on the site or in the vicinity of Kin-Buc; these are the northern harrier, the osprey, the great and little blue herons, and the yellow-crowned night heron.

Geology and Hydrogeology

The Kin-Buc site is underlain by sedimentary rocks of Triassic Age, the Brunswick Formation and the Lockatong Formation. These formations consist chiefly of siltstone, mudstone and shale, and occur at depths ranging between 25 and 46 feet below the OU 2 study area. A sand-and-gravel unit, representing Recent Raritan River channel fill, overlies the bedrock locally at an average thickness of 16 feet. Within the Operable Unit 2 study area, a layer of organic-rich clay and silt known as "meadow mat" overlies the sand-and-gravel deposit at an average thickness of 7 feet. A refuse layer of varying thickness (between 7 and 24 feet) overlies the meadow mat deposit throughout the OU 2 study area. The refuse contains relatively old waste materials, such as household and municipal solid waste, debris, white goods (household appliances), industrial wastes and fill materials. This layer is overlain by a thin (between 1 and 9 feet) layer of cover soil.

All four stratigraphic units are water-bearing, although only the bedrock unit is regionally extensive and used for water supply. In the refuse layer, ground water flows radially from the Kin-Buc I mound toward the Pool C area, the Edison Landfill, and the Raritan River, and is not tidally influenced by the river. The underlying meadow mat layer acts as a semi-confining layer; its fine-grained organic-rich matrix exhibits very low permeability, indicating that ground water does not readily flow in this unit either vertically or laterally. The sand-and-gravel unit is in direct hydraulic contact with the river, and is therefore affected by tidal influences. At low tide, ground water in this unit flows across the site from southeast to northwest. At high tide, this flow is reversed when ground water flows from Mound B toward the Low-Lying Area. However, net flow is west, towards the river. Ground water flows in the bedrock unit towards the south. However, in the Operable Unit 2 study area, where bedrock is directly overlain by the sand-and-gravel unit, bedrock flow is tidally influenced, causing a general oscillation of flow in the Mound B and Low-Lying areas. Vertical gradients within the four units indicate that net discharge from these units is to the Raritan River, either directly or indirectly. The refuse and sand-and-gravel units discharge directly into the Raritan River at high and low tides, respectively, while the bedrock unit discharges upward into the sand-and-gravel unit, from which ground water discharges to the river.

Contaminants were found in the refuse unit leachate, as well as in ground water from the sand-and-gravel unit and, at very low levels, in the bedrock aquifer. Leachate in the refuse unit contains volatile organic compounds (VOCs), base-neutral/acid extractable compounds (BNAs), metals and pesticides, and polychlorinated biphenyls (PCBs). Table 1 shows the maximum concentrations of contaminants in the leachate. These constituents appear to have originated within the Kin-Buc I and II mounds and have migrated toward Mound B and the Raritan River to the west, and towards the Edmonds Creek marsh on the east. The sand and gravel unit contains similar VOCs and BNAs as were found in the refuse unit, although at lower concentrations. Table 2 indicates the maximum levels of contaminants in this unit. These constituents also appear to have migrated from the landfill mounds. The bedrock unit contains very low levels of VOCs, as illustrated in Table 3, which may also be attributed to migration from Kin-Buc I.

Sediment

Sediments in the Edmonds Creek/Marsh system contain PCBs, polyaromatic hydrocarbons (PAHs) and metals. PCBs were found at concentrations less than 10 parts per million (ppm) in most parts of the marsh, although portions of the Edmonds Creek channel contained concentrations which ranged up to 81 ppm, and areas immediately adjacent to Pool C exhibited concentrations between 100 and 290 ppm. Table 4 indicates the range in concentrations observed during the investigation. PCBs identified were predominantly Arochlors 1248 and 1254. Distribution of these contaminants indicate that PCBs are attributable to Pool C via the connecting channel to Edmonds Creek. PAHs and metals were found throughout the marsh. Distribution patterns were less clear regarding PAHs and metals in the sediments; other man-made sources of PAHs and metals in the vicinity of the site have most likely contributed to the distribution of these constituents in the study area. However, certain metals and PAHs are highest in areas also characterized by high levels of PCBs. Figure 3 indicates the levels and distribution of PAHs in the Operable Unit 2 study area. Figures 4, 5, 6, and 7 illustrate the distribution of arsenic, copper, lead and nickel throughout the study area. Only one sample from Mill Brook contained PCBs, and the level observed was significantly below the detection limit. No site-attributable patterns of metals of PAHs were observed in sediment samples from Mill Brook/Martins Creek.

Wehran also conducted a supplemental sediment sampling program which further refined the extent of PCB contamination in the Edmonds Creek wetlands sediment. The report confirmed the findings of the RI that low levels (less than 1 ppm and 10 ppm respectively) of PCBs and PAHs are present in the marsh. Metals were observed at higher levels in the vegetated areas of the Edmonds Creek marsh than in the stream channels which transect these wetlands, but distribution patterns are not related to Pool C or elevation within the marsh.

Surface waters in Edmonds Creek did not appear to be affected by site-derived contamination.

Biota

PCBs and metals were detected in resident wildlife collected in Edmonds Creek/Marsh, Mill Brook/Martins Creek, and the Reference Area (a similar area, located across the Raritan River from the site, which is intended to represent local background conditions). Tables 5 summarizes data from tissue analysis. The highest concentrations of PCBs were detected in fiddler crabs and small fish from the Edmonds Creek/Marsh area, while elevated levels of cadmium were observed in muskrat kidneys from the lower end of Edmonds Creek and Mill Brook/Martins Creek.

EPA conducted supplementary biological sampling in 1990 and 1991. In July 1990, EPA collected sediment and fiddler crab tissue samples from Edmonds Creek, Martins Creek, and an upstream reference location. The samples were analyzed for PCBs, semivolatile organics, and cadmium, chromium, copper, mercury and zinc. The results indicated that bioaccumulation of PCBs, chromium, copper and zinc was evident in the fiddler crabs. EPA also collected samples of muskrat tissues during the October 1990 through January 1991 period, but found no evidence of PCB bioaccumulation in muskrat livers. However, the study did show bioaccumulation of metals in these samples, although a specific source of metals contamination could not be ascertained, since distribution of metals throughout the OU 2 study area did not point to a single source. Tables 6 and 7 summarize the results of these studies.

SUMMARY OF SITE RISKS

EPA conducted a baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Kin-Buc Landfill site in its current state. The Risk Assessment focused on contaminants in the sediment, ground water, surface water, and fish which are likely to pose significant risks to human health and the environment. The summary of the contaminants of concern (COC) in sampled media is listed in Table 8 for human health receptors. Tables 9, 10 and 11 provide a statistical summary of the data for all three media, including the frequency-of-detection, mean concentration, and the 95 percent Upper Confidence Limit (UCL).

Human Health Assessment

EPA's baseline risk assessment identified several potential exposure pathways by which the public may be exposed to contaminant releases at the site under current and future land-use conditions. Exposures to sediment, surface water, ground water, and fish were assessed for both potential present and future land use scenarios, such as residential and recreational land use. A total of eight exposure pathways were evaluated, using reasonable maximum exposure assumptions. The baseline risk assessment evaluated the health effects that could result from exposure to contamination as a result of ingestion of ground water, ingestion of fish, dermal contact with sediments during recreation, inhalation of chemicals volatilizing during showering, dermal exposure to shower water, dermal absorption and ingestion of surface water during recreation, and ingestion of sediment during recreation. These pathways were evaluated separately for children and adults. Certain pathways were eliminated on the basis of the existing landfill cap or existing site characteristics, such as the air pathways. It should also be noted that the site is not currently used for residential purposes and only for limited recreational use (i.e., fishing in the vicinity of the site). Current and past land use is primarily light-industrial and commercial. In addition, since there are no private or public drinking water wells located within the area of contaminated ground water or downgradient of the site, there is no existing mechanism for human exposure to the contaminated ground water. However, for the purposes of evaluating all possible risks associated with the site, EPA considered potential future residential scenarios involving ground-water consumption and current recreational exposure scenarios such as fishing and swimming.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic effects due to exposure to site chemicals are considered separately. It was assumed that the toxic effects of the site-related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams per kilogram per day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impact a particular receptor population.

An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The reference doses for the compounds of concern at the site are presented in Table 12. A summary of the noncarcinogenic risks associated with these chemicals for individual exposure pathways is found in Table 13.

It can be seen from Table 13 that the HIs for noncarcinogenic effects from ingestion of fish (reasonable maximum exposures) are 20 and 7.19, for children and adults, respectively. For ingestion of ground water, the HIs for noncarcinogenic effects are 6.13 and 5.42, respectively. Therefore, noncarcinogenic effects may occur from these pathways evaluated in the Risk Assessment. The noncarcinogenic risk was attributable to several compounds including PCBs, vinyl chloride, chlorobenzene, arsenic, antimony, beryllium, bis(2-ethylhexyl)phthalate, 4,4'-DDT, and manganese.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table 12.

For known or suspected carcinogens, EPA considers excess upper-bound individual lifetime cancer risks of between 10^{-4} to 10^{-6} to be acceptable. This level indicates that an individual has not greater than approximately a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at a site. The potential cancer risk from ingestion of fish from the site during a lifetime is 1.31×10^{-1} for an adult and 1.1×10^{-1} for a child. The potential carcinogenic risk for ingestion of the most contaminated ground water at the site by an adult during a 70-year lifespan is 6.6×10^{-4}, and by a child, 2.3×10^{-4}. These risk numbers can be interpreted to mean that 1.31 out of ten adults are at an excess risk of developing cancers because of their regular consumption of contaminated fish during their lifetime, or that 6.6 people out of ten thousand are at an excess risk of developing cancer because of their regular consumption of ground water from the site during their lifetime. These risks exceed the acceptable risk range for carcinogens of 10^{-4} to 10^{-6}. A summary of cancer risks associated with the chemicals of concern for various exposure pathways appears in Table 13.

The estimated total risks for both carcinogens and noncarcinogens are primarily due to the ingestion of contaminated fish from the site and secondarily to the ingestion of contaminated ground water by potential future residents at the site. These estimates were developed by taking into account various conservative assumptions about the likelihood of a person being exposed to these media. However, in reviewing both the baseline risk assessment and the site conditions, EPA concluded that the location and characteristics of Kin-Buc preclude any current exposure to contaminated ground water at the site. Furthermore, EPA believes that it is highly unlikely that humans will ever use the ground water underlying this site, given the historical and current land use in this area of Edison Township. The proximity of the Edison Landfill immediately to the south of Kin-Buc and the defunct ILR Landfill on the eastern side of the Edmonds Creek wetlands limit the future development of this area for residential purposes. In addition, ground-water modeling conducted during the FS indicates that natural attenuation will gradually reduce contaminants to acceptable levels after the source control measures provided by Operable Unit 1 are implemented. Since it is highly unlikely that any exposure pathways will exist in the foreseeable future, EPA does not believe that there are any actual or plausible potential site risks associated with ground water which would justify active response measures to reduce contaminant concentrations in ground water.

In summary, ingestion of fish from the site constitutes a risk to human health, since both carcinogenic and noncarcinogenic risks exceed the acceptable levels. Other plausible exposure pathways present risks that are within or below EPA's allowable range.

Ecological Risk Assessment

Potential risks to the environmental receptors associated with the Kin-Buc Landfill site were identified in the ecological risk assessment. The ecological risk assessment identified fish found in Edmonds Creek and the Raritan River and benthic invertebrates such as fiddler crabs found in the Edmonds Creek marsh as those receptors most threatened by the site contaminants under current site conditions. The major site-related risks to aquatic life are posed by PCBs in sediments in the area adjacent to Pool C and Edmonds Creek, since fish and crabs come into direct contact with sediments or may ingest other species which have accumulated contaminants through the food chain.

EPA, through its contractor, evaluated the potential ecological impacts to fish, wildlife and plants in the wetlands from chemicals of concern detected in sediments and surface waters. These chemicals include a variety of VOCs, PAHs, PCBs, pesticides and metals. Potentially affected biota include fiddler crabs, mummichogs (small fish), large birds such as herons and hawks which feed on smaller fish and mammals, muskrats and other small mammals (mice, Norway rats) found in such environments. The ecological risk assessment included an evaluation of sediment samples from the Operable Unit 2 study area. Tissue samples from key species captured in corresponding locations were collected in order to determine the extent of bioaccumulation relative to contaminant levels in sediment. The ecological risk assessment concluded that the major site-related risk to aquatic life is from exposure to PCBs in sediments in the vicinity of Pool C and the connecting channel, and portions of Edmonds Creek. Organics in surface waters do not appear to pose a threat to aquatic life at the site. Although several metals were elevated in species and sediments, those levels appear to reflect regional inputs and/or natural sources. Metals are present in levels of concern in the vicinity of Pool C and portions of Edmonds Creek, although distribution patterns do not indicate that Kin-Buc is the sole, or even primary source of metals contamination. Mammals do not appear to be at risk from PCBs or metals, although elevated levels of cadmium, chromium and lead were observed in muskrat tissues. Marsh plants may also be at risk from exposure to arsenic, copper and lead, but uncertainties associated with plant toxicity information preclude establishing risks in this case.

Sediments contaminated by PCBs and metals can serve as a source of PCB and metals contamination in fish and benthic invertebrates. The literature data indicate that levels present in Edmonds Creek fish samples may pose adverse effects in these species, although the effects of elevated body-burden levels in fiddler crabs are unknown. Both fish and fiddler crabs can be a food source to large birds such as the great blue heron. Estimated dosages did not exceed the toxicity reference values for this species, but a high level of uncertainty is associated with these estimates and the possibility of adverse effects cannot be dismissed for this or other predatory bird species occurring in the site area. Threatened and endangered species, such as the great blue heron, the little blue heron, the yellow-crowned night heron, the northern harrier, and the osprey, have been observed on or near the Kin-Buc site during the RI.

EPA has determined that no remediation will be required for surface or ground water in the study area, based on the available data and the unlikely possibility that the ground water will be used for human consumption. However, exposure pathways involving the ingestion of contaminated fish will continue to pose a threat to human health without active remediation of the contaminated sediments which act as the source of contaminants to fish and fiddler crabs. In addition, the ecological risk assessment indicates that contaminants are being taken up into the food chain via various aquatic species which come into contact with the sediments. Bioaccumulation of PCBs through this pathway may adversely impact these species as well as species which feed on them, including threatened and endangered birds.

Therefore, actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present a current or potential threat to public health, welfare or the environment.

<u>Uncertainties</u>

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper-bound estimates of the risks to populations near the site, and is highly unlikely to underestimate actual risks related to the site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment; they specify the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are based on available information and standards such as applicable or relevant and appropriate requirements (ARARs) and risk-based levels established in the risk assessment.

EPA has developed remedial action objectives for the wetlands sediments which are intended to reduce risks to human health via ingestion of contaminated fish and to the environment via bioaccumulation of contaminants in aquatic species. Although the general remedial objectives for this site include reduction of risks associated with metals and PAHs in the wetlands sediments, EPA chose to develop numerical cleanup goals only for PCBs. PCBs are clearly site-derived, whereas PAHs and metals may be derived from other sources in the area. In addition, the levels of cadmium, chromium and lead measured aquatic and terrestrial species did not appear to constitute significant risks to these species. PAHs were not observed in any species sampled. Finally, areas subject to remediation for PCB contamination also contain high levels of PAHs and metals, such that a PCB-driven remedial action will effect reduction of these other contaminants.

EPA's remediation goal for PCBs in wetlands sediment is 5 ppm. This goal reflects several different contributing factors: EPA's evaluation of bioavailability, based on application of the Interim Equilibrium Partitioning Method developed by the Office of Water; biological effects data from literature studies; and remediation goals for PCBs in sediment at other Superfund sites. EPA also considered competing factors such as the technical feasibility of full remediation and the desire to minimize, as much as possible, the impact of invasive remediation techniques on the existing wetlands, which currently support a variety of plant and animal species. Application of the 5 ppm cleanup goal to the sediments in the Edmonds Creek marsh provides for removal of PCBs that exceed the level EPA has determined to be adequately protective of resident wildlife. Removal of these sediments also reduces risks associated with the PAHs and metals which accompany PCBs in the connecting channel and the vicinity of Pool C, portions of Edmonds Creek, and the northern area of the marsh. The total volume of sediments to be excavated is approximately 2200 cubic yards, and involves approximately 1.36 acres of the Edmonds Creek wetlands. This area is shown in Figure 8.

As discussed above, under the **Summary of Site Risks**, EPA did not develop remedial action objectives for ground water or surface water. The implementation of source control provided for in the Operable Unit 1 remedial action will be sufficient to prevent further migration of contaminants into the environment. Contaminants which have already migrated into the ground water will be gradually reduced by natural attenuation to acceptable levels. Although significant impacts to the Raritan River are not suggested by current data, the future migration of contaminants from Kin-Buc will decrease following construction of the OU 1 containment system. In addition, EPA has determined that there are no current or plausible future exposure scenarios which could pose a risk to human health.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions, alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The information presented in the RI and Risk Assessment was used to prepare a Feasibility Study. The FS provides a detailed evaluation of various options, referred to as remedial alternatives, which address the environmental problems identified at the site. Detailed descriptions of these remedial alternatives may be found in the Draft Final FS Report available in the administrative record file. The following alternatives passed through a development and screening process which is also described in the FS Report.

This Record of Decision evaluates in detail, six remedial alternatives for addressing the contamination associated with the Kin-Buc Landfill site. The time to implement reflects only the time required to construct or implement the remedy, as well as the time required to design the remedy and procure contracts for design and construction.

The numbers in parentheses correspond to the numbering used in the FS Report to identify each alternative or subalternative.

Alternative 1--No Further Action

Capital Cost: $0
Annual Operation and Maintenance (O & M) Cost: $61,000/yr
Present Worth Cost: $938,900 (on a 30-year basis)
Time to Implement: between 7 and 82 years

The Superfund program requires that the No Action alternative be considered as a baseline for comparison of other alternatives. Under this alternative, no remedial activities would be conducted in any portion of the Edmonds Creek Marsh OU 2 study area. The source of contamination to the Edmonds Creek Marsh would be contained by implementation of the OU 1 remedy which includes a slurry wall, cap, and extraction and treatment of leachate and ground water within the slurry wall. Under this alternative, the 5 ppm remediation goal would be achieved, to the extent possible, through natural sediment burial and diffusive partitioning into the water column. A sediment dynamics model for estimating vertical sediment burial rates was applied to provide a rough estimate of the timeframe during which natural recovery of the wetlands would be expected to occur. The model was applied using the overall average PCB concentration in the wetlands (7.1 ppm), the average concentration exceeding the 5 ppm goal in the wetlands (77 ppm) and the maximum concentration (300 ppm) outside the OU 1 slurry wall. The model indicated that a concentration of 5 ppm would be achieved within 7 years, 55 years and 82 years, respectively. A sediment sampling program would be undertaken every 6 months to determine the rate at which burial of PCBs is taking place. This data would be reviewed periodically to evaluate changes in PCB concentrations over time. A 30-year monitoring program was used for costing purposes. There are no federal or state ARARs associated with this alternative, since the no action alternative does not involve any remedial activity in existing wetlands. Given the level of uncertainty in the model's results, the actual time required to reach compliance with the preliminary remediation goal of 5 ppm may exceed the estimated timeframe. To confirm the effectiveness of the OU 1 containment system, a ground water and surface water monitoring program will also be implemented. Present worth costs associated with this alternative include the monitoring program estimated over 30 years.

Alternative 2A (3A)--Sediment Removal and Consolidation in On-Site Containment

Capital Cost-- $3,537,000
Annual O&M Cost--$67,100
Present Worth Cost--$4,314,900
Time to Implement--3 years

Under this alternative, soils and benthic sediments containing PCBs in excess of 5 ppm in the Edmonds Creek marsh, creek, and areas adjacent to Pool C would be removed, dewatered and placed within the OU 1 on-site containment system. The total volume of sediment, as indicated in Figure 9, is estimated to be approximately 2200 cubic yards, based on the total estimated area which exceeds the cleanup goal (approximately 1.36 acres) and an excavation depth of one foot. Containment of excavated sediment would be provided within the OU 1 containment system. Supernatant from dewatering would be disposed of off site in compliance with the requirements of the Toxic Substances Control Act (TSCA) governing PCB disposal. Prior to excavation, additional surface sampling for PCBs would be conducted in areas previously identified as exceeding 5 ppm PCBs, as well as in the area east of Pool C, in order to refine the actual areas for excavation. Sampling would also be conducted at depth in selected locations to confirm the vertical extent of contamination. Engineering methods for controlling surface water flow, such as tide gates or temporary earthen dams, and to reduce impact to wetlands, such as hydraulic dredging or dragline dredging, would be utilized during excavation. Excavated areas would be restored by active revegetation with any of several marsh species. This alternative would meet ARARs requiring mitigation or restoration of disturbed wetlands, as well as chemical-specific ARARs associated with PCBs (TSCA), and meet the site-specific remediation goal of 5 ppm PCBs. RCRA Land Disposal Restrictions are not applicable to consolidation within the Area of Contamination (AOC), so testing for RCRA characteristics would not be required. Additional studies of surface water and biota will be necessary to design a restoration/mitigation program for the Edmonds Creek Marsh. Present worth and O&M costs for this alternative also include a ground-water and surface-water monitoring program, estimated over 30 years.

Alternative 2B (3B)--Sediment Removal and Off-Site Disposal

Capital Cost--$5,168,000
Annual O&M Cost--$67,100
Present Value Cost--$5,945,900
Time to Implement--3 years

This alternative is the same as Alternative 2A, Sediment Removal and Consolidation On-Site, except that the excavated sediments would be land disposed off site in a chemical waste facility in accordance with TSCA requirements governing disposal of PCB-contaminated soils. Prior to disposal, the sediments would be dewatered. The supernatant would be disposed of off site in a TSCA facility. Sediments would be tested to determine characteristicity for metals prior to disposal, so that compliance with RCRA Land Disposal Restrictions is ensured. Present worth and O&M costs include a ground water and surface water monitoring program, estimated over 30 years.

Alternative 2C (3C)--Sediment Removal and On-Site Treatment

Capital Cost--$6,225,000
Annual O&M Cost--$67,100
Present Worth Cost--$7,002,900
Time to Implement--4 years

This alternative is the same as Alternative 2A except that the excavated sediments would be treated on site to reduce PCB concentrations to below 5 ppm, using one of the following processes: solvent extraction, thermal extraction, or chemical dechlorination. Excavated sediments would be tested to determine whether they are RCRA characteristic due to metals content during predesign. A stabilization/solidification stage would be added prior to disposal in accordance with RCRA Land Disposal Restrictions if the sediments are characteristic wastes. Depending on costs, disposal would be either on site in an OU 2 containment system, or off site in a commercial disposal facility. A pilot-scale treatability study would be necessary in order to design a full-scale treatment train. Use of an on-site treatment system would require additional site preparation to accommodate the trailer and other equipment. Although no consolidation will be required prior to treatment, the system would have to meet ARARs for air pollution controls or TSCA requirements for disposal of a residual waste stream from the thermal and solvent extraction processes. This alternative involves higher costs per unit of sediment because of the treatability study and mobilization/demobilization costs associated with treatment equipment. Additional ARARs, as described in Table 12, involve requirements for wetlands mitigation/restoration. Present worth and O&M costs also include a ground-water and surface-water monitoring program, estimated over 30 years.

Alternative 3 (4)--Sediment Capping with Stream Relocation

Capital Costs--$4,956,000
Annual O&M Costs--$114,100 (year 1)
$104,100 (year 2)
$ 96,100 (years 3-5)
$ 49,100 (years 6-10)
$ 46,100 (years 11-30)
Present Worth Cost--$5,907,900
Time to Implement--4 years

This alternative would involve in-situ capping of sediments which exceed the 5 ppm cleanup level for PCBs, either with clean sediments or a single layer synthetic membrane cap. Portions of streams containing or immediately adjacent to contaminated sediments would be re-routed through a new channel dug parallel to the old channel in uncontaminated sediments. Excavated clean sediments would be used to fill in the former stream channel, burying the contaminated sediment. Any remaining exposed sediments which exceed 5 ppm and those adjacent to Pool C would be covered by a single layer synthetic membrane cap. A sampling program to further refine the actual areas for removal and identify the new stream channel would be necessary. This alternative would also require a hydrologic study of Edmonds Creek/Marsh in order to design the new stream system. Vegetation control would be required to prevent regrowth of marsh plants through the capped portions. The cap and protective berms would displace approximately 5.9 acres of wetlands, and there would be long-term impacts to the remaining wetlands associated with maintenance of the containment system. Mitigation of wetlands would be required. Engineering methods to reduce impacts to the wetlands during construction would be utilized. RCRA Land Disposal Restrictions are not applicable to consolidation within the Area of Contamination, so metals testing for characteristicity will not be required. Higher O&M costs reflect the maintenance costs associated with capping, as well as higher wetlands mitigation costs. Present worth and O&M costs include a ground-water and surface-water monitoring program, estimated over 30 years.

Alternative 4 (5)--Sediment Containment in Vicinity of Pool C by Capping and Slurry Wall to Meadow Mat, Remaining Sediment Consolidation, Limited Stream Relocation

Capital Costs--$4,706,000
Annual O&M Costs--$110,100 (year 1)
$103,100 (year 2)
$ 96,100 (years 3-5)
$ 50,100 (years 6-10)
$ 49,100 (years 11-30)
Present Worth Cost--$5,686,900
Time to Implement--3 years

This alternative would require excavation of soils and benthic sediments exceeding the 5 ppm cleanup level. These sediments would be dewatered and placed within an on-site containment unit constructed in the vicinity of Pool C, which is the most highly contaminated area of OU 2. This area would be encompassed by a slurry wall to the meadow mat layer, extending out from the OU 1 slurry wall. The resulting contained area would be separate from OU 1 but located on the perimeter, and would receive a single-layer synthetic membrane cap similar to the OU 1 cap. Construction of this containment unit would require relocation of a portion of Edmonds Creek. The area subject to removal is approximately 0.94 acres, although sampling would be done during the predesign phase to refine the extent of excavation and after excavation to confirm compliance with the cleanup level. This alternative would require a hydrologic study of Edmonds Creek in order to determine the effects of the tidal cycle on the remedial action. The alternative may also involve compatibility testing to determine the composition of the slurry/backfill mixture used for the wall, and a subsurface boring program to obtain the geologic information necessary to the design. A wetlands mitigation program would be required to compensate for the wetlands area lost. Liquid from dewatering would be sent to an off-site disposal facility in accordance with TSCA requirements. RCRA Land Disposal Restrictions are not applicable to consolidation within the AOC. Higher costs reflect higher maintenance costs associated with capping and the slurry wall, as well as wetlands mitigation. Present worth and O&M costs reflect a ground water and surface water monitoring program, estimated over 30 years.

Because Alternatives 1, 2A, 3, 4 and possibly 2C would result in contaminants remaining on the site, CERCLA requires that the site be reviewed every five years. The five-year review for Alternative 2A would be accomplished by the five-year review also required for the Operable Unit 1 remedy. If justified by the review, additional remedial actions may be implemented to remove or treat the wastes.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative was assessed utilizing nine evaluation criteria as set forth in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01. These criteria were developed to address the requirements of Section 121 of CERCLA to ensure all important considerations are factored into remedy selection decisions.

The following "threshold" criteria are the most important, and must be satisfied by any alternative in order to be eligible for selection:

1. *Overall protection of human health and the environment* addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. *Compliance with ARARs* addresses whether or not a remedy would meet all of the applicable, or relevant and appropriate requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

3. *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

4. *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of a remedial technology, with respect to these parameters, that a remedy may employ.

5. *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

6. *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

7. *Cost* includes estimated capital and operation and maintenance costs, and the present-worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

8. *State acceptance* indicates whether, based on its review of the RI/FS and the Proposed Plan, the State supports, opposes, and/or has identified any reservations with the preferred alternative.

9. *Community acceptance* refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include support, reservation, and opposition by the community.

A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows.

o Overall Protection of Human Health and the Environment

With the exception of the No Further Action alternative, all of the alternatives will prevent the further migration of contaminated sediments, reducing human health risks associated with ingestion of contaminated fish and environmental risks associated with uptake of PCBs and other contaminants from sediment into the aquatic and terrestrial food chains. Therefore, all of these alternatives except the no action alternative will provide adequate protection of human health and the environment through containment of contaminated sediments or a combination of treatment and containment. All active response actions will impact the wetlands and Edmonds Creek during construction. Alternatives 3 and 4 will involve permanent ecological impacts in the Edmonds Creek marsh, since they include in-situ containment and stream relocation.

Modeling of sediment burial rates indicates that maximum PCB concentrations could take as long as 82 years to decline through burial to the 5 ppm cleanup goal. Since EPA's ecological and human health assessments have indicated that the contaminated sediments currently pose a risk to human health and the environment, the no action alternative will not provide sufficient protection within a reasonable timeframe.

o Compliance with ARARs

The applicable or relevant and appropriate requirements for the Operable Unit 2 remedial action are listed in Table 14. Portions of the study area lie within the 100- and 500-year floodplains, and the remedial objectives for this site require response action within the

Edmonds Creek wetlands area. Therefore, a variety of state and federal wetlands and floodplain regulations will be ARARs for the remedial action at the Kin-Buc site.

Although EPA has established a cleanup goal of 5 ppm for PCBs in the sediments, there are no chemical-specific ARARs for sediments in the Edmonds Creek/Marsh area. All of the alternatives will comply with the action/location-specific ARARs for remedial activities in wetlands and floodplains, although certain alternatives require compliance with a greater number of ARARs. Alternatives 2B and 2C involve off-site disposal and on-site treatment and disposal, respectively. Both of these actions constitute "placement" (removing the waste from the area of contamination prior to land disposal) of a potential RCRA characteristic waste. Sediments for these alternatives must be tested to determine whether they are characteristic RCRA wastes prior to any disposal; if they are characteristic because of their metals content, additional treatment (solidification/stabilization) will be required prior to disposal. All treatment residues must be disposed of in accordance with either TSCA or RCRA depending on their constituents. All alternatives involving dewatering of sediment must also comply with TSCA requirements for disposal of the supernatant. Alternatives 3 and 4 call for in-situ containment and stream relocation. Since these alternatives will involve greater displacement and have permanent ecological impacts compared to Alternatives 2A, 2B or 2C, a greater degree of mitigation/restoration will be required to satisfy both state and federal ARARs.

o Long-Term Effectiveness and Permanence

Alternative 1, No Further Action, does not provide for long-term protection of human health and the environment, since it will not prohibit the migration of contaminants into the aquatic and terrestrial food chains for a significant period of time, nor can the effectiveness of natural sedimentation rates be evaluated with a high degree of confidence. Alternative 2A provides adequate protection by removing the source of contaminants, the sediments, from direct contact with the wetlands and placing them within the OU 1 containment system, which is equivalent in specifications to a chemical waste landfill. Alternative 2B is similar in that it provides for containment of the source materials, but removes the excavated sediments from the site completely, to a commercial chemical waste land disposal facility. Alternative 2C provides the greatest degree of permanence by requiring treatment of the sediments to remove or destroy the contaminants. In-situ containment in the wetlands, such as described in Alternatives 3 and 4, may be the least effective over the long term because of the technical difficulty of constructing and maintaining containment in this environment. In addition, unlike Alternatives 2A, 2B, and 2C, contaminants will remain in the wetlands. Maintenance of containment structures--cap, slurry wall--will have long-term effects on the hydrology of the wetlands as well as on the plant and animal species which inhabit the wetlands. Construction of Alternative 3 is expected to result in a greater loss of wetlands acreage (5.9 acres) than Alternatives 2A, B, and C (1.36 acres), or 4 (2.67 acres). All alternatives, except Alternatives 2B and 2C, will result in contaminants remaining on-site and will be subject to a regular five-year review. However, containment in the OU 1 landfill will be more protective and provide more long-term effectiveness than either containment in a much smaller unit constructed (in the area adjacent to Pool C) or in-situ containment in the wetlands, since OU 1 includes a slurry wall constructed to bedrock as well as leachate and ground water control. All alternatives except No Action will provide reduction in risks associated with the sediments, but only Alternative 2C will not require long-term monitoring or maintenance.

o Reduction in Toxicity, Mobility, or Volume

Only Alternative 2C addresses the principal threats (PCB-contaminated sediment containing more than 5 ppm PCBs) by treatment. All available treatment technologies for PCBs can be expected to meet the remediation objective of 5 ppm PCBs through either removal of PCBs via solvent extraction, or thermal destruction of organics. Treatment would therefore effect a reduction in toxicity, mobility and volume of contaminants. None of the other alternatives involve treatment of the principal threats. Although dewatering may remove some percentage of the total mass of PCBs in the sediment, this process is not expected to result in significant reduction since PCBs adsorb to sediments. Residuals will remain after either thermal treatment or solvent extraction; these will be disposed of off-site in a chemical waste facility.

o Short-Term Effectiveness

Short-term effectiveness denotes the length of time it takes for the remedy to become effective, as well as the adverse impacts that implementation of the remedy may have on human health or the environment. The No Further Action alternative is not considered effective in the short-term, since it would allow continued migration of contaminants in the wetlands, and provides no immediate protection of human health or the environment. Alternatives 2A, and 2B could be completed within approximately three years, compared to a longer implementation time for Alternatives 2C (four years), 3 and 4 (at least four years). Therefore, Alternatives 2A, 2B, and 2C would involve fewer short-term impacts to the wetlands during construction. Alternatives 3 and 4 also involve construction of a permanent containment system in the wetlands, as well as permanent relocation of the Edmonds Creek stream channel. This construction would result in more short-term impacts to the wetlands than construction of Alternatives 2A, 2B, and 2C, due to lengthier implementation times and the more complex and invasive nature of the remedies. Construction of Alternative 3 is expected to result in a greater loss of wetlands acreage (5.9 acres) than Alternatives 2A, B, and C (1.36 acres). Construction of Alternative 4 would result in impacts to 2.67 acres of wetlands, although only .94 acres represent excavated sediment. These features would result in both short- and long-term adverse impacts to resident wildlife, including mammals and aquatic species, in the wetlands. All alternatives would involve adverse impacts to the wetlands, either through containment of contaminated sediment or excavation of sediment which exceeds the remedial objective of 5 ppm PCBs. Mitigation of these impacts will be required, either in the form of active restoration (revegetation by marsh plants) of disturbed areas, or replacement of areas which will be permanently disrupted. Use of temporary surface water controls and specialized excavation methods and equipment can reduce the amount of sediment remobilized during excavation as well as impacts to the wetlands.

Minimal health risks to workers are anticipated for implementation of Alternatives 2A, B and C. Removal of sediment may result in a potential exposure pathway for on-site workers, although use of protective equipment can mitigate health risks to these workers. Off-site disposal presents some degree of risk to workers and off-site communities relative to on-site disposal, since it involves transportation of potentially hazardous materials. On-site treatment will transfer contaminants to additional media (air, liquid), requiring additional controls to reduce exposures of on-site workers and to prevent migration off site of these residuals.

o <u>Implementability</u>

All of the alternatives are considered implementable. Alternative 1, No Further Action, is the easiest to implement since it requires only periodic monitoring to evaluate natural recovery. All alternatives depend on additional hydrologic and biota studies to minimize impacts due to construction and maximize restoration of the wetlands. On-site disposal of sediments in OU 1 depends on the design and construction schedule for the OU 1 remedial action; placement of the excavated sediment within OU 1 must be coordinated to avoid delays in implementation of the OU 1 remedy. Off-site disposal depends on the availability of a disposal facility and on the results of hazardous classification testing, since the sediments will have to be solidified prior to disposal if they are characteristic wastes. Treatment of wastes on the site is technically implementable, but the small volume of sediments to be treated (2200 cubic yards) may not warrant performance of a pilot-scale treatability study and mobilization of equipment designed for much larger volumes of soil. In addition, the treated wastes will have be tested to determine if they are RCRA characteristic based on metals content. If they are characteristic, the sediments will have to be solidified prior to any land disposal since treatment will only be effective for PCBs and other organic compounds. Alternatives 3 and 4 require long-term maintenance and operation of the containment systems, which include control of vegetation and surface water flow, as well as maintenance of a cap and/or slurry wall in a wetlands environment.

o <u>Cost</u>

A summary of cost estimates for all alternatives evaluated appears in Table 15.

The No Further Action alternative is the least costly, with a present worth cost of $938,900 which includes long-term ground water and surface water monitoring. The present worth costs of Alternatives 2A, 2B, and 2C are, respectively, $4,314,900, $5,945,900, and $7,002,-900. Present worth costs for Alternatives 3 and 4 are $5,907,900, and $5,686,9000, respectively.

It should be noted that the O&M costs for Alternatives 3 and 4, estimated over thirty years, far exceed those associated with Alternatives 2A, 2B and 2C: $189,000 for Alternative 3 and

$188,000 for Alternative 4, as compared to $23,000 for each of the previous alternatives. These O&M costs reflect relatively high maintenance costs for containment structures such as caps and slurry walls, including control of vegetation and burrowing animals, over an indefinite period of time. The most expensive remedy is Alternative 2C, because of the high unit cost associated with on-site treatment of the sediments. On-site sediment treatment is not usually implemented for volumes of waste smaller than 10,000 to 15,000 cubic yards because of the costs associated with equipment mobilization/demobilization and performance of treatability studies. The high cost of Alternative 2B derives from the high unit costs associated with land disposal in a commercial chemical waste facility. Alternative 2A, which provides for on-site disposal of the sediment in OU 1, is the second least expensive option, since it uses the containment system currently in design as part of the OU 1 response action. All estimated costs include a long-term surface-water and groundwater monitoring program.

o <u>State Acceptance</u>

The State of New Jersey concurs with EPA's preferred alternative, 2A.

o <u>Community Acceptance</u>

In general, both officials and community residents expressed support for Alternative 2A. A more detailed discussion of community concerns is presented in the Responsiveness Summary.

SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, both the New Jersey Department of Environmental Protection and Energy and EPA have determined that Alternative 2A is the most appropriate remedy for Operable Unit 2 of the Kin-Buc site.

The major components of the selected remedy are as follows:

- Excavation of approximately 2200 cubic yards of sediments with PCB levels that exceed the remedial action objective of 5 ppm total PCBs;
- Disposal and containment of the excavated sediment within the OU 1 slurry wall and cap;
- Active restoration of the approximately 1.36 acres of excavated wetlands, according to a restoration program which will be developed during the design phase, in the Edmonds Creek Marsh, as well as mitigation of impacts caused by remedial activities;

- Long-term monitoring of ground water underlying Mound B and the Low-Lying Area, surface water in Edmonds Creek, and the Raritan River adjacent to Mound B; and

- Maintenance of the Mound B cover.

By excavating contaminated sediments, the preferred alternative will prevent the further bioaccumulation of PCBs and metals in aquatic and terrestrial species residing in the Edmonds Creek Marsh, thereby reducing ecological and human health risks associated with the Kin-Buc Landfill. Disposal of the excavated sediment in the OU 1 containment system will provide long-term protection of human health and the environment. Although this alternative does not satisfy the statutory preference for treatment, EPA concluded that the costs and implementability of available treatment technologies did not justify selection of Alternative 2C, given the small volume of sediment with relatively low concentrations of PCBs. Alternative 2B did not provide more protectiveness than 2A, despite considerably greater costs. The preferred alternative will have fewer short-term impacts to wetlands in comparison to Alternatives 3 and 4, which involve stream relocation and some degree of in-situ containment in the marsh, thereby reducing the subsequent mitigation requirements. Alternative 3 would involve disturbance of a significantly greater area of the wetlands compared to Alternatives 4, 2A, 2B, or 2C. Few long-term adverse impacts on plants or wildlife are anticipated with 2A, 2B, or 2C, since the remedial action will not involve any permanent changes in the wetlands environment, unlike Alternatives 3 and 4. With respect to cost, Alternative 2A is the least costly of the active response measures. With respect to compliance with ARARs, Alternative 2A is expected to satisfy all of the action- and location-specific ARARs described in the FS. A wetlands restoration/mitigation program will be developed during the design phase and implemented after excavation of the contaminated sediments. No RCRA Land Disposal Restrictions are potentially applicable to this action, because consolidation within the same area of contamination does not constitute "placement." Finally, Alternative 2A will take approximately three years to implement, as compared to at least five for Alternatives 3 and 4. A shorter timeframe will lessen impacts to wildlife species and encourage more rapid restoration of the marsh.

EPA has determined that ground water underlying Mound B and the Low-Lying Area does not currently pose a risk to human health, and is not expected to pose such a risk. Ground water in this area is not a source of potable water and is prevented from further migration by discharge to the Raritan River. EPA believes, with a high degree of certainty, that ground water underlying the site will not be used for drinking water in the foreseeable future. However, because contaminants already present in the ground water will continue to discharge to the Raritan River for an extended period of time, both the ground water and the river water will be monitored to ensure that the preferred alternative is protective of human health and the environment.

As part of the OU 2 selected remedy, no further remedial action will be taken to reduce ground-water contaminant concentrations or to control leachate in the refuse layer. The source of Kin-Buc contributions to the contamination in these areas will be eliminated after construction of the OU 1 remedial action, which includes a slurry wall and cap. Natural remediation or attenuation, involving natural process such as degradation, dispersion and dilution, will gradually reduce contaminant concentrations to acceptable levels in the sand and gravel aquifer and in the refuse layer. Contaminants in the bedrock aquifer are already at acceptable levels. Contaminant transport modeling for both the Mound B and Low-Lying areas was conducted as part of the Feasibility Study to determine how long natural remediation would take to achieve this reduction. Results indicate that levels of contaminants drop most rapidly in the Low-Lying Area (MCLs may be attained within 50 years) and less quickly within the Mound B area. However, over time, compliance with federal and state ground-water quality standards will be achieved.

Maintenance of the Mound B cap will continue. As discussed above, a comprehensive ground water monitoring program will be implemented to track changes in ground water quality over time, using existing monitoring wells installed during the OU 2 RI. These wells will be sampled regularly. During each periodic review of the remedy, EPA will determine the need to continue monitoring, based on the collected sampling data. A river water sampling and analysis program will also be implemented in order to monitor the Raritan River water quality adjacent to the site. Although current data does not indicate impacts due to Kin-Buc, this issue will continue to be evaluated over time, as part of the periodic reviews.

EPA and the NJDEPE believe that the preferred alternative is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected alternative achieves the ARARs more quickly, or as quickly, and at less cost than the other options. Therefore, the selected alternative will provide the best balance of trade-offs among alternatives with respect to the evaluating criteria. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. However, since the contaminated sediments could not be cost-effectively treated due to the small volume of material excavated, the preferred alternative does not satisfy the statutory preference for treatment as a principal element of the remedy with respect to source control. Because this action will result in contamination remaining on site, CERCLA requires that the site be reviewed every five years. This review will be conducted as part of the OU 1 review, since the contaminated sediments will be consolidated within OU 1. If justified by the review, EPA will revise the remedial decision as necessary.

Contingency Remedy

If, during the design process for this operable unit, EPA determines that disposal of the excavated sediment in OU 1 will delay the construction of the OU 1 remedy, EPA may change the preferred alternative to Alternative 2B, which differs from Alternative 2A only in the disposal of the excavated materials at an off-site chemical waste facility. The following description of how the selected remedy meets the CERCLA 121 statutory determinations also applies to the contingency remedy, except where noted.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource-recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes, as available. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected alternative provides for protection of human health and the environment by removing the source of PCB contamination, thereby reducing the volume of contaminated sediments in the wetlands from which PCBs and other contaminants migrate via bioaccumulation into resident biota such as fish and fiddler crabs. The excavated sediment will be consolidated within the Operable Unit 1 containment system, which will prevent future releases into the surrounding environment. Because this remedy involves removal of a limited portion of the marsh, approximately 1.36 acres, short-term and long-term impacts to the wetland are expected to be minimal. In addition, a shorter timeframe for implementation of the remedy will lessen impacts to wetlands biota and encourage more rapid restoration of the wetlands ecosystem. No permanent alteration of the wetlands will result from implementation of the remedy. Active restoration of excavated areas will reduce any long-term impacts.

Compliance with ARARs

The selected remedy is expected to comply with all ARARs, as described in Table 3. There are no chemical-specific ARARs for the sediment medium. However, the remedy is designed to comply with all action- and location-specific ARARs that pertain to activities in wetlands, coastal areas, and floodplains, including design and implementation of a wetlands mitigation program and restoration of excavated areas of the marsh. The remedial activity will comply with the National Ambient Air Quality Standard. Any dewatering liquid derived from sediment consolidation will be disposed of in accordance with TSCA requirements. Potential RCRA Land Disposal Restrictions do not apply to consolidation of contaminated materials within the area of contamination. Should EPA find it necessary to change the selected remedy from Alternative 2A to Alternative 2B, the excavated sediments will be tested to determine whether they constitute RCRA characteristic hazardous wastes prior to removal from the site. If the sediments are RCRA characteristic, RCRA Land Disposal Restrictions will apply, and treatment such as solidification or stabilization will be utilized prior to disposal.

Cost-Effectiveness

The selected remedy has been determined to provide the greatest overall long-term and short-term effectiveness in proportion to its present worth cost, $3,637,000, when compared to equivalently protective alternatives, such as Alternatives 2B and 2C. Alternatives 3 and 4 were determined to be less effective and more costly.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the second operable unit action at the site. EPA has determined that the selected remedy provides the best balance of trade-offs in terms of the five primary balancing criteria, including state and community acceptance, although the selected remedy does not involve reduction of toxicity, mobility, or volume through treatment. The selected remedy provides the greatest long- and short-term effectiveness, is easily implementable, and provides the greatest cost-effectivness compared to Alternatives 2B and 2C.

Preference for Treatment as a Principal Element

The selected remedy does not satisfy the preference for treatment as a principal element, since treatment of the contaminated sediment did not provide greater effectiveness, or risk reduction and resulted in disproportionately higher costs because of the small volume and relatively low levels of contaminants of concern observed in the sediments.

DOCUMENTATION OF SIGNIFICANT CHANGES

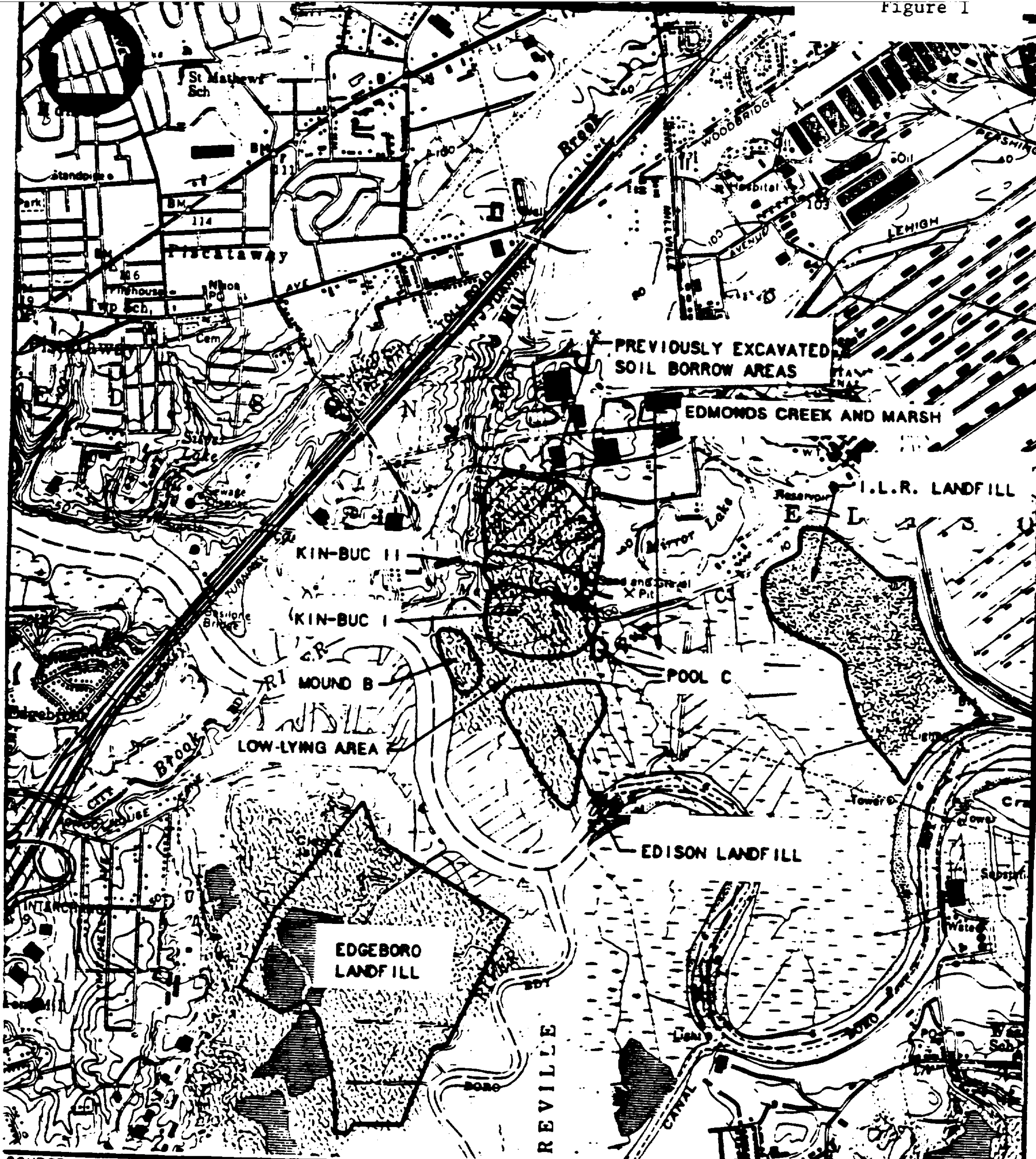
The costs described in the Proposed Plan did not include the comprehensive ground-water and surface-water monitoring program as described in the **Selected Remedy** section. Present worth costs of this program are estimated at $677,900, based on a 30-year time period. Annual O&M costs are estimated at $44,100. These costs have been added to the costs reported in the Proposed Plan, resulting in the higher present worth and O&M costs which appear in the **Description of Alternatives** and **Comparative Analysis** sections.

APPENDIX I

FIGURES

Figures

Figure 1



SOURCE:
TOPOGRAPHY TAKEN FROM
1954 NEW BRUNSWICK, N.J.
1954 SOUTH AMBOY, N.J./N.Y.
1955 PLAINFIELD, N.J.
1956 PERTH AMBOY, N.J./N.Y.
U.S.G.S QUADRANGLES 7.5 MIN. SERIES

2000 0 2000
SCALE IN FEET

FIGURE 1-1

REGIONAL LOCATION MAP

KIN-BUC LANDFILL
EDISON, NEW JERSEY

WehranEnviroTech
Wehran Engineering Corporation

ZCM: (09406.FS.ENV)FIG REGIONAL LOCATION DWG: KS039214

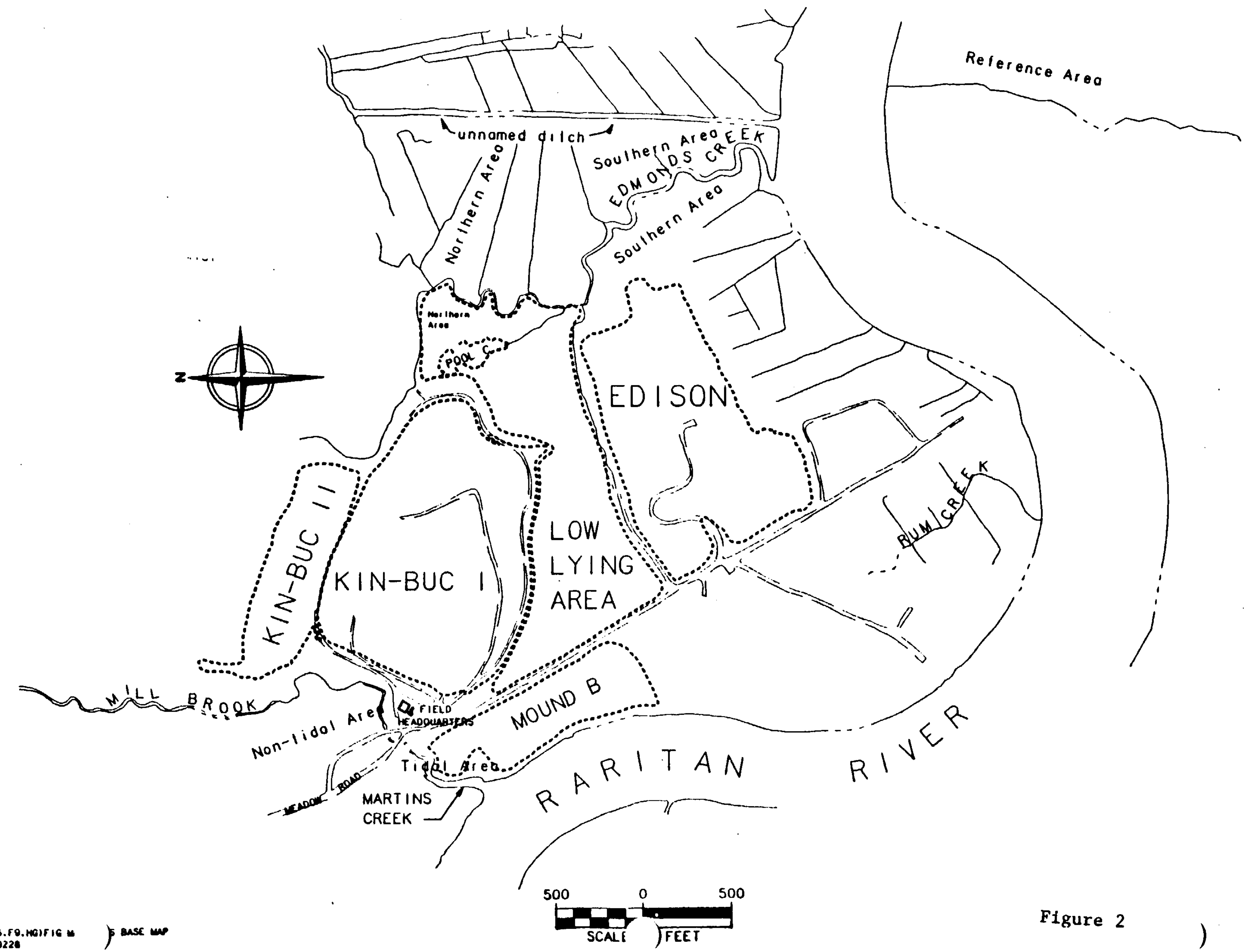


Figure 2

2CM:(09406.F9.HG)FIG 4 5 BASE MAP
DWG: SW069228

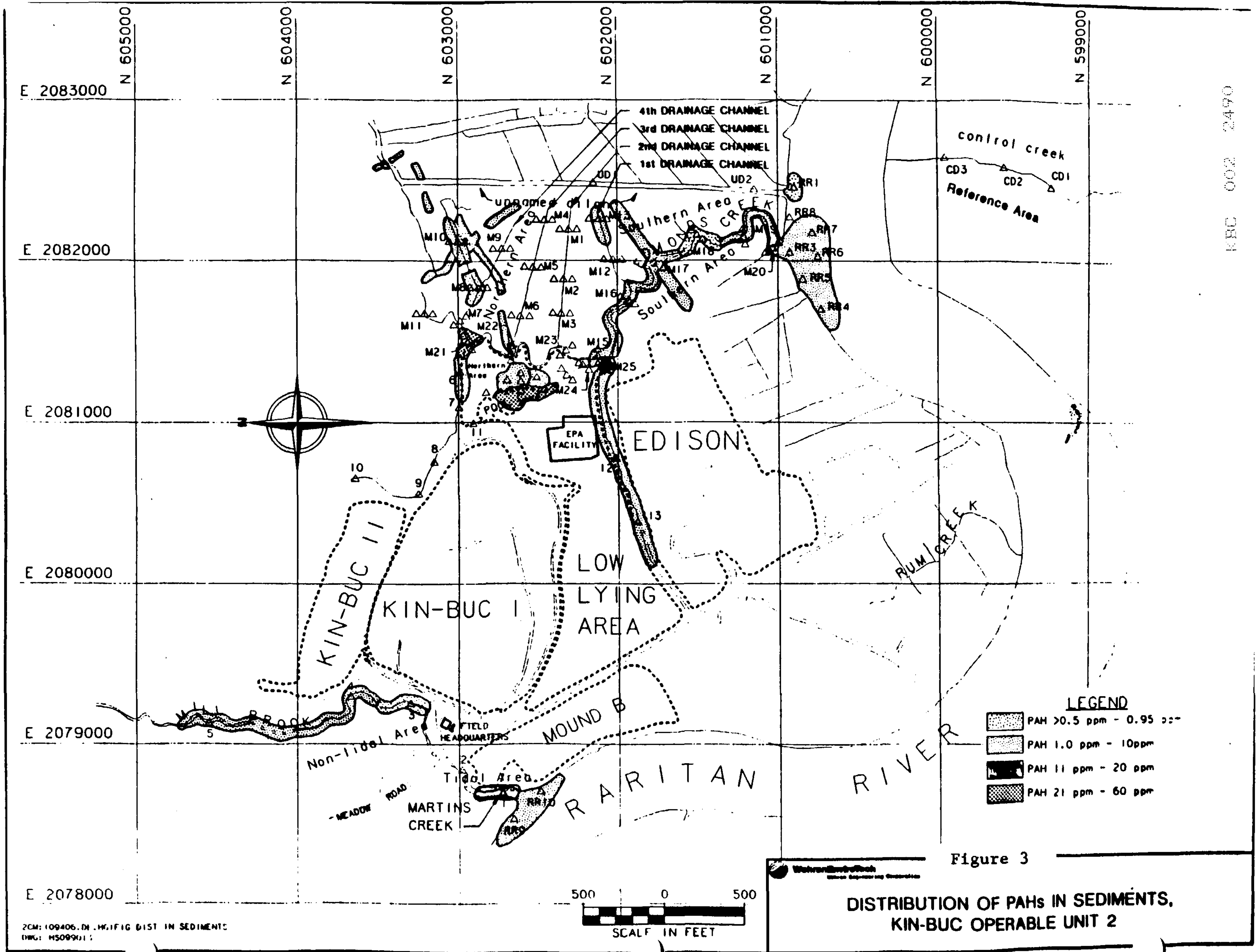


Figure 3

DISTRIBUTION OF PAHs IN SEDIMENTS, KIN-BUC OPERABLE UNIT 2

KBC 002 2490

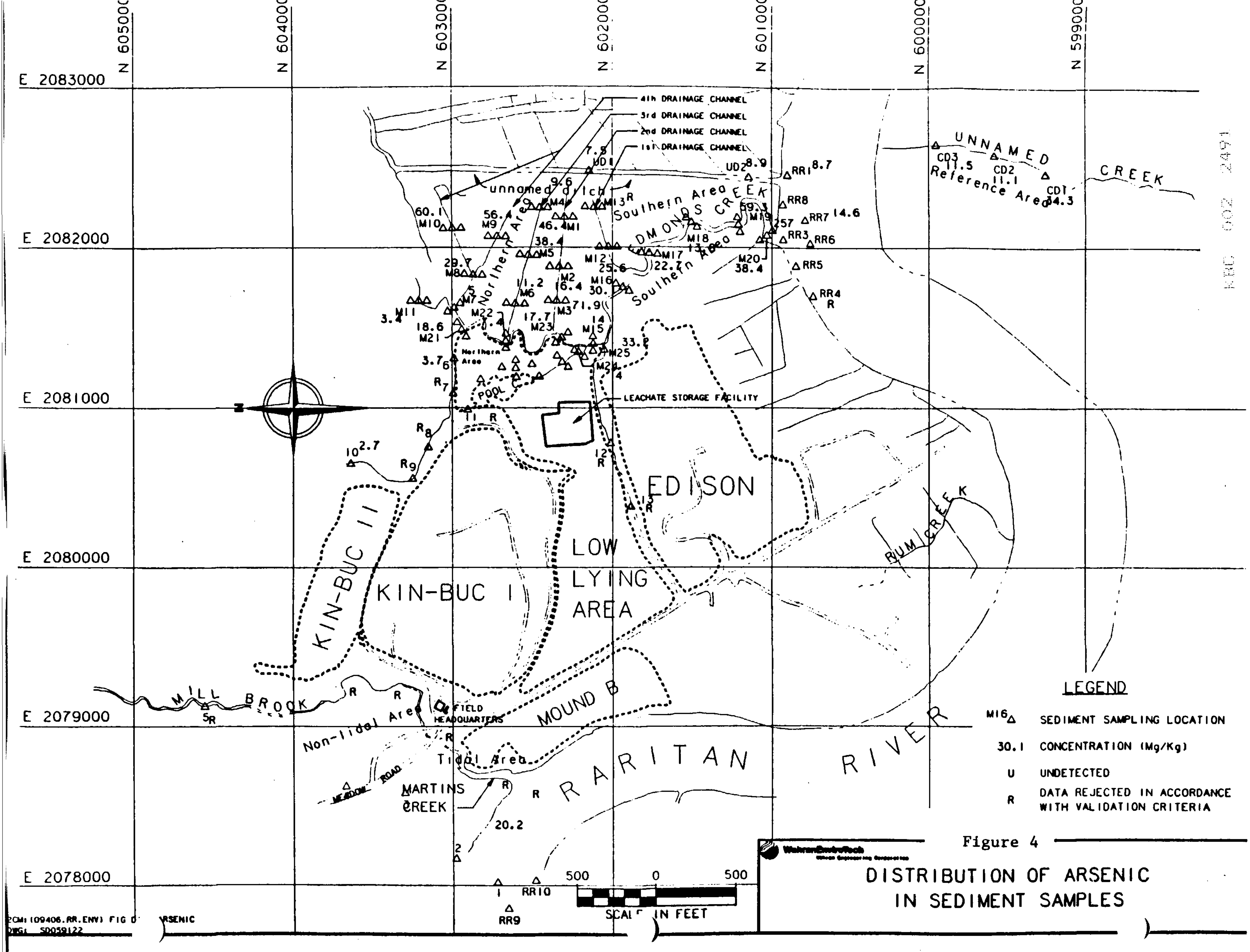


Figure 4

DISTRIBUTION OF ARSENIC IN SEDIMENT SAMPLES

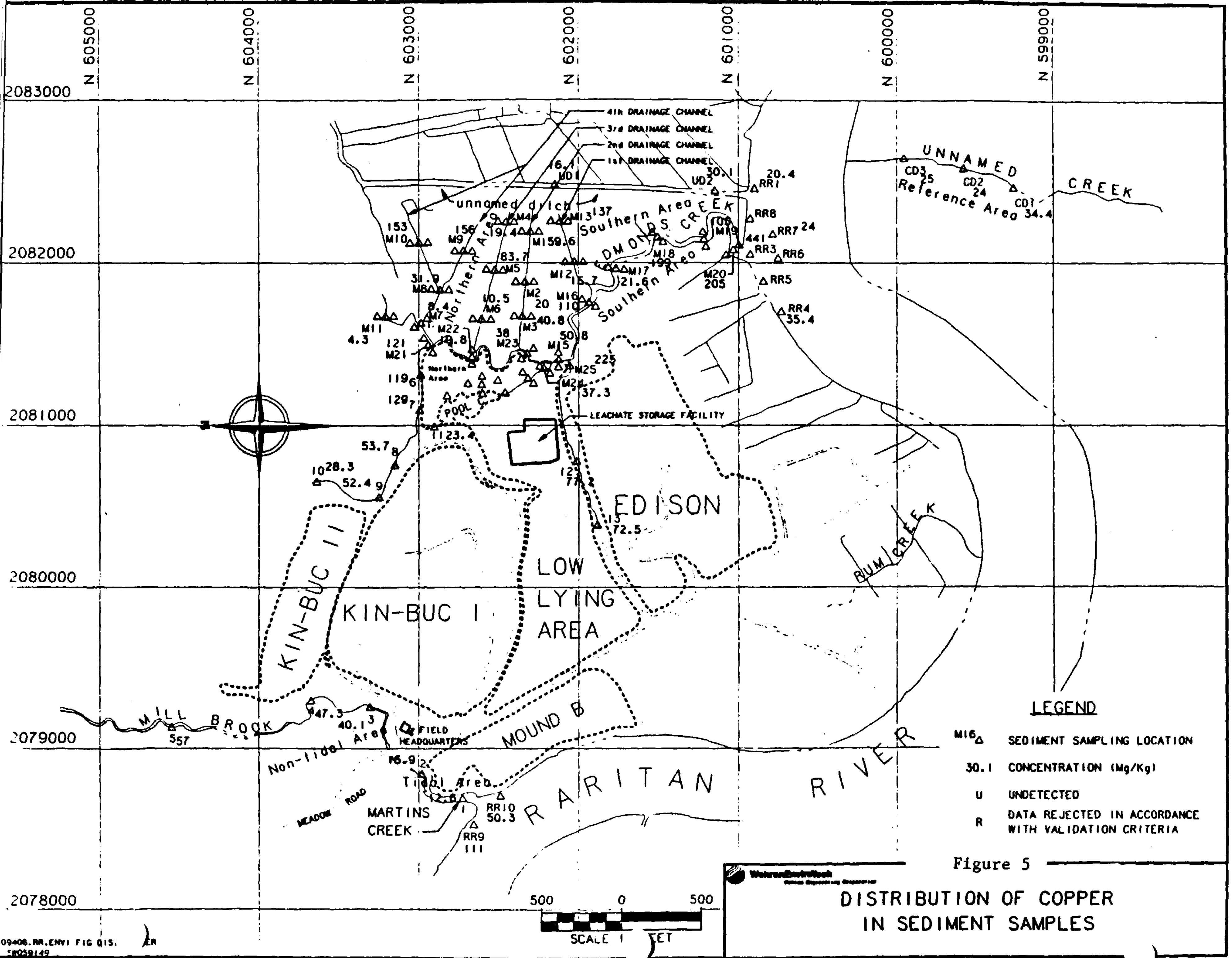


Figure 5
DISTRIBUTION OF COPPER IN SEDIMENT SAMPLES

KBC 002 2492

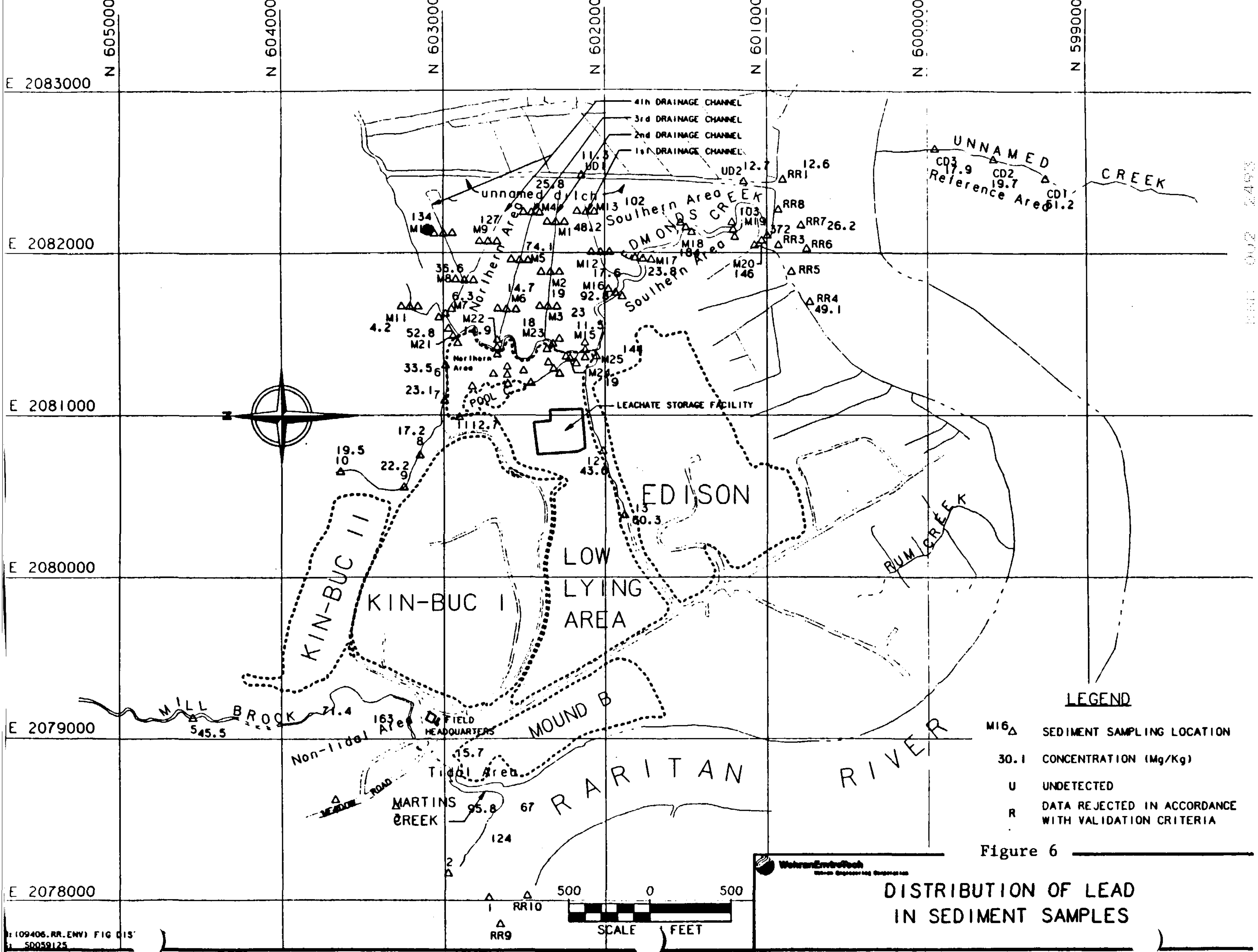


Figure 6

DISTRIBUTION OF LEAD IN SEDIMENT SAMPLES

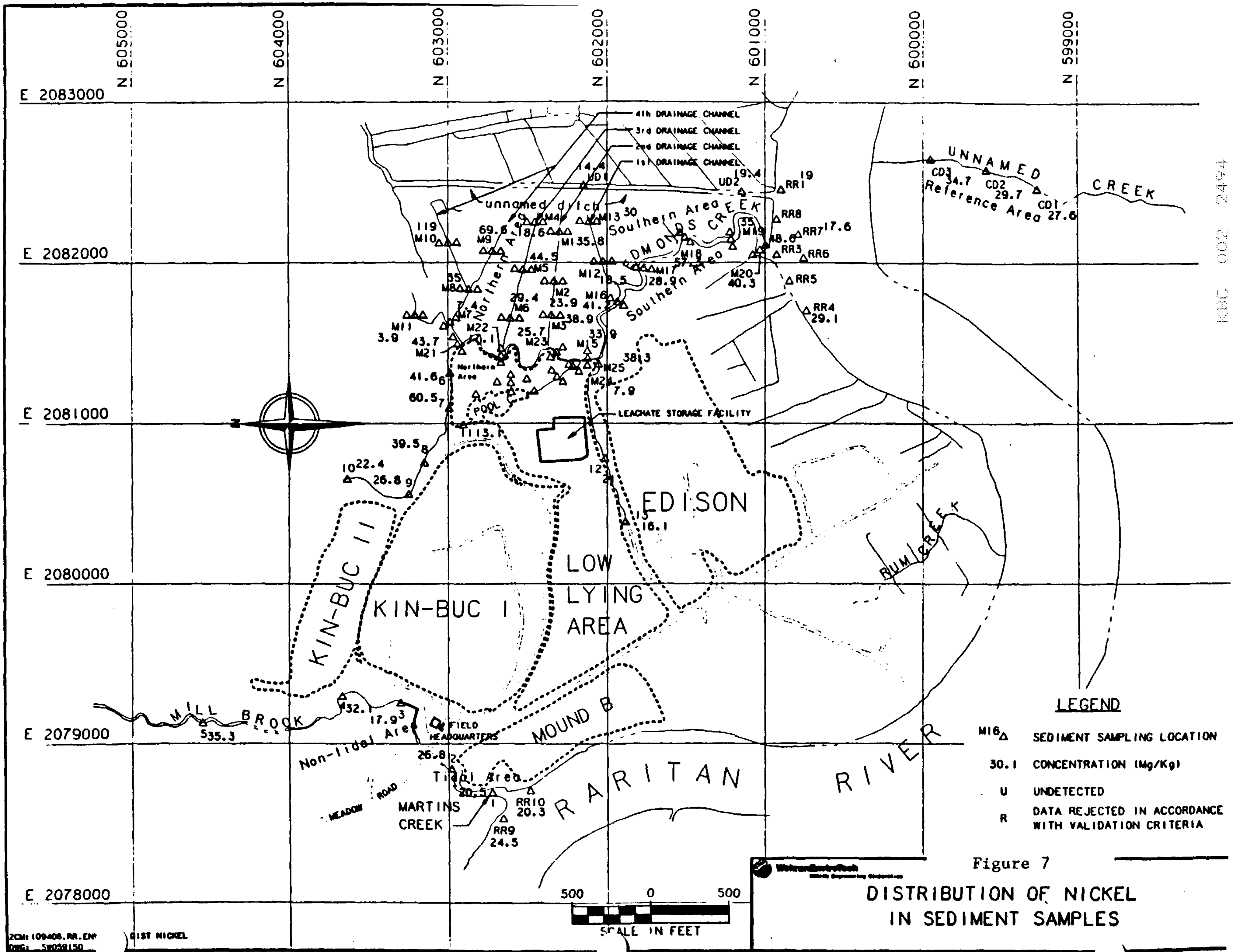
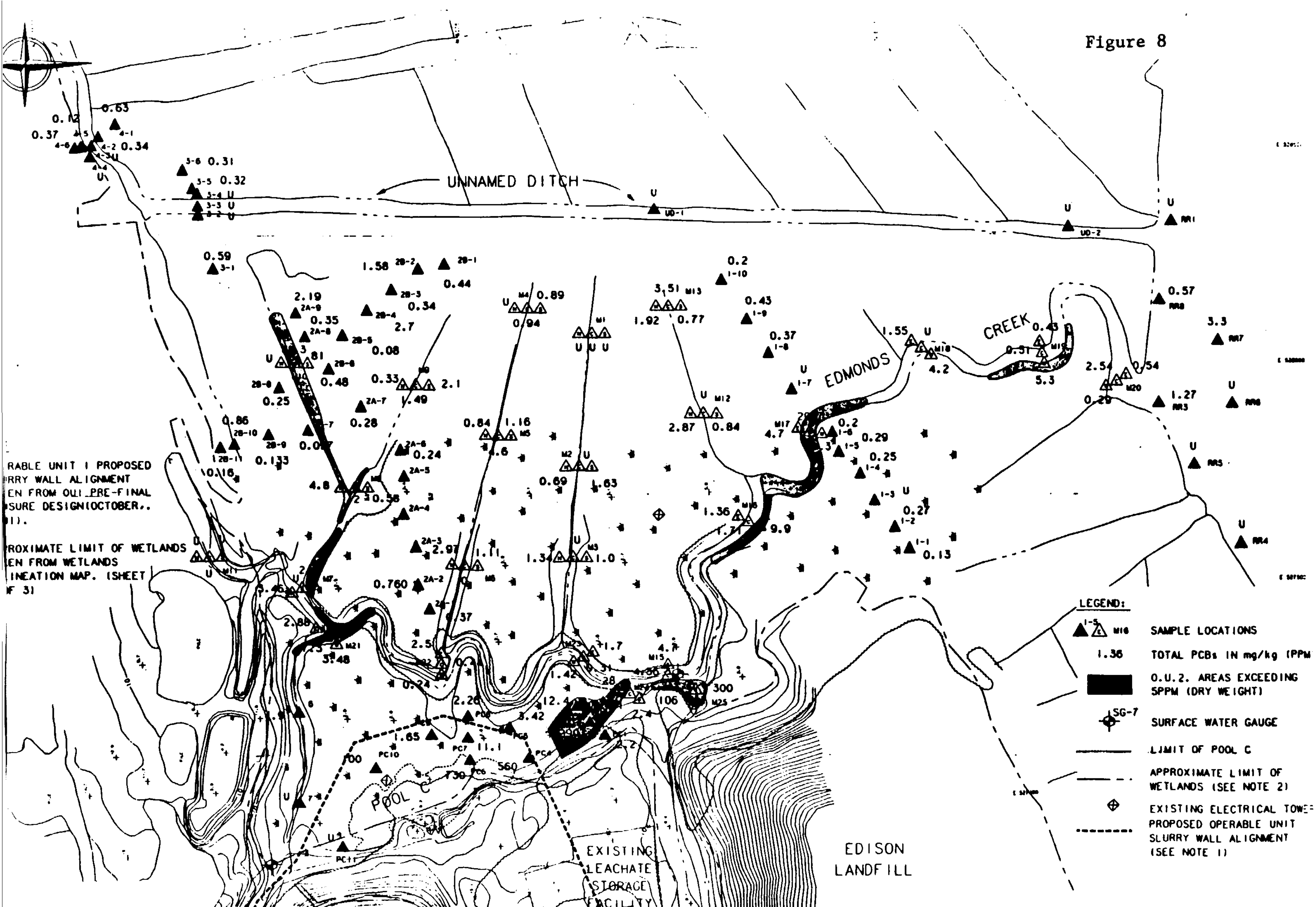


Figure 7

DISTRIBUTION OF NICKEL IN SEDIMENT SAMPLES

Figure 8



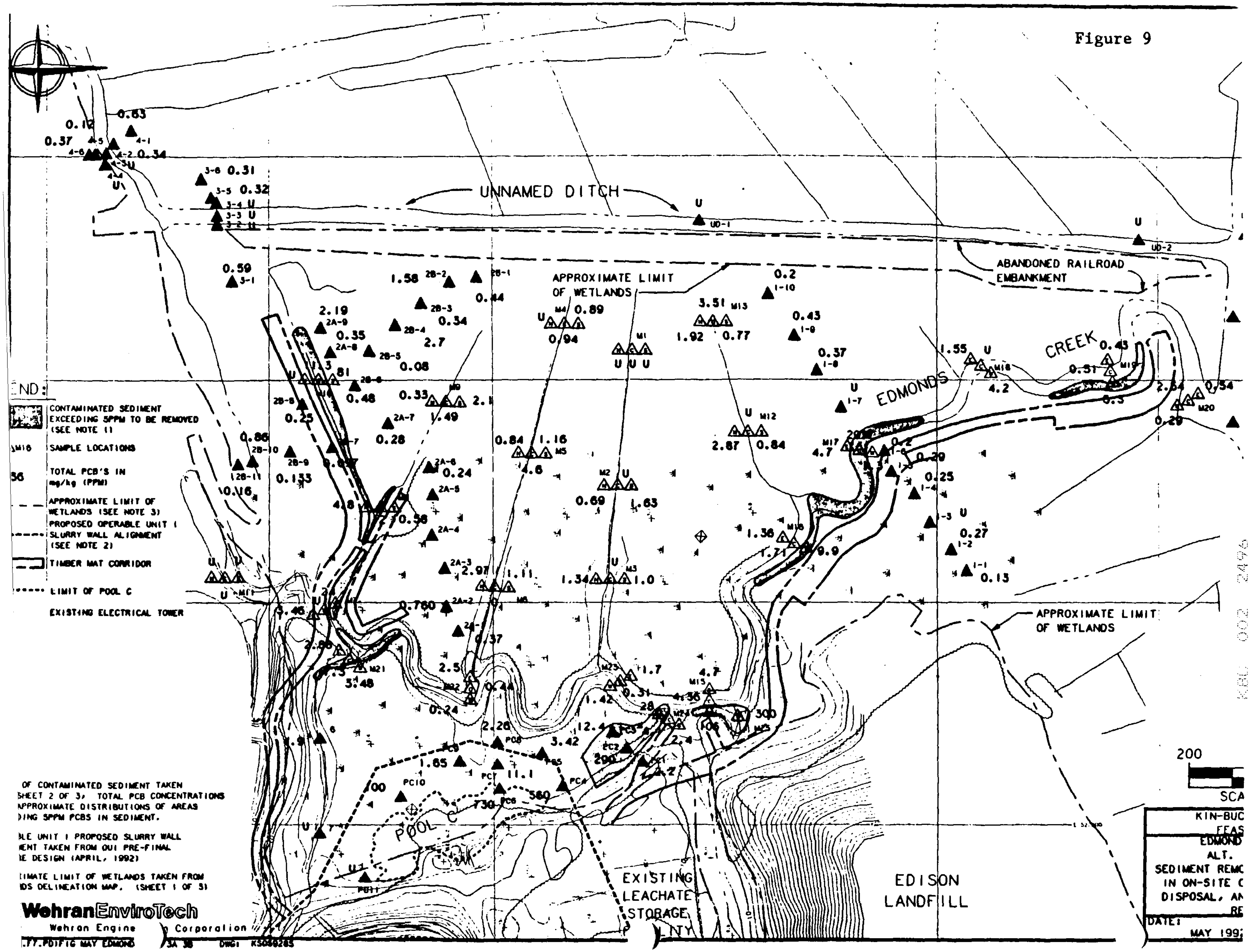
WehranEnviroTech
Wehran E neering Corporation

KIN BUC, INC.
KIN-BUC LANDFILL
OPERABLE UNIT 2 FEASIBILITY STUDY
EDISON TOWNSHIP, MIDDLESEX COUNTY, NEW JERSEY

TOTAL PCB CONCENTRATIONS WITH APPROXIMATE DISTRIBUTION OF O.U.2 AREAS EXCEEDING 5 PPM PCBs IN SEDIMENTS

KBD 002 2495

Figure 9


UNNAMED DITCH
ABANDONED RAILROAD EMBANKMENT
APPROXIMATE LIMIT OF WETLANDS
EDMONDS CREEK
APPROXIMATE LIMIT OF WETLANDS
POOL C
EXISTING LEACHATE STORAGE
EDISON LANDFILL
CONTAMINATED SEDIMENT EXCEEDING 5PPM TO BE REMOVED (SEE NOTE 1)
SAMPLE LOCATIONS
TOTAL PCB'S IN mg/kg (PPM)
APPROXIMATE LIMIT OF WETLANDS (SEE NOTE 3)
PROPOSED OPERABLE UNIT 1 SLURRY WALL ALIGNMENT (SEE NOTE 2)
TIMBER MAT CORRIDOR
LIMIT OF POOL C
EXISTING ELECTRICAL TOWER
OF CONTAMINATED SEDIMENT TAKEN
SHEET 2 OF 3) TOTAL PCB CONCENTRATIONS
APPROXIMATE DISTRIBUTIONS OF AREAS
DING 5PPM PCBS IN SEDIMENT.
BLE UNIT 1 PROPOSED SLURRY WALL
MENT TAKEN FROM OU1 PRE-FINAL
E DESIGN (APRIL, 1992)
IMATE LIMIT OF WETLANDS TAKEN FROM
DS DELINEATION MAP. (SHEET 1 OF 3)
WehranEnviroTech
Wehran Engine Corporation
200
SCA
KIN-BUC
FEAS
EDMOND
ALT.
SEDIMENT REMO
IN ON-SITE C
DISPOSAL, AN
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MAY 199

APPENDIX II

TABLES

Table 1

Table E-1
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (REFUSE) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

KBC 002 2498

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Volatile Organics (μg/ℓ)								
Acetone	22 J	31,000 J	NA	NA	NA	NA	700	700
Benzene	1,200	16,000 J	NA	5	NA	1	1	0.2
Toluene	62 J	51,000 BJ	NA	1,000	NA	NA	1,000	1,000
Chlorobenzene	550 J	9,500 J	NA	100	NA	4	5	5
Ethylbenzene	83	13,00 J	NA	700	NA	NA	700	700
Xylene (total)	610	2,200	NA	10,000	NA	44	40	40
Base/Neutral-Acid Extractables (μg/ℓ)								
Phenol	400	120	NA	NA	3,500	NA	4,000	4,000
2-Chlorophenol	U	4 J	NA	NA	NA	NA	40	40
1,3-Dichlorobenzene	U	2 J	NA	NA	NA	600	600	600
1,4-Dichlorobenzene	5 J	18	NA	75	NA	NA	70	75
1,2-Dichlorobenzene	U	200	NA	600	NA	600	600	600
Isophorone	U	7 J	NA	NA	NA	NA	100	100
2,4-Dimethylphenol	17 J	130	NA	NA	NA	NA	100	100
Naphthalene	15	110	NA	NA	NA	NA	30	NA

10.7/92 09406.F9

Table E-1
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (REFUSE) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Acenaphthene	11	4 J	NA	NA	NA	NA	400	400
Diethylphthalate	2 J	2 J	NA	NA	NA	NA	5,000	5,000
Fluorene	10	6 J	NA	NA	NA	NA	300	300
n-Nitrosodiphenylamine	7 J	110	NA	NA	NA	NA	20	7
Anthracene	2 J	2 J	NA	NA	NA	NA	2,000	2,000
di-n-Butylphthalate	7 J	13 J	NA	NA	NA	NA	900	900
Fluoranthene	4 J	12 J	NA	NA	NA	NA	300	300
Pyrene	3 J	11 J	NA	NA	NA	NA	200	200
Butylbenzylphthalate	U	19 J	NA	NA	NA	NA	100	100
bis (2-Ethylhexyl)phthalate	U	520 B	NA	NA	NA	NA	30	3
Pesticides/PCBs (µg/ℓ)								
4,4'-DDE	U	0.71 J	NA	NA	0.001	NA	0.1	0.1
PCB-1242	U	20 J	NA	NA	0.001	0.5	*	**
PCB-1254	U	6.3 J	NA	NA	0.001	0.5	*	**
Total Metals (µg/ℓ)								
Aluminum	2,020	83,000 EJ	NA	50 – 200	NA	NA	NA	50 – 200
Antimony	34.4 B	U	NA	6	NA	NA	20	2

Table E-1
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (REFUSE) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Arsenic	18.3	170	50	50	50	NA	8	0.02
Barium	745 EJ	2,400	1,000	2,000	1,000	NA	2,000	2,000
Beryllium	U	4.8 B	NA	NA	NA	NA	20	0.008
Cadmium	3 BNJ	86.3	10	5	10	NA	4	4
Chromium	19.4	390 J	50	10	50	NA	100	100
Copper	U	823	NA	NA	1,000	NA	NA	1,000
Iron	59,600	503,000	NA	300	300	NA	NA	300
Lead	1,170 SJN	2,490 #J	50	50	50	NA	10	5
Manganese	1,510	4,610	NA	50	50	NA	NA	50
Mercury	1.3	2.0 NJ	2	2	2	NA	2	2
Nickel	134	576 EJ	NA	100	NA	NA	100	100
Selenium	1.7 BNW	1.6 BW	10	50	10	NA	50	50
Silver	U	7.1 B	50	50	50	NA	20	20
Sodium	673,000 EJ	617,000	NA	NA	50,000	NA	NA	50,000
Zinc	32.4 J	18,100	NA	5,000	5,000	NA	5,000	5,000
Dissolved Metals (µg/ℓ)								
Antimony	U	20.8 B	NA	NA	NA	NA	20	2

10.7/92.09406.F9

Table E-1
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (REFUSE) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Arsenic	19.7	170	50	50	50	NA	8	0.02
Barium	621	2,400	1,000	2,000	1,000	NA	2,000	2,000
Beryllium	U	1.7 B	NA	4	NA	NA	20	0.008
Cadmium	U	86.3	10	5	10	NA	4	4
Chromium	8.2 B	390	50	10	50	NA	100	100
Copper	U	4.2 B	NA	NA	1,000	NA	NA	1,000
Iron	50,000	503,000	NA	300	300	NA	NA	300
Lead	21.4	2490	50	50	50	NA	10	5
Manganese	1,520	4,610 E	NA	50	50	NA	NA	50
Mercury	U	2 N	2	2	2	NA	2	2
Nickel	132	576 E	NA	NA	NA	NA	100	100
Selenium	U	1.6 BW	10	50	10	NA	50	50
Silver	U	7.1 B	50	50	50	NA	20	20
Sodium	674,000 EJ	333,000	NA	NA	50,000	NA	NA	50,000
Zinc	R	74.9 EJ	NA	5,000	5,000	NA	5,000	5,000
Other Inorganics (mg/ℓ)								
Ammonia-Nitrogen	323	400	NA	NA	0.5	NA	NA	0.5

Table E-1
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (REFUSE) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Cyanide	--	0.184	NA	200	0.2	NA	0.2	0.2
Nitrate-Nitrogen	2.6	0.34	NA	10	10	NA	NA	10
Total Dissolved Solids	3,370	2,380	NA	NA	500 Nat. Back.	NA	NA	500

Notes:

NA No Standard Available
* Combined total of PCBs shall not exceed 0.05 µg/ℓ
** Combined total of PCBs shall not exceed 0.02 µg/ℓ
(1) 40 CFR Part 264.94 (Table 1 – Maximum Concentration of Constituents for Groundwater Protection)
(2) 40 CFR Part 141.11 (Maximum Contaminant Levels for Inorganic Chemicals), 40 CFR Part 141.12 (Maximum Contaminant Levels for Organic Chemicals), 40 CFR Part 141.61 (Maximum Contaminant Levels for Organic Contaminants), 40 CFR Part 141.62 (Maximum Contaminant Levels for Inorganic Contaminants), and 40 CFR Part 143.3 (Secondary Maximum Contaminant Levels)
(3) N.J.A.C. Part 7:9-6.6 – Groundwater Quality Criteria
(4) N.J. Safe Drinking Water Act "A-280 Amendments" (N.J.A.C. Part 7:10-16.7 – Maximum contaminant levels (MCLs) for hazardous contaminants)
(5) 24 N.J.R. 373 (a) Cleanup Standards for Contaminated Sites – Proposed New Rules: N.J.A.C. 7:26 D, February 3, 1992
(6) 24 N.J.R. 193 (a) Groundwater Quality Standards – Proposed Repeal and New Rules: N.J.A.C. 7:9-6, January 21, 1992

U = Result less than instrument detection limit (IDL).
B = Result between IDL and contract required detection limited (CRDL).
N = Spiked sample recovery not within control limits
W = Post-digest spike recovery furnace analysis was out of 85-115 percent control limit, while sample absorbance was less than 50 percent of spike absorbance
S = Reported value was determined by the method of standard additions (MSA).
J = Concentration is estimated.
R = Data rejected in accordance with validation criteria
# = Duplicate analysis not within control limit

Table 2

Table E-2
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (SAND & GRAVEL) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

KPRD 003 0003

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Volatile Organics (µg/ℓ)								
Vinyl Chloride	46	U	NA	2	NA	2	2	0.08
Acetone	230 J	U	NA	NA	NA	NA	700	700
1,1-Dichloroethane	13	18	NA	NA	NA	NA	70	70
1,2-Dichloroethene (total) *	93	U	NA	NA	NA	10	(7)	(7)
Trichloroethene	4 J	26	NA	5	NA	1	NA	1
Benzene	220	17 J	NA	5	NA	1	1	0.2
4-Methyl-2-pentanone	U	140	NA	NA	NA	NA	400	400
Tetrachloroethene	U	86	NA	5	NA	1	1	0.4
Toluene	28	570	NA	1,000	NA	NA	1,000	1,000
Chlorobenzene	260	23	NA	100	NA	4	5	5
Ethylbenzene	82	57	NA	700	NA	NA	700	700
Xylene (total)	120	290	NA	10,000	NA	44	40	40
Base/Neutral-Acid Extractables (µg/ℓ)								
Phenol	U	3,100	NA	NA	3,500	NA	4,000	4,000
1,2-Dichlorobenzene	0.8 J	U	NA	600	NA	600	600	600
2,4-Dimethylphenol	20	U	NA	NA	NA	NA	100	100
Naphthalene	130	0.3 J	NA	NA	NA	NA	30	NA

* CIS - 1,2 dichloroethene - 70ug/l (MCL)
trans - 1,2 dichloroethene - 100ug/l (MCL)

10.7/92.09406.F9

Table E-2
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (SAND & GRAVEL) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards(5)	NJDEPE Proposed GW Quality Standards(6)
Dimethylphthalate	U	1 J	NA	NA	NA	NA	7,000	7,000
Acenaphthane	10	U	NA	NA	NA	NA	400	400
Diethylphthalate	4 J	2 J	NA	NA	NA	NA	5,000	5,000
Fluorene	5 J	U	NA	NA	NA	NA	300	300
n-Nitrosodiphenylamine(1)	U	0.3 J	NA	NA	NA	NA	20	7
di-n-Butylphthalate	4 J	4 J	NA	NA	NA	NA	900	900
Pyrene	U	1 J	NA	NA	NA	NA	200	200
Butylbenzylphthalate	0.5 J	0.5 J	NA	NA	NA	NA	100	100
bis(2-Ethylhexyl) Phthalate	200 JB	U	NA	6	NA	NA	30	3
di-n-Octylphthalate	U	0.5 J	NA	NA	NA	NA	100	100
Total Metals (μg/ℓ)								
Aluminum	60,200 EJ	26,300	NA	50 – 200	NA	NA	NA	50 – 200
Antimony	53.7 BJ	52.1 B	NA	6	NA	NA	20	2
Arsenic	40.5	15	50	50	50	NA	8	0.02
Barium	978	1,620	1,000	2,000	1,000	NA	2,000	2,000
Beryllium	4.2 B	4.4 B	NA	4	NA	NA	20	0.008
Cadmium	U	2.6 B	10	5	10	NA	4	4
Chromium	88.5 J	76.6 J	50	100	50	NA	100	100
Copper	260 B	178	NA	1300	1,000	NA	NA	1,000
Iron	233,000	112,000	NA	300	300	NA	NA	300

Table E-2
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (SAND & GRAVEL) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Lead	52.7 JN	32.8	50	50	50	NA	10	5
Manganese	6,670	3,650	NA	50	50	NA	NA	50
Mercury	U	0.21	2	2	2	NA	2	2
Nickel	109	90.1 J	NA	100	NA	NA	100	100
Selenium	1.5 JBN	1.5 JBNW	10	50	10	NA	50	50
Sodium	2,260,000	4,000,000	NA	NA	50,000	NA	NA	50,000
Zinc	230	438 J	NA	5,000	5,000	NA	5,000	5,000
Dissolved Metals (μg/ℓ)								
Aluminum	R	86.1 B	NA	50 – 200	NA	NA	NA	50 – 200
Antimony	1,220	44.9 B	NA	NA	NA	NA	20	2
Arsenic	23	27.5	50	50	50	NA	8	0.02
Barium	614	416 J	1,000	2,000	1,000	NA	2,000	2,000
Beryllium	1.1 B	U	NA	NA	NA	NA	20	0.008
Chromium	3.9 B	9.6 B	50	10	10	NA	100	100
Copper	18.4 B	6.9 B	NA	NA	1,000	NA	NA	1,000
Iron	191,000	46,300 J	NA	300	300	NA	NA	300
Lead	4.8	4.6	50	50	50	NA	10	5
Manganese	6,670	3,260	NA	50	50	NA	NA	50
Nickel	92.2	38.4 B	NA	NA	NA	NA	100	100
Selenium	U	1.6 BN	10	50	10	NA	50	50

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Table E-2
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (SAND & GRAVEL) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Sodium	2,320,000	3,610,000	NA	NA	50,000	NA	NA	50,000
Zinc	80.1 EJ	66.4	NA	5,000	5,000	NA	5,000	5,000
Other Inorganics (mg/ℓ)								
Ammonia-Nitrogen	272	15	NA	NA	0.5	NA	NA	0.5
Nitrate-Nitrogen	0.27	0.24	NA	10	10	NA	NA	10
Total Dissolved Solids	7,680	12,800	NA	500	500 Nat. Back.	NA	NA	500

Notes:

NA No Standard Available

(1) 40 CFR Part 264.94 (Table 1 – Maximum Concentration of Constitutents for Groundwater Protection)

(2) 40 CFR Part 141.11 (Maximum Contaminant Levels for Inorganic Chemicals), 40 CFR Part 141.12 (Maximum Contaminant Levels for Organic Chemicals), 40 CFR Part 141.61 (Maximum Contaminant Levels for Organic Contaminants), 40 CFR Part 141.62 (Maximum Contaminant Levels for Inorganic Contaminants), and 40 CFR Part 143.3 (Secondary Maximum Contaminant Levels)

(3) N.J.A.C. Part 7:9-6.6 – Groundwater Quality Criteria

(4) N.J. Safe Drinking Water Act "A-280 Amendments" (N.J.A.C. Part 7:10-16.7 – Maximum contaminant levels (MCLs) for hazardous contaminants)

(5) 24 N.J.R. 373 (a) Cleanup Standards for Contaminanted Sites – Proposed New Rules: N.J.A.C. 7:26 D, February 3, 1992

(6) 24 N.J.R. 193 (a) Groundwater Quality Standards – Proposed Repeal and New Rules: N.J.A.C. 7:9-6, January 21, 1992

(7) GW Standards for 1,2-Dichloroethene are 10 µg/ℓ cis-, 100 µg/ℓ trans-.

U = Result less than instrument detection limit (IDL).
B = Result between IDL and contract required detection limited (CRDL).
N = Spiked sample recovery not within control limits
W = Post-digest spike recovery furnace analysis was out of 85-115 percent control limit, while sample absorbance was less than 50 percent of spike absorbance
S = Reported value was determined by the method of standard additions (MSA).
J = Concentration is estimated.
R = Data rejected in accordance with validation criteria

Table E-3
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (BEDROCK) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Volatile Organics (µg/ℓ)								
1,1-Dichloroethane	U	1.3	NA	NA	NA	NA	70	70
1,1,1-Trichloroethane	U	1.3	NA	200	NA	26	30	30
Benzene	1.3	0.25 J	NA	5	NA	1	1	0.2
Toluene	0.3 J	0.7 J	NA	1,000	NA	NA	1,000	1,000
Tetrachloroethene	U	1.6	NA	5	NA	1	1	0.4
Chlorobenzene	1.2	1.7 J	NA	100	NA	4	5	5
Ethylbenzene	1.1 J	U	NA	700	NA	NA	700	700
Xylene (total)	5.4	7.5	NA	10,000	NA	44	40	40
1,3-Dichlorobenzene	0.8 J	U	NA	NA	NA	600	600	600
1,4-Dichlorobenzene	0.2 J	4.4 J	NA	75	NA	NA	70	75
1,2-Dichlorobenzene	U	0.6 J	NA	600	NA	600	600	600
Trichlorobenzene (1,2,4-Trichlorobenzene)	0.7 J	U	NA	70	NA	8	9	9
Base/Neutral-Acid Extractables (µg/ℓ)								
n-Nitrosodiphenylamine	4 J	U	NA	NA	NA	NA	20	7
di-n-Butylphthalate	1 J	0.9 J	NA	NA	NA	NA	900	900

Table E-3
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (BEDROCK) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Pyrene	U	0.1 J	NA	NA	NA	NA	200	200
Butylbenzylphthalate	2 J	0.4 J	NA	NA	NA	NA	100	100
bis(2-Ethylhexyl) phthalate	U	78 B	NA	NA	NA	NA	30	3
di-n-Octylphthalate	22 B	0.5 J	NA	NA	NA	NA	100	100
Total Metals (µg/ℓ)								
Aluminum	41,200	24,500	NA	50 – 200	NA	NA	NA	50 – 200
Antimony	32 B	36.7 B	NA	6	NA	NA	20	2
Arsenic	21	68.9 S	50	50	50	NA	8	0.02
Barium	814	1,310	1,000	2,000	1,000	NA	2,000	2,000
Beryllium	2.3 B	2.3 B	NA	4	NA	NA	20	0.008
Cadmium	U	4.5 B	10	5	10	NA	4	4
Chromium	906	60.5	50	10	50	NA	100	100
Copper	116	58.5	NA	NA	1,000	NA	NA	1,000
Iron	52,100	31,000	NA	300	300	NA	NA	300
Lead	20.3 NJ	14 NJ	50	50	50	NA	10	5
Manganese	2,350	4,960	NA	50	50	NA	NA	50
Nickel	432	130	NA	100	NA	NA	100	100
Sodium	2,480,000	3,060,000	NA	NA	50,000	NA	NA	50,000

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Table E-3
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (BEDROCK) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

Compound	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Zinc	208	98.6	NA	5,000	5,000	NA	5,000	5,000
Dissolved Metals (μg/ℓ)								
Aluminum	U	37.2 B	NA	50 – 200	NA	NA	NA	50 – 200
Antimony	36.5 B	45.8 B	NA	NA	NA	NA	20	2
Arsenic	1.6 B	49.4	50	50	50	NA	8	0.02
Barium	425	797 J	1,000	2,000	1,000	NA	2,000	2,000
Cadmium	2 U	2 U	10	5	10	NA	4	4
Chromium	3 U	4.6 BJ	50	10	50	NA	100	100
Copper	3.5 B	15.8 B	NA	NA	1,000	NA	NA	1,000
Iron	12,300 J	16,400	NA	300	300	NA	NA	300
Lead	1 UNWJ	5 UNJ	50	50	50	NA	10	5
Manganese	2,120 J	4,590	NA	50	50	NA	NA	50
Mercury	0.2 UNJ	0.2 U	2	2	2	NA	2	2
Nickel	277 J	92.7	NA	NA	NA	NA	100	100
Sodium	2,400,000 J	3,210,000 JE	NA	NA	50,000	NA	NA	50,000
Zinc	15.4 B	42.8 J	NA	5,000	5,000	NA	5,000	5,000
Other Inorganics (mg/ℓ)								
Ammonia-Nitrogen	17.3	70.1	NA	NA	0.5	NA	NA	0.5

Table E-3
KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
COMPARISON OF MAXIMUM CONCENTRATIONS OF CONTAMINANTS IN GROUNDWATER (BEDROCK) WITH CHEMICAL-SPECIFIC ARARs AND TBCs

	Operable Unit 2 Maximum Concentrations		ARARs				TBCs	
			Federal		State		State	
Compound	Mound B	Low-Lying Area	RCRA Stds (1)	SDWA MCLS (2)	NJAC Stds Class GW2 (3)	SDWA MCLS (4)	NJDEPE Proposed GW Cleanup Standards (5)	NJDEPE Proposed GW Quality Standards (6)
Nitrate-Nitrogen	0.1	0.21	NA	10	10	NA	NA	10
Total Dissolved Solids	8,500	12,500	NA	NA	500 Nat. Back.	NA	NA	500

Notes:

NA No Standard Available

(1) 40 CFR Part 264.94 (Table 1 – Maximum Concentration of Constituents for Groundwater Protection)

(2) 40 CFR Part 141.11 (Maximum Contaminant Levels for Inorganic Chemicals), 40 CFR Part 141.12 (Maximum Contaminant Levels for Organic Chemicals), 40 CFR Part 141.61 (Maximum Contaminant Levels for Organic Contaminants), 40 CFR Part141.62 (Maximum Contaminant Levels for Inorganic Contaminants), and 40 CFR Part 143.3 (Secondary Maximum Contaminant Levels)

(3) N.J.A.C. Part 7:9-6.6 – Groundwater Quality Criteria

(4) N.J. Safe Drinking Water Act "A-280 Amendments" (N.J.A.C. Part 7:10-16.7 – Maximum contaminant levels (MCLs) for hazardous contaminants)

(5) 24 N.J.R. 373 (a) Cleanup Standards for Contaminated Sites – Proposed New Rules: N.J.A.C. 7:26D, February 3, 1992

(6) 24 N.J.R. 193 (a) Groundwater Quality Standards – Proposed Repeal and New Rules: N.J.A.C. 7:9-6, January 21, 1992

U = Result less than instrument detection limit (IDL).
B = Result between IDL and contract required detection limited (CRDL).
N = Spiked sample recovery not within control limits
W = Post-digest spike recovery furnace analysis was out of 85-115 percent control limit, while sample absorbance was less than 50 percent of spike absorbance
S = Reported value was determined by the method of standard additions (MSA).
J = Concentration is estimated.

Table 4

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M12C	M13C	M12S	M12N	M13N	M13S	M1C	M2C	M3C	M1S
TOTAL PCBs (ug/g)	U	3.51	0.84	2.87	1.92	0.77	U	U	U	U
Total Organic Carbon (%)*	8.00%	7.32%	6.73%	6.95%	7.85%	8.00%	6.96%	8.00%	7.18%	8.00%
NORMALIZED PCBs (ug/gOC)**	U	48	12	41	24	10	U	U	U	U
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.31	0.28	0.26	0.27	0.30	0.31	0.27	0.31	0.28	0.31
Mean (ug PCBs/g sediment)	1.6	1.4	1.3	1.4	1.5	1.6	1.4	1.6	1.4	1.6
Upper (ug PCBs/g sediment)	8.0	7.3	6.7	6.9	7.8	8.0	7.0	8.0	7.2	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.66	0.61	0.56	0.58	0.65	0.66	0.58	0.66	0.60	0.66
Mean (ug PCBs/g sediment)	3.3	3.1	2.8	2.9	3.3	3.3	2.9	3.3	3.0	3.3
Upper (ug PCBs/g sediment)	17	16	14	15	17	17	15	17	15	17

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts)million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M1N	M2S	M2N	M3N	M3S	M4C	M5C	M6C	M4N	M4S
TOTAL PCBs (ug/g)	U	1.63	0.69	1.34	1	0.94	4.6	U	U	0.89
Total Organic Carbon (%)*	8.00%	8.00%	0.0122%	5.02%	6.30%	8.00%	8.00%	6.96%	8.00%	8.00%
NORMALIZED PCBs (ug/gOC)**	U	20	5656	27	16	12	58	U	U	11
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.31	0.31	0.0005	0.19	0.24	0.31	0.31	0.27	0.31	0.31
Mean (ug PCBs/g sediment)	1.6	1.6	0.002	1.0	1.2	1.6	1.6	1.4	1.6	1.6
Upper (ug PCBs/g sediment)	8.0	8.0	0.01	5.0	6.3	8.0	8.0	7.0	8.0	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.66	0.66	0.001	0.42	0.52	0.66	0.66	0.58	0.66	0.66
Mean (ug PCBs/g sediment)	3.3	3.3	0.01	2.1	2.6	3.3	3.3	2.9	3.3	3.3
Upper (ug PCBs/g sediment)	17	17	0.03	11	13	17	17	15	17	17

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M5N	M5S	M6N	M6S	M7C	M8C	M9C	M10C	M11C	M7N
TOTAL PCBs (ug/g)	0.84	1.16	2.97	1.11	U	12	1.49	11.3	U	3.46
Total Organic Carbon (%)*	8.00%	8.00%	8.00%	8.00%	0.231%	4.76%	8.00%	8.00%	0.372%	8.00%
NORMALIZED PCBs (ug/gOC)**	11	15	37	14	U	252	19	141	U	43
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.31	0.31	0.31	0.31	0.01	0.18	0.31	0.31	0.01	0.31
Mean (ug PCBs/g sediment)	1.6	1.6	1.6	1.6	0	0.93	1.6	1.6	0.07	1.6
Upper (ug PCBs/g sediment)	8.0	8.0	8.0	8.0	0.23	4.8	8.0	8.0	0.37	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.66	0.66	0.66	0.66	0.02	0.39	0.66	0.66	0.03	0.66
Mean (ug PCBs/g sediment)	3.3	3.3	3.3	3.3	0.10	2.0	3.3	3.3	0.16	3.3
Upper (ug PCBs/g sediment)	17	17	17	17	0.49	10	17	17	0.80	17

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M7S	M8N	M8S	M9N	M9S	M10N	M10S	M11N	M11S	M21C
TOTAL PCBs (ug/g)	24	4.8	0.58	0.33	2.1	U	81	U	U	17.3
Total Organic Carbon (%)*	7.04%	6.46%	8.00%	8.00%	8.00%	8.00%	6.60%	0.25%	0.282%	1.88%
NORMALIZED PCBs (ug/gOC)**	341	74	7.3	4.1	26	U	1227	U	U	920
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.27	0.25	0.31	0.31	0.31	0.31	0.26	0.01	0.01	0.07
Mean (ug PCBs/g sediment)	1.4	1.3	1.6	1.6	1.6	1.6	1.3	0.05	0.05	0.37
Upper (ug PCBs/g sediment)	7.0	6.5	8.0	8.0	8.0	8.0	6.6	0.25	0.28	1.9
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.58	0.54	0.66	0.66	0.66	0.66	0.55	0.02	0.02	0.16
Mean (ug PCBs/g sediment)	2.9	2.7	3.3	3.3	3.3	3.3	2.8	0.10	0.12	0.79
Upper (ug PCBs/g sediment)	15	14	17	17	17	17	14	0.54	0.60	4.0

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M22C	M23C	M15C	M16C	M17C	M18C	M19C	M20C	M21E	M21W
TOTAL PCBs (ug/g)	0.44	0.31	4.36	1.71	29.7	U	0.51	2.54	2.88	3.48
Total Organic Carbon (%)*	2.98%	8.00%	2.54%	3.33%	3.44%	3.52%	2.80%	4.35%	5.70%	5.00%
NORMALIZED PCBs (ug/gOC)**	15	3.9	172	51	863	U	18	58	51	70
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.12	0.31	0.10	0.13	0.13	0.14	0.11	0.17	0.22	0.19
Mean (ug PCBs/g sediment)	0.58	1.6	0.50	0.65	0.67	0.69	0.55	0.85	1.1	1.0
Upper (ug PCBs/g sediment)	3.0	8.0	2.5	3.3	3.4	3.5	2.8	4.3	5.7	5.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.25	0.66	0.21	0.28	0.29	0.29	0.23	0.36	0.47	0.41
Mean (ug PCBs/g sediment)	1.2	3.3	1.1	1.4	1.4	1.5	1.2	1.8	2.4	2.1
Upper (ug PCBs/g sediment)	6.4	17	5.4	7.1	7.4	7.5	6.0	9.3	12	11

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = part[illegible]r million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M22E	M22W	M23E	M23W	M15E	M15W	M16E	M16W	M17E	M17W
TOTAL PCBs (ug/g)	2.5	0.24	1.7	1.42	4.7	106	1.36	9.9	4.7	1.3
Total Organic Carbon (%)*	6.52%	6.91%	7.34%	6.02%	5.56%	8.00%	4.20%	4.64%	3.32%	5.67%
NORMALIZED PCBs (ug/gOC)**	38	3.5	23	24	85	1325	32	213	142	23
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.25	0.27	0.28	0.23	0.22	0.31	0.16	0.18	0.13	0.22
Mean (ug PCBs/g sediment)	1.3	1.3	1.4	1.2	1.1	1.6	0.82	0.90	0.65	1.1
Upper (ug PCBs/g sediment)	6.5	6.9	7.3	6.0	5.6	8.0	4.2	4.6	3.3	5.7
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.54	0.57	0.61	0.50	0.46	0.66	0.35	0.38	0.28	0.47
Mean (ug PCBs/g sediment)	2.7	2.9	3.1	2.5	2.3	3.3	1.8	1.9	1.4	2.4
Upper (ug PCBs/g sediment)	14	15	16	13	12	17	9.0	10	7.1	12

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts million (ppm)

Table 1
KIN-BUC OPERABLE UNIT 2 RI/FS
SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M18E	M18W	M19E	M19W	M20E	M20W	SD-6	SD-7	SD-8	SD-9
TOTAL PCBs (ug/g)	1.55	4.2	0.43	5.3	0.54	0.29	1.9	U	U	U
Total Organic Carbon (%)*	6.04%	5.82%	5.48%	3.66%	4.80%	1.76%	1.86%	2.30%	2.16%	0.895%
NORMALIZED PCBs (ug/gOC)**	26	72	7.8	145	11	16	102	U	U	U
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.23	0.23	0.21	0.14	0.19	0.07	0.07	0.09	0.08	0.03
Mean (ug PCBs/g sediment)	1.2	1.1	1.1	0.71	0.94	0.34	0.36	0.45	0.42	0.17
Upper (ug PCBs/g sediment)	6.0	5.8	5.5	3.7	4.8	1.8	1.9	2.3	2.2	0.89
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.50	0.48	0.45	0.30	0.40	0.15	0.15	0.19	0.18	0.07
Mean (ug PCBs/g sediment)	2.5	2.4	2.3	1.5	2.0	0.74	0.78	0.96	0.90	0.37
Upper (ug PCBs/g sediment)	13	12	12	7.8	10	3.8	4.0	4.9	4.6	1.9

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts million (ppm)

Table 1
KIN-BUC OPERABLE UNIT 2 RI/FS
SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	SD-10	SD-11	RR1	RR3	RR4	RR5	RR6	RR7	RR8	M24C
TOTAL PCBs (ug/g)	U	U	U	1.27	U	U	U	3.3	0.57	4.1
Total Organic Carbon (%)*	0.634%	0.386%	8.00%	3.94%	2.02%	2.22%	2.02%	1.95%	2.53%	0.88%
NORMALIZED PCBs (ug/gOC)**	U	U	U	32	U	U	U	169	23	466
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.02	0.01	0.31	0.15	0.08	0.09	0.08	0.08	0.10	0.03
Mean (ug PCBs/g sediment)	0.12	0.08	1.6	0.77	0.39	0.43	0.39	0.38	0.49	0.17
Upper (ug PCBs/g sediment)	0.63	0.39	8.0	3.9	2.0	2.2	2.0	1.9	2.5	0.88
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.05	0.03	0.66	0.33	0.17	0.18	0.17	0.16	0.21	0.07
Mean (ug PCBs/g sediment)	0.27	0.16	3.3	1.6	0.84	0.93	0.84	0.82	1.06	0.37
Upper (ug PCBs/g sediment)	1.4	0.83	17	8.4	4.3	4.8	4.3	4.2	5.4	1.9

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts per million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	M24N	M24S	PC-01	PC-02	PC-03	PC-04	PC-05	PC-06	PC-07	PC-08
TOTAL PCBs (ug/g)	28	2.4	2.2	290	12.4	560	3.42	730	11.1	2.26
Total Organic Carbon (%)*	8.00%	4.08%	7.14%	8.00%	8.00%	2.80%	8.00%	8.00%	8.00%	8.00%
NORMALIZED PCBs (ug/gOC)**	350	59	31	3625	155	20000	43	9125	139	28
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.31	0.16	0.28	0.31	0.31	0.11	0.31	0.31	0.31	0.31
Mean (ug PCBs/g sediment)	1.6	0.80	1.4	1.6	1.6	0.55	1.6	1.6	1.6	1.6
Upper (ug PCBs/g sediment)	8.0	4.1	7.1	8.0	8.0	2.8	8.0	8.0	8.0	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.66	0.34	0.59	0.66	0.66	0.23	0.66	0.66	0.66	0.66
Mean (ug PCBs/g sediment)	3.3	1.7	3.0	3.3	3.3	1.2	3.3	3.3	3.3	3.3
Upper (ug PCBs/g sediment)	17	8.7	15	17	17	6.0	17	17	17	17

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts)million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	PC-09	PC-10	SD-12	SD-13	M25C	CD1	CD2	CD3	UD1	UD2
TOTAL PCBs (ug/g)	1.65	100	0.22	0.9	300	U	U	U	U	U
Total Organic Carbon (%)*	8.00%	8.00%	5.08%	1.24%	3.98%	3.26%	3.36%	3.32%	1.24%	1.84%
NORMALIZED PCBs (ug/gOC)**	21	1250	4.3	73	7538	U	U	U	U	U
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.31	0.31	0.20	0.05	0.15	0.13	0.13	0.13	0.05	0.07
Mean (ug PCBs/g sediment)	1.6	1.6	1.0	0.24	0.78	0.64	0.66	0.65	0.24	0.36
Upper (ug PCBs/g sediment)	8.0	8.0	5.1	1.2	4.0	3.3	3.4	3.3	1.2	1.8
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.66	0.66	0.42	0.10	0.33	0.27	0.28	0.28	0.10	0.15
Mean (ug PCBs/g sediment)	3.3	3.3	2.1	0.52	1.7	1.4	1.4	1.4	0.52	0.77
Upper (ug PCBs/g sediment)	17	17	11	2.7	8.5	7.0	7.2	7.1	2.7	3.9

Notes

* - Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** - Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** - Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts per million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	SD-1	SD-2	SD-3	SD-4	SD-5	RR9	RR10	SD-1-1	SD-1-2	SD-1-3
TOTAL PCBs (ug/g)	U	U	U	U	0.096	U	U	0.13	0.27	U
Total Organic Carbon (%)*	2.70%	2.81%	0.251%	0.231%	2.66%	4.55%	5.06%	8.00%	8.00%	8.00%
NORMALIZED PCBs (ug/gOC)**	U	U	U	U	3.6	U	U	1.6	3.4	U
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.10	0.11	0.01	0.01	0.10	0.18	0.20	0.31	0.31	0.31
Mean (ug PCBs/g sediment)	0.53	0.55	0.05	0.05	0.52	0.89	1.0	1.6	1.6	1.6
Upper (ug PCBs/g sediment)	2.7	2.8	0.25	0.23	2.7	4.5	5.1	8.0	8.0	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***										
Lower (ug PCBs/g sediment)	0.22	0.23	0.02	0.02	0.22	0.38	0.42	0.66	0.66	0.66
Mean (ug PCBs/g sediment)	1.1	1.2	0.10	0.10	1.1	1.9	2.1	3.3	3.3	3.3
Upper (ug PCBs/g sediment)	5.8	6.0	0.5	0.49	5.7	10	11	17	17	17

Notes

* - Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** - Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** - Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

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Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	SD-1-4	SD-1-5	SD-1-6	SD-1-7	SD-1-8	SD-1-9	SD-1-10	SD-2A-1	SD-2A-2
TOTAL PCBs (ug/g)	0.25	0.29	0.2	U	0.37	0.43	0.2	0.37	0.76
Total Organic Carbon (%)*	8.00%	8.00%	4.94%	8.00%	5.995%	8.00%	8.00%	8.00%	8.00%
NORMALIZED PCBs (ug/gOC)**	3.1	3.6	4.0	U	6.2	5.4	2.5	4.6	10
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.31	0.31	0.19	0.31	0.23	0.31	0.31	0.31	0.31
Mean (ug PCBs/g sediment)	1.6	1.6	1.0	1.6	1.2	1.6	1.6	1.6	1.6
Upper (ug PCBs/g sediment)	8.0	8.0	4.9	8.0	6.0	8.0	8.0	8.0	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.66	0.66	0.41	0.66	0.50	0.66	0.66	0.66	0.66
Mean (ug PCBs/g sediment)	3.3	3.3	2.1	3.3	2.5	3.3	3.3	3.3	3.3
Upper (ug PCBs/g sediment)	17	17	11	17	13	17	17	17	17

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = parts p illion (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	SD-2A-3	SD-2A-4	SD-2A-5	SD-2A-6	SD-2A-7	SD-2A-8	SD-2A-9	A-9DUP	SD-2B-1
TOTAL PCBs (ug/g)	0.32	0.41	0.72	0.24	0.28	0.35	0.57	2.19	0.044
Total Organic Carbon (%)*	8.00%	8.00%	8.00%	8.00%	6.915%	7.656%	8.00%	8.00%	8.00%
NORMALIZED PCBs (ug/gOC)**	4.0	5.1	9.0	3.0	4.0	4.6	7.1	27	0.6
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.31	0.31	0.31	0.31	0.27	0.30	0.31	0.31	0.31
Mean (ug PCBs/g sediment)	1.6	1.6	1.6	1.6	1.3	1.5	1.6	1.6	1.6
Upper (ug PCBs/g sediment)	8.0	8.0	8.0	8.0	6.9	7.6	8.0	8.0	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.66	0.66	0.66	0.66	0.57	0.63	0.66	0.66	0.66
Mean (ug PCBs/g sediment)	3.3	3.3	3.3	3.3	2.9	3.2	3.3	3.3	3.3
Upper (ug PCBs/g sediment)	17	17	17	17	15	16	17	17	17

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = part r million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	SD-2B-2	SD-2B-3	SD-2B-4	SD-2B-5	SD-2B-6	SD-2B-7	SD-2B-8	SD-2B-9	SD-2B-10
TOTAL PCBs (ug/g)	1.58	0.34	2.7	0.08	0.48	0.097	0.25	0.133	0.86
Total Organic Carbon (%)*	8.00%	6.65%	8.00%	8.00%	4.91%	8.00%	8.00%	8.00%	8.00%
NORMALIZED PCBs (ug/gOC)**	20	5.1	34	1.0	10	1.2	3.1	1.7	11
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.31	0.26	0.31	0.31	0.19	0.31	0.31	0.31	0.31
Mean (ug PCBs/g sediment)	1.6	1.3	1.6	1.6	1.0	1.6	1.6	1.6	1.6
Upper (ug PCBs/g sediment)	8.0	6.6	8.0	8.0	4.9	8.0	8.0	8.0	8.0
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.66	0.55	0.66	0.66	0.41	0.66	0.66	0.66	0.66
Mean (ug PCBs/g sediment)	3.3	2.8	3.3	3.3	2.1	3.3	3.3	3.3	3.3
Upper (ug PCBs/g sediment)	17	14	17	17	11	17	17	17	17

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = part per million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	SD-2B-11	SD-3-1	SD-3-2	SD-3-3	SD-3-4	3-4-DUP	SD-3-5	SD-3-6	SD-4-1
TOTAL PCBs (ug/g)	0.16	0.59	U	U	0.16	U	0.32	0.31	0.63
Total Organic Carbon (%)*	8.00%	8.00%	0.963%	0.235%	7.065%	8.00%	5.26%	4.66%	6.335%
NORMALIZED PCBs (ug/gOC)**	2.0	7.4	U	U	2.3	U	6.1	6.7	10
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.31	0.31	0.04	0.01	0.27	0.31	0.20	0.18	0.25
Mean (ug PCBs/g sediment)	1.6	1.6	0.19	0.05	1.4	1.6	1.0	0.91	1.2
Upper (ug PCBs/g sediment)	8.0	8.0	1.0	0.23	7.1	8.0	5.3	4.7	6.3
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***									
Lower (ug PCBs/g sediment)	0.66	0.66	0.08	0.02	0.59	0.66	0.44	0.39	0.53
Mean (ug PCBs/g sediment)	3.3	3.3	0.40	0.10	3.0	3.3	2.2	1.9	2.6
Upper (ug PCBs/g sediment)	17	17	2.1	0.50	15	17	11	10	14

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = par er million (ppm)

Table 1

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF SEDIMENT PCB AND ORGANIC CARBON DATA, NORMALIZED DATA AND CRITERIA

LOCATION	4-1DUP	SD-4-2	SD-4-3	SD-4-4	SD-4-5	SD-4-6
TOTAL PCBs (ug/g)	0.43	0.34	U	U	0.12	0.37
Total Organic Carbon (%)*	8.00%	4.19%	0.2705%	8.00%	2.99%	4.39%
NORMALIZED PCBs (ug/gOC)**	5.4	8.1	U	U	4.0	8.4
LOCATION-SPECIFIC FRESHWATER CRITERIA EQUIVALENTS***						
Lower (ug PCBs/g sediment)	0.31	0.16	0.01	0.31	0.12	0.17
Mean (ug PCBs/g sediment)	1.6	0.82	0.05	1.6	0.58	0.86
Upper (ug PCBs/g sediment)	8.0	4.2	0.27	8.0	3.0	4.4
LOCATION-SPECIFIC SALTWATER CRITERIA EQUIVALENTS***						
Lower (ug PCBs/g sediment)	0.66	0.35	0.02	0.66	0.25	0.36
Mean (ug PCBs/g sediment)	3.3	1.8	0.11	3.3	1.2	1.8
Upper (ug PCBs/g sediment)	17	9.0	0.58	17	6.4	9.4

Notes

* – Total Organic Carbon (OC) values reported as >8% are considered to be 8%

** – Total PCBs (ug/g) x Fraction OC = Normalized PCB concentration (compare with established freshwater or saltwater criteria shown in Table 2)

*** – Criterion (ug PCBs/gOC) x Fraction OC = Total PCB equivalent (compare with total PCBs at each location)

Source: All data from Draft Final Remedial Investigation Report for Kin-Buc Landfill Operable Unit 2 (October 1990, revised May 1991) and Draft Supplemental Sediment Sampling Program for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site Operable Unit 2 (April 1991)

Units: ug/g = mg/kg = part[illegible] million (ppm)

Table 2

KIN-BUC OPERABLE UNIT 2 RI/FS

SUMMARY OF USEPA PCB SEDIMENT CRITERIA

FRESHWATER	
Lower	3.87 ug PCBs/g OC
Mean	19.5 ug PCBs/g OC
Upper	99.9 ug PCBs/gOC
SALTWATER	
Lower	8.29 ug PCBs/g OC
Mean	41.8 ug PCBs/g OC
Upper	214 ug PCBs/g OC

Notes

OC = Organic carbon

Source: USEPA, 1988. Interim Sediment Criteria Values for Nonpolar Hydrophobic Organic Contaminants. Office of Water Regulations and Standards, Criteria and Standards Division. Washington, D.C.

TABLE 1-7a. Compounds Detected in Biota at Kin-Buc II Site (data from Wehran 1990).

Organism/ Compound	A. EDMONDS CREEK - TIDAL			B. MARTINS CREEK			C. MILL BROOK		
	FREQUENCY	GEO. MEAN	MAXIMUM	FREQUENCY	GEO. MEAN	MAXIMUM	FREQUENCY	GEO. MEAN	MAXIMUM
Mummichog									
PCB's: (mg/kg)									
Aroclor-1248	6/6	2.070	2.900	3/3	0.400	0.430	2/2	0.640	0.880
Aroclor-1254	6/6	0.890	1.200	3/3	0.640	0.780	3/3	0.580	0.910
Total PCBs	6/6	2.970	4.100	3/3	1.040	1.200	2/2	1.380	1.390
Metals: (mg/kg)									
Cadmium	0/6			0/3			1/3	NC	0.180
Chromium	6/6	0.970	2.300	3/3	0.500	0.950	3/3	0.490	0.740
Lead	0/6			1/3	NC	0.580	1/3	NC	0.580
Fiddler crab									
PCBs: (mg/kg)									
Aroclor 1248	12/12	0.490	1.600						
Aroclor 1254	12/12	0.330	0.570						
Total PCBs	12/12	0.830	2.090						
Metals: (mg/kg)									
Cadmium	12/12	0.300	0.360						
Chromium	12/12	0.840	1.300						
Lead	12/12	1.510	1.800						
Muskrat									
PCBs: (mg/kg) (liver)									
Aroclor 1254	6/7	0.06	0.20						
Metals: (mg/kg) (kidney)									
Cadmium	5/7	0.280	1.800	3/3	0.620	2.300			
Chromium	7/7	0.280	0.450	3/3	0.240	0.440			
Lead	0/7			1/3	NC	0.500			
Norway rat									
PCBs: (mg/kg) (liver)									
Aroclor 1260	3/3	0.230	0.370						
Metals: (mg/kg) (kidney)									
Cadmium	2/3	0.100	0.110						
Chromium	3/3	0.280	0.340						
Lead	3/3	1.500	2.000						
House mouse (liver)									
PCBs: (mg/kg)	1/1	NC	0.067						
Aroclor 1260									

NC - Not calculated

Table 1-7b. Compounds detected in fiddler crabs at Kin-Buc II (from Adams et al. 1990). Samples were composites of males only.

Compound	A. EDMONDS CREEK (TIDAL)			B. MARTINS CREEK			C. REFERENCE (RARITAN RIVER @ NJ TURNPIKE)		
	FREQUENCY	GEO. MEAN	MAXIMUM	FREQUENCY	GEO. MEAN	MAXIMUM	FREQUENCY	GEO. MEAN	MAXIMUM
PCBs: (mg/kg)									
Aroclor 1248	2/2	0.64	0.990	0/2			0/1		
without carapace	1/1	NC	14.00						
Aroclor 1254	0/2			0/2					
Aroclor 1260	0/2			1/1	NC	0.17			
Metals: (mg/kg)									
cadmium							1/1	NC	0.60
chromium	2/2	5.13	32.15				1/1	NC	1.20
copper	2/2	32.20	37.70	1/1	NC	42.60	1/1	NC	47.90
zinc	2/2	29.65	32.80	1/1	NC	26.50	1/1	NC	29.10

NC - Not Calculated

Table 1-7c. Compounds detected in muskrat liver at Kin-Buc II site and a South River reference site (from Charters et al. 1991).

Compound	A. EDMONDS CREEK - TIDAL FREQUENCY	MEAN	MAXIMUM	B. SOUTH RIVER FREQUENCY	MEAN	MAXIMUM
PCBs: (mg/kg)						
Aroclor 1016	0/61			0/16		
Aroclor 1221	0/61			0/16		
Aroclor 1232	0/61			0/16		
Aroclor 1242	0/61			0/16		
Aroclor 1248	0/61			0/16		
Aroclor 1254	0/61			0/16		
Aroclor 1260	0/61			0/16		
Pesticides: (mg/kg)						
alpha BHC	2/24	NR	0.004			
beta BHC	2/24	NR	0.017			
gamma BHC	2/24	NR	0.005			
delta BHC	1/24	NC	0.007			
Heptachlor	1/24	NC	0.007			
Aldrin	1/24	NC	0.003			
Endosulfan sulfate	1/24	NC	0.004			
Methoxychlor	1/24	NC	0.020			
Endosulfan I				9/16	1.2E-03	4.4E-02
Endosulfan II				1/16	5.0E-05	2.9E-04
Dieldrin				7/16	3.3E-04	1.1E-01
Heptachlor epoxide				10/16	5.0E-05	9.0E-05
DDT				1/16	2.4E-04	1.4E-02
DDD				1/16	1.6E-04	1.9E-04
DDE				10/16	4.0E-05	1.3E-04
Metals: (mg/kg)						
Copper						
Juvenile males	16/16	18.52	*	4/4	8.18	*
Juvenile Females	18/18	24.19	*	1/1	NC	14.00
Adult Males	13/13	18.79	*	4/4	8.98	*
Adult Females	13/13	16.90	*	6/6	7.83	*
Lead						
Juvenile males	16/16	0.47	*	4/4	0.16	*
Juvenile Females	18/18	0.32	*	1/1	NC	0.18
Adult Males	13/13	0.50	*	4/4	0.20	*
Adult Females	13/13	0.48	*	6/6	0.20	*
Manganese						
Juvenile males	16/16	2.98	*	4/4	1.77	*
Juvenile Females	18/18	3.50	*	1/1	NC	2.40
Adult Males	13/13	2.64	*	4/4	1.20	*
Adult Females	13/13	2.38	*	6/6	1.77	*
Zinc						
Juvenile males	16/16	41.18	*	4/4	28.25	*
Juvenile Females	18/18	41.95	*	1/1	NC	11.00
Adult Males	13/13	40.67	*	4/4	20.23	*
Adult Females	13/13	39.05	*	6/6	19.00	*

NC - Not Calculated.
NR - Not reported because geometric mean exceeded maximum value.
* - Only means reported.

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TABLE 1-7
CHEMICALS OF CONCERN CHOSEN FOR EACH MEDIA
AT THE KIN-BUC SUPERFUND SITE
OPERABLE UNIT 2

COMPOUND	SEDIMENTS	SURFACE WATER	GROUND WATER
VOCS:			
BENZENE		X	X
CARBON DISULFIDE			
CHLOROBENZENE		X	X
1,2-DICHLOROETHENE			X
VINYL CHLORIDE			X
XYLENE			
PAHS:			
NAPHTHALENE		X	X
PHTHALATES:			
BIS(2-ETHYLHEXYL)PHTHALATE	X		
PESTICIDES/PCBs:			
4,4'-DDT		X	
PCBs	X	X	(1)
METALS:			
ANTIMONY	X	X	X
ARSENIC	X	X	X
BARIUM		X	X
BERYLLIUM		X	X
CADMIUM	X		X
MANGANESE	X	X	X
NICKEL	X	X	
VANADIUM	X	X	X

NOTE:

This table presents the contaminants of concern for the human health evaluation of the Kin-Buc RA. Note that all of the contaminants selected above will be evaluated for all of the pathways in which they were detected. For example: cadmium was selected for ground water and for sediments although it will also be evaluated for surface water. Because the air pathway involves volatilization, cadmium will not be evaluated for air.

(1) - Although PCBs were not detected in sand and gravel wells during the RI, they were detected in the refuse layer monitoring wells. Due to their potential for adverse health effects, they were retained for analysis during the RI at OP-2.

Table 9

GROUND-WATER DATA STATISTICAL SUMMARY

15-Jan-92	MAXIMUM	ARITHMETIC MEAN	95% UPPER CONFIDENCE LIMIT	FREQUENCY
VOCs (mg/L)				
Vinyl Chloride	4.60E-02	7.87E-03	1.20E-02	2/23
Chloroethane	2.70E-02	5.96E-03	7.90E-03	2/23
Acetone	2.30E-01	2.67E-02	5.15E-02	4/23
Carbon Disulfide	2.90E-02	5.26E-03	8.47E-03	5/23
1,1-Dichloroethane	1.80E-02	3.57E-03	5.19E-03	2/23
1,2-Dichloroethene (total)	1.60E-01	1.32E-02	2.89E-02	4/23
Trichloroethene	5.50E-02	6.24E-03	1.12E-02	4/23
Benzene	2.80E-01	3.80E-02	7.12E-02	15/23
4-Methyl-2-pentanone	1.40E-01	1.07E-02	2.26E-02	3/23
Tetrachloroethene	8.60E-02	6.93E-03	1.44E-02	2/23
Toluene	5.70E-01	4.06E-02	9.22E-02	16/23
Chlorobenzene	1.30E+00	8.22E-02	1.98E-01	10/23
Ethylbenzene	8.20E-02	1.43E-02	2.53E-02	7/23
Total Xylenes	2.90E-01	2.71E-02	5.47E-02	12/23
BNAs (mg/L)				
Phenol	3.10E+00	1.98E-01	1.99E-01	1/16
2-Chlorophenol	5.00E-03	4.81E-03	4.81E-03	1/16
1,3-Dichlorobenzene	9.00E-03	5.20E-03	5.20E-03	1/20
1,4-Dichlorobenzene	1.10E-02	5.30E-03	5.30E-03	1/20
1,2-Dichlorobenzene	5.00E-03	4.49E-03	4.49E-03	3/20
2-Methylphenol	1.10E+00	7.58E-02	7.59E-02	2/16
4-Methylphenol	1.30E+00	8.63E-02	8.64E-02	2/16
2,4-Dimethylphenol	3.60E-02	7.94E-03	7.94E-03	3/16
Benzoic Acid	1.50E+01	9.59E-01	9.60E-01	3/16
4-Chloro-3-Methylphenol	7.50E-02	1.31E-02	1.31E-02	3/16
N-Nitrosodiphenylamine (1)	5.00E-03	4.55E-03	4.55E-03	2/20
PAHs (mg/L)				
Naphthalene	1.30E-01	1.13E-02	1.13E-02	4/19
2-Methylnaphthalene	1.40E-02	5.45E-03	5.45E-03	1/20
Acenaphthene	1.00E-02	5.25E-03	5.25E-03	1/20
Fluorene	5.00E-03	5.00E-03	5.00E-03	1/20
Phenanthrene	9.00E-04	4.80E-03	4.80E-03	1/20
Flouranthene	3.00E-04	4.50E-03	4.50E-03	2/19
Pyrene	1.00E-03	4.09E-03	4.09E-03	4/20
Phthalates (mg/L)				
Diethylphthalate	4.00E-03	4.61E-03	4.61E-03	3/21
Di-n-butylphthalate	5.00E-03	3.53E-03	3.53E-03	11/21
Butylbenzylphthalate	5.00E-04	3.67E-03	3.67E-03	6/20
bis(2-Ethylhexyl)Phthalate	2.00E-01	1.79E-02	1.79E-02	4/20
Di-n-Octylphthalate	5.00E-03	4.38E-03	4.38E-03	3/21
Total Metals (mg/L)				
Aluminum	6.02E+01	9.80E+00	1.70E+01	18/18
Antimony	5.37E-02	2.95E-02	3.54E-02	19/22
Arsenic	4.05E-02	1.26E-02	1.70E-02	21/22
Barium	1.62E+00	5.55E-01	7.14E-01	23/23
Beryllium	4.40E-03	1.11E-03	1.59E-03	8/23
Cadmium	2.60E-03	1.19E-03	1.40E-03	3/23
Calcium	2.80E+02	1.28E+02	1.57E+02	22/22
Chromium	8.85E-02	1.58E-02	2.66E-02	8/23
Cobalt	5.07E-02	1.15E-02	1.67E-02	11/23
Copper	2.60E-01	4.94E-02	8.29E-02	14/19
Iron	2.33E+02	5.07E+01	7.27E+01	23/23
Lead	5.27E-02	1.06E-02	1.64E-02	17/23
Magnesium	4.84E+02	2.30E+02	2.86E+02	23/23
Manganese	1.04E+01	2.98E+00	4.12E+00	23/23
Nickel	1.09E-01	3.14E-02	4.59E-02	15/23
Potassium	1.23E+02	6.81E+01	8.12E+01	23/23
Selenium	2.50E-03	7.83E-04	1.04E-03	2/23
Sodium	4.00E+03	1.89E+03	2.29E+03	23/23
Vanadium	1.76E-01	3.89E-02	6.05E-02	18/23
Zinc	4.38E-01	7.80E-02	1.29E-01	14/20

Table 10

SURFACE WATER DATA STATISTICAL SUMMARY

21-Jan-92 Compound	MAXIMUM	ARITHMETIC MEAN	95% UPPER CONFIDENCE LIMIT	FREQUENCY
VOCs (mg/L)				
Methylene Chloride	2.00E-03	2.46E-03	2.54E-03	1/13
1,2-Dichlroethene (total)	2.00E-03	2.46E-03	2.54E-03	1/13
2-Butanone	1.20E-02	5.58E-03	6.80E-03	1/12
Benzene	5.70E-02	6.51E-03	1.53E-02	3/13
Tetrachloroethene	2.00E-03	2.46E-03	2.54E-03	1/13
Toluene	1.00E-03	2.13E-03	2.54E-03	3/13
Chlorobenzene	3.10E-01	2.62E-02	7.57E-02	1/13
Ethylbenzene	5.30E-02	6.27E-03	1.44E-02	2/13
Styrene	6.00E-04	2.35E-03	2.66E-03	1/13
Xylene (total)	6.00E-01	4.84E-02	1.45E-01	3/13
BNAs (mg/L)				
Phenol	8.00E-03	5.30E-03	5.92E-03	1/10
N-Nitrosodiphenylamine	4.00E-03	4.90E-03	5.11E-03	1/10
PAHs (mg/L)				
Naphthalene	1.30E-02	5.80E-03	7.45E-03	1/10
2-Methylnaphthalene	1.00E-03	4.60E-03	5.43E-03	1/10
Phthalates (mg/L)				
Di-n-butylphthalate	1.00E-03	4.60E-03	5.43E-03	1/10
Pesticides/PCBs (mg/L)				
Aldrin	4.90E-05	2.68E-05	3.07E-05	1/13
4,4'-DDT	1.60E-04	5.85E-05	7.62E-05	1/13
Aroclor 1254	3.30E-04	4.87E-04	5.14E-04	1/13
Metals (mg/L)				
Aluminum	2.47E+01	3.03E+00	6.88E+00	13/13
Antimony	4.82E-02	1.99E-02	2.98E-02	6/13
Arsenic	7.00E-03	2.18E-03	3.17E-03	7/13
Barium	3.46E-01	9.71E-02	1.59E-01	13/13
Beryllium	1.90E-03	8.00E-04	1.09E-03	4/13
Calcium	1.54E+02	7.05E+01	9.60E+01	13/13
Chromium	1.20E-01	1.19E-02	3.08E-02	5/13
Cobalt	2.20E-01	4.97E-02	9.06E-02	6/13
Copper	1.33E-01	5.25E-02	8.48E-02	11/11
Iron	5.41E+01	8.08E+00	1.74E+01	13/13
Lead	4.72E-02	6.61E-03	1.40E-02	10/13
Magnesium	4.55E+02	1.47E+02	2.40E+02	13/13
Manganese	7.90E-01	2.94E-01	4.48E-01	13/13
Mercury	1.10E-04	6.23E-05	7.60E-05	1/13
Nickel	4.07E-01	9.10E-02	1.66E-01	12/13
Potassium	1.43E+02	5.77E+01	8.45E+01	13/13
Sodium	4.19E+03	1.26E+03	2.12E+03	13/13
Vanadium	1.52E-01	1.49E-02	3.88E-02	5/13
Zinc	3.97E-01	8.80E-02	1.61E-01	6/13
Cyanide	2.22E-02	6.82E-03	9.70E-03	2/13

Table 11

SEDIMENT DATA STATISTICAL SUMMARY

Compound	MAXIMUM	ARITHMETIC MEAN	95% UPPER CONFIDENCE LIMIT	FREQUENCY
VOCs (mg/kg)				
Acetone	9.20E-01	4.70E-02	8.55E-02	3/53
Carbon Disulfide	1.50E-02	3.09E-03	3.76E-03	5/53
2-Butanone	1.30E+00	6.86E-02	1.36E-01	15/52
Benzene	1.20E-01	7.62E-03	1.30E-02	7/53
Toluene	4.00E-02	3.73E-03	5.30E-03	4/53
Chlorobenzene	3.10E-01	1.76E-02	3.20E-02	7/53
Ethylbenzene	1.60E+01	3.07E-01	9.08E-01	8/53
Xylene (total)	1.60E+01	3.33E-01	9.34E-01	13/53
BNAs (mg/kg)				
1,4-Dichlorobenzene	1.90E-01	1.38E-02	2.35E-02	6/52
Benzoic acid	8.80E+00	6.40E-01	1.14E+00	29/49
Dibenzofuran	1.60E-01	1.23E-02	1.98E-02	6/52
N-Nitrosodiphenylamine	1.20E+01	2.52E-01	7.11E-01	7/52
2-Chlorophenol	1.40E-02	1.53E-01	1.65E-01	4/52
PAHs (mg/kg)				
Naphthalene	1.50E+00	3.22E-01	3.87E-01	13/96
2-Methylnaphthalene	3.90E+00	3.67E-01	4.66E-01	24/96
Acenaphthylene	1.35E+00	1.87E-01	2.35E-01	14/97
Acenaphthene	2.60E+00	3.77E-01	4.54E-01	25/96
Fluorene	1.50E+00	3.14E-01	3.75E-01	10/96
Phenanthrene	1.40E+01	5.76E-01	8.85E-01	13/97
Anthracene	1.20E+00	1.75E-01	2.20E-01	32/97
Fluoranthene	2.90E+01	9.72E-01	1.63E+00	26/97
Pyrene	2.50E+01	9.29E-01	1.47E+00	47/96
Benzo(a)anthracene	1.20E+00	2.71E-01	3.19E-01	46/97
Chrysene	1.30E+00	3.04E-01	3.55E-01	14/97
Benzo(b)fluoranthene	1.60E+00	3.77E-01	4.41E-01	16/96
Benzo(k)fluoranthene	9.00E-01	1.92E-01	2.31E-01	28/97
Benzo(a)pyrene	1.50E+00	2.77E-01	3.25E-01	18/97
Indeno(1,2,3-cd)pyrene	1.50E+00	2.26E-01	2.73E-01	22/97
Benzo(g,h,i)perylene	1.50E+00	2.53E-01	3.07E-01	16/96
TOTAL PAHS:	5.40E+01	3.38E+00	4.80E+00	93/97
Phthalates (mg/kg)				
Diethylphthalate	1.50E-01	1.30E-01	1.46E-01	15/52
Butylbenzylphthalate	4.20E+01	1.22E+00	2.89E+00	10/52
bis(2-Ethylhexyl)phthalate	3.50E+03	5.55E+01	1.31E+02	36/94
Di-n-octylphthalate	8.70E+00	3.46E-01	6.94E-01	24/50
Pesticides/PCBs (mg/kg)				
Aroclor-1242	6.00E+02	1.16E+01	2.49E+01	13/129
Aroclor-1248	2.90E+02	5.37E+00	1.02E+01	56/129
Aroclor-1254	1.30E+02	1.78E+00	3.65E+00	81/146
Aroclor-1260	3.60E+00	1.93E-01	2.58E-01	10/130
TOTAL PCB:	7.30E+02	1.66E+01	3.02E+01	111/147
Metals (mg/kg)				
Aluminum	2.98E+04	1.59E+04	1.79E+04	51/51
Antimony	2.53E+01	6.26E+00	7.16E+00	8/93
Arsenic	2.57E+02	5.30E+01	6.37E+01	37/78
Barium	2.76E+02	7.33E+01	8.56E+01	50/51
Beryllium	2.20E+00	1.19E+00	1.33E+00	47/51
Cadmium	2.94E+01	1.49E+00	2.10E+00	6/93
Calcium	1.71E+04	2.41E+03	3.12E+03	48/48
Chromium	1.17E+02	5.98E+01	6.55E+01	51/93
Cobalt	5.78E+01	1.76E+01	2.06E+01	49/51
Copper	4.41E+02	1.26E+02	1.45E+02	51/93
Iron	5.95E+04	2.82E+04	3.17E+04	51/51
Lead	3.72E+02	1.08E+02	1.28E+02	51/80
Magnesium	8.93E+03	5.42E+03	6.06E+03	49/49
Manganese	7.04E+02	1.83E+02	2.17E+02	51/51
Mercury	3.40E+00	7.95E-01	9.54E-01	30/93
Nickel	1.76E+02	4.36E+01	4.95E+01	51/93
Potassium	7.99E+03	3.04E+03	3.43E+03	51/51
Selenium	1.38E+01	1.45E+00	2.05E+00	21/51
Silver	7.50E+00	1.41E+00	1.72E+00	23/76
Sodium	1.69E+04	3.37E+03	4.41E+03	48/48
Vanadium	9.76E+01	4.78E+01	5.29E+01	50/51
Zinc	6.62E+02	2.18E+02	2.46E+02	35/77

TABLE 4-1
CRITICAL TOXICITY VALUES FOR ORAL AND INHALATION ROUTES

CHEMICAL	Oral RfD * (mg/kg-day)	Oral SF ** 1/(mg/kg-day)	Inhalation RfC * (mg/kg-day)	Inhalation SF ** 1/(mg/kg-day)
Benzene (C)	NA	2.90E-02 (1)	NA	2.90E-02
Carbon Disulfide (NC)	1.00E-01 (1)	NA	3.00E-03	NA
Chlorobenzene (NC)	2.00E-02 (1)	NA	6.00E-03 (1)	NA
1,2-Dichloroethene (NC)	9.00E-03 (1)	NA	NA	NA
Vinyl Chloride (C)	NA	2.30E+00 (1)	NA	2.94E-01
Xylene (NC)	2.00E+00 (1)	NA	9.00E-02	NA
Naphthalene (NC)	4.00E-03	NA	NA	NA
bis(2-Ethylhexyl)phthalate (NC)	2.00E-02 (1)	NA	NA	NA
bis(2-Ethylhexyl)phthalate (C)	NA	1.40E-02 (1)	NA	NA
PCBs (C)	NA	7.70E+00 (1)	NA	NA
4,4'-DDT (NC)	5.00E-04 (1)	NA	NA	NA
4,4'-DDT (C)	NA	3.40E-01 (1)	NA	3.40E-01
Antimony (NC)	4.00E-04 (1)	NA	NA	NA
Arsenic (NC)	1.00E-03	NA	NA	NA
Arsenic (C)	NA	NA	NA	5.00E+01
Barium (NC)	7.00E-02 (1)	NA	NA	NA
Beryllium (NC)	5.00E-03 (1)	NA	NA	NA
Beryllium (C)	NA	4.30E+00 (1)	NA	8.40E+00
Cadmium (NC)	5.00E-04 (1)	NA	NA	NA
Manganese (NC)	1.00E-01 (1)	NA	NA	NA
Nickel (NC)	2.00E-02 (1)	NA	NA	NA
Vanadium (NC)	7.00E-03	NA	NA	NA

(C) - Carcinogen
(NC) - Noncarcinogen

NA - Not Analyzed, Not Applicable, or Not Available
* Reference Dose/Reference Concentration
** Carcinogenic Slope Factor
(1) Values obtained from IRIS (1990). All other values obtained from HEAST FY90.

Table 13

20-Feb-92

SUMMARY OF RISKS BY EXPOSURE PATHWAY

Route of Exposure	Noncarcinogenic Hazard Index	Carcinogenic Risk
RESIDENTIAL		
ADULT		
Ground water		
Inhalation	3.77E-02	6.54E-06
Ingestion	5.37E+00	6.39E-04
Absorption	8.42E-03	1.98E-05
TOTAL	5.42E+00	6.65E-04
CHILD		
Ground water		
Inhalation	1.06E-01	5.49E-06
Ingestion	6.01E+00	2.15E-04
Absorption	1.14E-02	8.46E-06
TOTAL	6.13E+00	2.29E-04
RECREATIONAL		
ADULT		
Sediments		
Ingestion	2.91E-03	2.82E-06
Absorption	5.68E-03	3.45E-05
TOTAL	8.59E-03	3.73E-05
Surface Water		
Ingestion	1.43E-03	5.36E-08
Absorption	4.37E-04	4.03E-07
TOTAL	1.87E-03	4.57E-07
TOTAL RECREATIONAL:	1.06E-02	3.78E-05
CHILD		
Sediments		
Ingestion	4.89E-02	1.42E-05
Absorption	2.75E-02	5.01E-05
TOTAL	7.64E-02	6.43E-05
Surface Water		
Ingestion	2.41E-02	2.70E-07
Absorption	3.74E-03	1.04E-06
TOTAL	2.78E-02	1.31E-06
TOTAL RECREATIONAL:	1.04E-01	6.56E-06
FISH INGESTION		
ADULT	7.19E+00	1.31E-01
CHILD	2.01E+01	1.11E-01

Table 14

KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
POTENTIAL LOCATION/ACTION SPECIFIC ARARs FOR REMEDIAL ACTIVITIES

Potential Regulatory Compliance Requirement	Regulatory Citations
• Facility Closure Requirements (Solid and hazardous waste)	• New Jersey Solid Waste Management Act N.J.S.A. 13:1E-1 et seq. • New Jersey Solid and Hazardous Waste Management Regulations N.J.A.C. 7:26-1 et seq.
• Disruption of Solid Waste	• New Jersey Solid Waste Management Act N.J.S.A. 13:IE-1 et seq. • New Jersey Solid and Hazardous Waste Regulations N.J.A.C. 7:26-2A.8J • Federal Resource Conservation and Recovery Act (RCRA), Land Disposal Restrictions 40 CFR 268.1 - 268.50 • Federal Toxic Substances Control Act 40 CFR Part 761 et seq
• Stream Encroachment	• New Jersey Flood Hazard Area Control Act N.J.S.A. 58:16 A-50 et seq. • New Jersey Flood Hazard Area Control Regulations N.J.A.C. 7:13-1 et seq.
• Waterfront Development	• New Jersey Waterfront Development Law N.J.S.A. 12:5-3 • New Jersey Division of Coastal Resources Coastal Permit Program Rules N.J.A.C. 7:7-1 et seq. • Coastal Area Facility Review Act (CAFRA) N.J.S.A. 13:19-1 et seq.
• Wetlands	• Water Pollution Control Act (Clean Water Act) 33 U.S.C. 1251 et seq. (section 404) • Army Corps of Engineers Permit Program Regulations 33 CFR 320-330 • EPA Regulation for Disposal of Dredge and Fill Materials 40 CFR 230 • Migratory Bird Treaty Act 50 CFR 10 • New Jersey Wetlands Act (of 1970) N.J.S.A. 13:9 A-1 et seq. • Coastal Area Facility Review Act (CAFRA) N.J.S.A. 13:19-1 et seq. • New Jersey Division of Coastal Resources Coastal Permit Program Rules N.J.A.C. 7:7-1 et seq.
• Air Quality	• New Jersey Air Pollution Control Act N.J.A.C. 26:2 C-9.2 et seq. • New Jersey Bureau of Air Pollution Control Regulations N.J.A.C. 7:27-1 et seq.
• Soil Erosion and Sediment Control	• New Jersey Soil Erosion and Sediment Control Act N.J.S.A. 4:24-1 et seq.

Table 14 cont'd

KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
POTENTIAL LOCATION/ACTION SPECIFIC ARARs FOR REMEDIAL ACTIVITIES

Potential Regulatory Compliance Requirement	Regulatory Citations
• Cultural Resource Identification/Coordination	• National Historic Perservation Act 16 U.S. C., Section 470 et seq. • Protection of Historic and Cultural Properties 36 CFR Part 800
• Rare and Endangered Species Coordination	• Endangered Species Act (of 1973) 16 U.S.C., Section 1531 et seq. (50 CFR Part 402) • New Jersey Division of Fish, Game and Wildlife Regulations N.J.A.C. 7:25-1 et seq.
• Wildlife Coordination	• Fish and Wildlife Coordination Act (of 1934) 16 U.S.C. Section 661 et seq. (40 CFR Part 122.49) • New Jersey Division of Fish, Game and Wildlife Regulations N.J.A.C. 7:25-1 et seq.
• Hazardous Waste Accumulation and Management	• Federal Toxic Substances Control Act 40 CFR Part 761 et seq • Federal Resource Conservation and Recovery Act (RCRA), Land Disposal Restrictions 40 CFR 268 1 – 268.50 • New Jersey Solid Waste Managment Act N.J.S.A. 13:1E et seq • New Jersey Solid and Hazardous Waste Management Regulations N.J.A.C. 7.26-9 et seq. • DOT Rules for the Transportation of Hazardous Materials, 49 CFR Parts 107, 171, 172 and 178

The following ARARs have also been identified for remedial activity at the Kin-Buc site:

1 The Coastal Zone Management Act
16 USC 1451 Section 307 (c) (1).

2 The National Ambient Air Quality Standard
for PM 10 of 150 µg/m3 (24 hour average)

Table 15

KIN-BUC OPERABLE UNIT 2 FEASIBILITY STUDY
EDMONDS CREEK AND MARSH
SUMMARY OF COST ESTIMATES

Alternative	Capital Cost ($000)	Annual O&M Cost ($000)	Present Value Cost* ($000)
1. No Further Action	--	17	261
3A. Sediment Removal and Consolidation in On-Site	3,537	23 yr 1 – 5	3,637
3B. Sediment Removal and Off-Site Disposal	5,168	23 yr 1 – 5	5,268
3C. Sediment Removal and On-Site Treatment	6,225	23 yr 1 – 5	6,325
4. Sediment Capping with Stream Relocation	4,956	70 yr 1 60 yr 2 52 yr 3 – 5 5 yr 6 – 10 2 yr 11 – 30	5,230
5. Sediment Consolidation and Containment in Vicinity of Pool C	4,706	66 yr 1 59 yr 2 52 yr 3 – 5 6 yr 6 – 10 5 yr 11 – 30	5,009

* Using present worth factors for 5% before taxes and after inflation for 30 years

APPENDIX III

ADMINISTRATIVE RECORD INDEX

Document Number: KBC-001-0001 To 0002 Date: 01/08/91

Title: (Letter forwarding the attached final Remedial Investigation/Feasibility Study Work Plan Addendum for Sediment Sampling in the Edmonds Creek/Marsh Area of the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Burger, Kevin M.: Wehran Engineering
Recipient: O'Connell, Kimberly: US EPA
Attached: KBC-001-0003

Document Number: KBC-001-0003 To 0018 Parent: KBC-001-0001 Date: 01/01/91

Title: Final Remedial Investigation Work Plan Addendum for Supplemental Sediment Sampling in the Edmonds Creek/Marsh Area at the Kin-Buc Landfill Site, Operable Unit 2

Type: PLAN
Author: none: Wehran Engineering
Recipient: none: Kin Buc, Inc.
none: SCA Services, Inc.

:ument Number: KBC-001-0019 To 0173 Date: 04/01/89

Title: Briefing Report to the EPA Science Advisory Board on the Equilibrium Partitioning Approach to Generating Sediment Quality Criteria

Type: REPORT
Author: none: US EPA
Recipient: none: US EPA

Document Number: KBC-001-0174 To 0174 Date: 09/16/91

Title: (Handwritten note forwarding the attached copy of the Department of the Interior's Section 7 - Endangered Species letter for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Burr, Robin: US Fish & Wildlife Service
Recipient: Barry, Alison: US EPA
Attached: KBC-001-0175

Document Number: KBC-001-0175 To 0176 Parent: KBC-001-0174 Date: 06/09/89

Title: (Letter stating that no federally listed or proposed threatened or endangered flora or fauna are known to exist within the study area of the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Day, Clifford G.: US Fish & Wildlife Service
Recipient: Hargrove, Robert W.: US EPA

Document Number: KBC-001-0177 To 0180 Date: 01/29/91

Title: (Letter detailing visits to the Kin-Buc Landfill site on January 16 and 17, 1991, to oversee activities and respond to questions about surface soil and sediment samples)

Type: CORRESPONDENCE
Author: Day, Clifford G.: US Fish & Wildlife Service
Recipient: O'Connell, Kimberly: US EPA

Document Number: KBC-001-0181 To 0182 Date: 01/04/91

Title: (Letter forwarding a technical memorandum prepared on behalf of the respondents to Administrative Order Index No. CERCLA-II-0014 for review and requesting that a meeting be scheduled to discuss the memo)

Type: CORRESPONDENCE
Author: Burger, Kevin M.: Wehran Engineering
Recipient: Basso, Raymond: US EPA
Attached: KBC-001-0183

Document Number: KBC-001-0183 To 0188 Parent: KBC-001-0181 Date: 01/04/91

Title: (Memo forwarding the Biota Sampling Program and providing an impartial opinion concerning additional sampling proposed by EPA)

Type: CORRESPONDENCE
Author: Cura, Jereme J.: Menzie-Cura Associates, Inc.
Recipient: Burger, Kevin M.: Wehran Engineering

Document Number: KBC-001-0189 To 0192 Date: 12/20/90

Title: (Letter requesting that EPA re-evaluate the technical merits of the required Scope of Work for additional soil and sediment sampling at the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Burger, Kevin M.: Wehran Engineering
Recipient: Basso, Raymond: US EPA

Document Number: KBC-001-0193 To 0199 Date: 09/17/91

Title: (Letter stating that the revised draft Remedial Investigation Report for the Kin-Buc Landfill site does not specifically address EPA's comments and must be resubmitted)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Burger, Kevin M.: Wehran Engineering

Document Number: KBC-001-0200 To 0202 Date: 05/06/91

Title: (Letter containing EPA's comments on the draft Remedial Investigation Report for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Basso, Raymond: US EPA
Recipient: Burger, Kevin M.: Wehran Engineering

Document Number: KBC-001-0203 To 0204 Date: 04/08/91

Title: (Letter forwarding attached comments on the draft Remedial Investigation Report for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Burger, Kevin M.: Wehran Engineering
Attached: KBC-001-0205

Document Number: KBC-001-0205 To 0238 Parent: KBC-001-0203 Date: 05/06/91

Title: (Comments on the draft Remedial Investigation Report for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: none: US EPA
Recipient: none: none

Document Number: KBC-001-0239 To 0243 Date: 01/24/91

Title: (Letter responding to points raised in a December 20, 1990, letter requesting that EPA re-evaluate the technical merits of the marsh sampling program)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Burger, Kevin M.: Wehran Engineering

Document Number: KBC-001-0244 To 0246 Date: 12/27/90

Title: (Letter conditionally approving the Remedial Investigation Work Plan Addendum for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Burger, Kevin M.: Wehran Engineering

Document Number: KBC-001-0247 To 0274 Date: 01/20/92

Title: (Letter submitting the attached tables and figures containing normalized sediment PCB data for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Burger, Kevin M.: Wehran Engineering
Recipient: Barry, Alison: US EPA

Document Number: KBC-001-0275 To 0275 Date: 03/12/92

Title: (Letter forwarding information requested for the development of effluent limits related to the discharge of leachate/groundwater from the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Burger, Kevin M.: Wehran Engineering
Recipient: Barry, Alison: US EPA
Attached: KBC-001-0276

Document Number: KBC-001-0276 To 0441 Parent: KBC-001-0275 Date: 03/01/92

Title: Background Information for Development of Effluent Limits for Kin-Buc Landfill, Operable Unit 1, Remedial Design/Remedial Action

Type: PLAN
Author: none: Wehran Engineering
Recipient: none: Kin Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-001-0442 To 0550 Date: 02/01/90

Title: Draft Preliminary Assessment of Sediment Chemistry Data and Recommendations for Chemical Analysis in Biological Tissue at Kin-Buc, Operable Unit 2

Type: PLAN
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-001-0551 To 0551 Date: 04/22/91

Title: (Letter submitting the "Draft Supplemental Sediment Sampling Report for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site, Operable Unit 2" for review)

Type: CORRESPONDENCE
Author: Burger, Kevin M.: Wehran Engineering
Recipient: Barry, Alison: US EPA
Attached: KBC-001-0552

Document Number: KBC-001-0552 To 0866 Parent: KBC-001-0551 Date: 04/01/91

Title: Draft Supplemental Sediment Sampling Report for the Edmonds Creek/Marsh Area, Kin-Buc Landfill Site, Operable Unit 2

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-001-0867 To 0867 Date: 04/03/90

Title: (Letter forwarding the Final Work Plan for the Kin-Buc Landfill site, Operable Unit 2, Remedial Investigation/Feasibility Study and Appendices)

Type: CORRESPONDENCE
Author: Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA
Attached: KBC-001-0868 KBC-001-1002 KBC-001-1133

Document Number: KBC-001-0868 To 1001 Parent: KBC-001-0867 Date: 10/01/89

Title: Final Work Plan for Kin-Buc Landfill, Operable Unit 2, Remedial Investigation/Feasibility Study

Type: PLAN
Author: none: Wehran Engineering
Recipient: none: Kin Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-001-1002 To 1132 Parent: KBC-001-0867 Date: 10/01/89

Title: Appendices for the Final Work Plan for Operable Unit 2, Remedial Investigation/Feasibility Study, Kin-Buc Landfill, Volume I

Type: PLAN
Author: none: Wehran Engineering
Recipient: none: Kin Buc, Inc.

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Document Number: KBC-001-1133 To 1499 Parent: KBC-001-0867 Date: 10/01/89

Title: Appendices for the Final Work Plan for Operable Unit 2 Remedial Investigation/Feasibility Study, Kin-Buc Landfill, Volume 2

Type: PLAN
Author: none: Wehran Engineering
Recipient: none: Kin Buc, Inc.

Document Number: KBC-001-1500 To 1503 Date: 05/11/90

Title: (Letter containing a summary of rationales used in selecting biota samples collected at the Kin-Buc Landfill site for analysis)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA

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ocument Number: KBC-001-1504 To 1514 Date: 06/18/90

Title: (Letter forwarding the revised Tables 1 and 2 listing the specific biological organisms or tissues to be analyzed for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA

Document Number: KBC-001-1515 To 1520 Date: 06/29/90

Title: (Letter forwarding the information requested concerning biological sampling extraction dates and discussing sampling procedures)

Type: CORRESPONDENCE
Author: Miller, Robert T.: Wehran Engineering
Recipient: O'Connell, Kimberly: US EPA

Document Number: KBC-001-1521 To 1524 Date: 05/03/90

Title: (Letter confirming issues raised during an April 25, 1990, conference call about the Kin-Buc Landfill site Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1525 To 1527 Date: 06/15/90

Title: (Letter requesting that a report detailing all sampling and analysis procedures employed and the rationale for biota sampling at the Kin-Buc Landfill site be submitted)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1528 To 1531 Date: 08/27/90

Title: (Letter discussing data validation of Kin-Buc sampling data and denying an extension of time for the submittal of the Operable Unit 2 Remedial Investigation Report)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1532 To 1536 Date: 05/07/90

Title: (Letter expressing concern about Wehran's performance of the Remedial Investigation/Feasibility Study and objecting to deviation from EPA's sampling and analysis procedures)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1537 To 1543 Date: 10/15/90

Title: (Letter detailing the numerous delays in the implementation of the Remedial Investigation/Feasibility Study and Remedial Design/Remedial Action at the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1544 To 1548 Date: 10/29/90

Title: (Letter directing that additional sampling for the Remedial Investigation/Feasibility Study be conducted at the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Burger, Kevin M.: Wehran Engineering

Document Number: KBC-001-1549 To 1553 Date: 11/09/90

'tle: (Letter containing determinations regarding the biota sampling program conducted as part of the Remedial Investigation/Feasibility Study for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Burger, Kevin M.: Wehran Engineering

Document Number: KBC-001-1554 To 1580 Date: 05/11/90

Title: (Letter summarizing the rationales used in selecting biota samples collected at the Kin-Buc Landfill site for analysis and forwarding tables of sampling results)

Type: CORRESPONDENCE
Author: Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA

Document Number: KBC-001-1581 To 1584 Date: 04/18/90

Title: (Letter responding to EPA's comments on the Draft Preliminary Assessment of Sediment Chemistry Data and Recommendations for Chemical Analysis in Biological Tissue at the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Kapp, Raymond M.: Kin Buc, Inc.
Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA

Document Number: KBC-001-1585 To 1594 Date: 08/30/89

Title: (Letter forwarding the attached proposed modification to the Remedial Investigation/Feasibility Study Work Plan for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA

Document Number: KBC-001-1595 To 1596 Date: 07/24/89

Title: (Letter submitting a revised list of PCB/pesticide sampling locations which will supply more representative information than previous locations)

Type: CORRESPONDENCE
Author: Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA

Document Number: KBC-001-1597 To 1597 Date: 07/13/89

Title: (Letter containing the well locations and sampling intervals for PCB and pesticide groundwater sampling at the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Miller, Robert T.: Wehran Engineering
Recipient: Schmidtberger, James: US EPA

Document Number: KBC-001-1598 To 1638 Date: 04/14/89

Title: (Letter submitting for review and approval, a partial Sampling and Analysis Plan for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: Fenn, Dennis G.: Wehran Engineering
Kapp, Raymond M.: Wehran Engineering
Miller, Robert T.: Wehran Engineering
Recipient: Katz, Perry: US EPA

Document Number: KBC-001-1639 To 1639 Date: 02/02/89

Title: (Letter requesting EPA's approval for Transtech to provide the Risk Assessment for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Sundstrom, Ralph E.: Kin Buc, Inc.
Recipient: Katz, Perry: US EPA

Document Number: KBC-001-1640 To 1644 Date: 10/06/88

Title: (Letter forwarding, for review, preliminary outlines of the proposed scope of work for the Remedial Investigation for Operable Unit 2, and the Supplemental RI in support of the Remedial Design for Operable Unit 1 at the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Batholomew, Dawn R.: Wehran Engineering
Fenn, Dennis G.: Wehran Engineering
Miller, Robert T.: Wehran Engineering
Recipient: Katz, Perry: US EPA

Document Number: KBC-001-1645 To 1646 Date: 04/06/90

Title: (Letter discussing water sampling procedures and the need for resampling at the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

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Document Number: KBC-001-1647 To 1649 Date: 03/28/90

Title: (Letter containing EPA's comments on the "Draft Preliminary Assessment of Sediment Chemistry Data and Recommendations for Chemical Analysis in Biological Tissue at Kin-Buc Operable Unit 2")

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1650 To 1653 Date: 03/09/90

Title: (Letter confirming the discussions held on March 1, 1990, for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Schmidtberger, James: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1654 To 1655 Date: 02/23/90

Title: (Letter discussing procedural issues regarding the biota sampling conducted for the Remedial Investigation/Feasibility Study for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1656 To 1658 Date: 10/24/89

Title: (Letter conditionally approving the Sampling and Analysis Plan, with the exception of the biological analyses, and stating that field work may proceed)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1659 To 1661 Date: 09/29/89

Title: (Letter confirming discussions held at the September 26, 1989, Kin-Buc Landfill site meeting)

Type: CORRESPONDENCE
Author: Schmidtberger, James: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1662 To 1664 Date: 09/22/89

Title: (Letter conditionally approving the July 1989 Draft Work Plan for the Kin-Buc Landfill site, Operable Unit 2, Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1665 To 1667 Date: 09/22/89

Title: (Letter, with handwritten comments, conditionally approving the July 1989 Draft Work Plan for the Kin-Buc Landfill site, Operable Unit 2, Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1668 To 1680 Date: 08/18/89

Title: (Letter forwarding EPA's comments on the Draft Sampling and Analysis Plan for Operable Unit I Remedial Design/Remedial Action and Operable Unit 2 Remedial Investigation/Feasibility Study for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1681 To 1697 Date: 04/01/87

Title: Section E - Quality Assurance/Quality Control Requirements

Type: PLAN
Condition: ILLEGIBLE
Author: none: US EPA
Recipient: none: none

Document Number: KBC-001-1698 To 1703 Date: 06/15/89

Title: (Letter forwarding EPA's and the US Fish and Wildlife Service's comments on the April 1989 Draft Work Plan for the Remedial Investigation/Feasibility Study for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: Basso, Raymond: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1704 To 1704 Date: 06/02/89

Title: Kin-Buc Meeting (June 2, 1989, Attendance list)

Type: OTHER
Author: various: various
Recipient: none: none

Document Number: KBC-001-1705 To 1713 Date: 05/22/89

Title: (Letter forwarding EPA's comments on sections of the Sampling and Analysis Plan concerning the biological and sediment sampling activities for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Katz, Perry: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

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Document Number: KBC-001-1714 To 1717 Date: 04/07/89

Title: (Letter confirming agreements and discussions of the April 4, 1989, meeting for the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Katz, Perry: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1718 To 1728 Date: 03/29/89

Title: (Letter forwarding EPA's comments on the Draft Work Plan prepared by Wehran for the Remedial Investigation/Feasibility Study for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: Katz, Perry: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1729 To 1738 Date: 03/29/89

Title: (Letter forwarding EPA's comments on the Draft Work Plan submitted by Wehran for the Remedial Investigation/Feasibility Study for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Katz, Perry: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1739 To 1741 Date: 02/22/89

Title: (Letter stating that EPA will prepare an Endangerment Assessment for the Remedial Investigation/Feasibility Study for the Kin-Buc Landfill site, Operable Unit 2)

Type: CORRESPONDENCE
Author: Katz, Perry: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

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Document Number: KBC-001-1742 To 1753 Date: 01/06/89

Title: (Letter containing EPA's comments on Outline I for Operable Unit 1, Remedial Design/Remedial Action, and Outline II for Operable Unit 2, Remedial Investigation/Feasibility Study, as presented in Wehran Engineering's October 6, 1988, letter)

Type: CORRESPONDENCE
Author: Katz, Perry: US EPA
Recipient: Sundstrom, Ralph E.: Kin Buc, Inc.

Document Number: KBC-001-1754 To 1754 Date: 01/29/92

Title: (Memo forwarding the final report on biological sampling conducted at the Kin-Buc Landfill site)

Type: CORRESPONDENCE
Author: Adams, Darvene: US EPA
Recipient: Barry, Alison: US EPA
Attached: KBC-001-1755

Document Number: KBC-001-1755 To 1807 Parent: KBC-001-1754 Date: 01/01/92

Title: U.S. Environmental Protection Agency, Kin-Buc Landfill Biological Sampling

Type: PLAN
Author: Adams, Darvene: US EPA
Recipient: none: US EPA

Document Number: KBC-001-1808 To 1861 Date: 08/01/91

Title: Final Report for Kin Buc Landfill, Edison, New Jersey

Type: REPORT
Author: Charters, David W.: US EPA
Recipient: none: US EPA

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Document Number: KBC-001-1862 To 2330 Date: 10/01/91

Title: Draft Final Remedial Investigation for Kin-Buc Landfill, Operable Unit 2

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin-Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-002-0001 To 0495 Date: 10/01/90

Title: Draft Remedial Investigation Report for Kin-Buc Landfill, Operable Unit 2, Volume 2, Appendices A-H

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin-Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-002-0496 To 0847 Date: 10/01/90

Title: Draft Remedial Investigation Report for Kin-Buc Landfill, Operable Unit 2, Volume 3, Appendices I-J

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin-Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-002-0848 To 1244 Date: 10/01/90

Title: Draft Remedial Investigation Report for Kin-Buc Landfill, Operable Unit 2, Volume 4, Appendices J (continued) -L

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin-Buc, Inc.
none: SCA Services, Inc.

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Document Number: KBC-002-1245 To 1399 Date: 02/27/92

Title: Final Risk Assessment, Part I - Human Health Assessment, Part II - Environmental Assessment, Kin Buc Landfill Operable Unit II, Edison, New Jersey

Type: PLAN
Author: Litwin, Jeanne: CDM Federal Programs Corporation
Recipient: Barry, Alison: US EPA

Document Number: KBC-002-1400 To 1501 Date: 02/27/92

Title: Final Risk Assessment, Part II - Environmental Assessment, Kin Buc Landfill Operable Unit II, Edison, New Jersey

Type: PLAN
Author: Litwin, Jeanne: CDM Federal Programs Corporation
Recipient: Barry, Alison: US EPA

Document Number: KBC-002-1502 To 1622 Date: 05/01/91

Title: Appendix A, Appendix B, Appendix D, and Appendix J

Type: DATA
Condition: INCOMPLETE; MISSING ATTACHMENT
Author: none: none
Recipient: none: none

Document Number: KBC-002-1623 To 1753 Date: 07/01/92

Title: Kin-Buc Landfill, Operable Unit 2, Draft Final Feasibility Study Report, Volume I - Report

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin-Buc, Inc.
none: SCA Services, Inc.

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Document Number: KBC-002-1754 To 2085 Date: 07/01/92

Title: Kin-Buc Landfill, Operable Unit 2, Draft Final Feasibility Study Report, Volume II - Appendices A through D

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin-Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-002-2086 To 2441 Date: 07/01/92

Title: Kin-Buc Landfill, Operable Unit 2, Draft Final Feasibility Study Report, Volume III - Appendix E through H

Type: REPORT
Condition: DRAFT
Author: none: Wehran Engineering
Recipient: none: Kin-Buc, Inc.
none: SCA Services, Inc.

Document Number: KBC-002-2442 To 2454 Date: 07/01/92

Title: Superfund Proposed Plan, Kin-Buc Landfill, Edison Township, Middlesex County, New Jersey

Type: PLAN
Author: none: US EPA
Recipient: none: none

Addendum to Administrative Record

1. Transcript of the Public Meeting for Operable Unit 2 of the Kin-Buc landfill Site, held August 4, 1992, at the Edison Municipal Building, Edison, New Jersey.

2. Written comments submitted by New Jersey State Senator Joe Kyrillos, dated August 10, 1992.

3. Written comments submitted by Robert Spiegel, President of the Edison Wetlands Association, dated August 14, 1992.

4. Written comments submitted by John Grun, Director of the Edison Township Department of Health and Human Resources, dated August 10, 1992.

APPENDIX IV

STATE LETTER OF CONCURRENCE

State of New Jersey
Department of Environmental Protection and Energy
Office of the Commissioner
CN 402
Trenton, NJ 08625-0402
Tel. # 609-292-2885
Fax. # 609-984-3962

Scott A. Weiner
Commissioner

SEP 18 1992

Mr. Constantine Sidamon-Eristoff
USEPA - Region II
26 Federal Plaza
New York, NY 10278

Dear Mr. Sidamon-Eristoff:

Re: Record Of Decision
Kin-Buc Landfill
Edison Township, Middlesex County

The New Jersey Department of Environmental Protection and Energy (NJDEPE) has reviewed the Record of Decision for the Kin-Buc Landfill Superfund Site, Operable Unit II. The NJDEPE concurs with the selected remedy which includes removal of PCB contaminated sediments in adjacent wetlands, long term monitoring of ground and surface waters, and restoration of wetland areas disturbed in conducting the sediment removal.

A ROD for Operable Unit I was signed in 1988 and addressed the extensive contamination found in the landfill proper. The Operable Unit I ROD included a landfill containment system (including a circumferential slurry wall), extension of the existing cap and a leachate collection and treatment system. The Operable Unit II ROD implements remediation of areas outside of the first Operable Unit.

Sincerely,

Scott A. Weiner
Commissioner

SAW:irc

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

KIN-BUC LANDFILL SITE

OPERABLE UNIT 2

This community relations responsiveness summary is divided into the following sections:

Overview: This section discusses the U.S. Environmental Protection Agency's (EPA's) preferred alternative for remedial action.

Background: This section briefly describes community relations activities related to the second operable unit at the Kin-Buc site.

Summary of Comments: This section provides a summary of commentators' major issues and concerns, and expressly acknowledges and responds to all significant comments raised by the local community. The local community includes residents, businesses, the municipality, and the potentially responsible parties (PRPs).

OVERVIEW

At the initiation of the public comment period on July 15, 1992, EPA presented its preferred alternative for the second operable unit at the Kin-Buc Landfill site, located in Edison Township, New Jersey. The first operable unit remedy consists of a landfill containment system (cap, slurry wall, and leachate collection and treatment) which will prevent the migration of landfill leachate into the surrounding environment, including ground water, surface water, and sediments. The second operable unit remedy was developed to remediate contaminated sediments found outside the boundary of the first operable unit's slurry wall.

The selected remedy for the second operable unit includes the excavation of sediments contaminated by polychlorinated biphenyls (PCBs) from the Edmonds Creek wetlands adjacent to the landfill, the consolidation of these sediments within the Operable Unit 1 containment system, and the active restoration of the wetlands areas disturbed by the remediation. In addition, long-term monitoring of ground water quality outside of the Operable Unit 1 containment system, and the Raritan River water quality will be implemented to ensure that the preferred alternative is protective of human health and the environment.

The principal threat for the second operable unit is the contaminated wetlands sediment from which PCBs and some metals are being taken up into the local aquatic food chain, thereby posing a threat to resident wildlife and to human health via consumption. Upon removal of the most contaminated sediments, in which PCBs exceed EPA's action level of 5 parts per million (ppm), the majority of these contaminants will no longer be available to local fish and crabs, thereby greatly reducing threats to human health and the environment. Although ground water and surface water (the Raritan River) do not currently pose risks to either human health or the environment, these media will continue to be monitored in order to ensure that both the Operable Unit 1 and 2 remedies are protective.

COMMUNITY RELATIONS BACKGROUND

The Remedial Investigation and Feasibility Study (RI/FS) Report and the Proposed Plan for the Kin-Buc Landfill Operable Unit 2 were released to the public on July 15, 1992. These two documents were made available to the public in the administrative record file, located at the information repositories maintained at the EPA Superfund Records Center at EPA's Region II office in New York City and at the Edison Free Public Library, 340 Plainfield Avenue, Edison, New Jersey. The notice of availability for these documents was published in the Home News on July 15, 1992. The public comment period on the preferred alternative was held between July 15, 1992 and August 14, 1992. In addition, a public meeting was held on August 4, 1992, at the Edison Municipal Building. At this meeting, representatives from EPA answered questions concerning the site and the remedial alternatives under consideration. Responses to the comments received during the comment period, including the public meeting, are provided in this Responsiveness Summary.

COMPREHENSIVE SUMMARY AND RESPONSES TO SIGNIFICANT COMMENTS

This section provides a comprehensive response to all significant comments and summarizes the major issues and concerns raised by the local community. The questions and comments raised during the public meeting and received during the public comment period can be grouped into several categories, as follows:

A. Operable Unit 1--Source Control Remedy for the Kin-Buc Landfill

B. Risks and Contamination Associated with Operable Unit 2

C. General Comments

A summary of these comments and EPA's response to them is provided in the following section.

A. Operable Unit 1--Source Control Remedy

1. **A representative of the Middlesex County Environmental Coalition asked at the meeting whether saltwater from the Raritan River could erode the slurry wall material.**

EPA response: Wehran Engineering, working on behalf of the Potentially Responsible Parties, with EPA oversight, is conducting long-term testing as part of the Operable Unit 1 design to determine the reaction of various mixtures of slurry with leachate and contaminated ground water from the site. The Raritan River flows under estuarine conditions in the vicinity of Kin-Buc, and its water is more saline than typical of a freshwater stream. However, river water will not directly contact the slurry wall. Net discharge of ground water from Kin-Buc is to the river, although some river water may temporarily recharge the refuse and sand-and-gravel layers during the tidal cycle. Therefore, only ground water or leachate will come into direct contact with the subsurface slurry wall. Data from the compatibility testing, which is not yet completed, indicates that the performance of the slurry mixture is not compromised by representative samples of contaminated ground water taken from the site. On the basis of this testing, EPA is confident that the reaction of slurry with ground water will not weaken the slurry wall after installation.

2. **A representative of the Middlesex County Environmental Coalition asked about the dimensions of the slurry wall, and the effectiveness of the leachate treatment facility.**

EPA response: The slurry wall will extend around the perimeter of Kin-Buc I and II and Pool C, as well as the portion of the Low-Lying Area adjacent to Kin-Buc I. The total perimeter of the wall, which will be several feet thick, will measure approximately 6900 feet. The average depth of the wall is approximately 30 feet, with a maximum depth of 54 feet and a minimum depth of six feet. Variations in depth reflect the northwest dip of the underlying bedrock, which is present at shallower depths on the north side of the landfill. The wall will not be located immediately adjacent to the Raritan River, since Mound B is located in between Kin-Buc I and the river. A distance of approximately 500 feet separates Kin-Buc I from the river bank. The slurry wall is designed to be virtually impermeable to leakage, and will be maintained in perpetuity by the PRPs under EPA oversight.

The leachate treatment facility is being designed to remove contaminants from leachate and contaminated ground water down to levels required by Federal and State water quality regulations. Organic contaminants will be removed completely, while metals will be removed to levels that will not cause degradation of river water quality. The treatment system will be designed to ensure that discharged water will not negatively impact the quality of the Raritan River.

3. **A representative of the Edison Wetlands Association expressed concern about potential hazards associated with construction of the cap and slurry wall, due to buried wastes with ignitable or flammable characteristics, and inquired about EPA's precautions to protect site workers and area residents.**

   EPA response: While EPA acknowledges that there are risks, primarily to on-site workers, associated with construction activities at hazardous waste sites, precautions are taken at all sites to minimize these risks. A site-specific Health and Safety Plan is developed for the construction of all remedies; this plan is designed to ensure the safety of all persons working on site, as well as the surrounding community. The Health and Safety Plan addresses such issues as protective equipment and clothing for workers, monitoring and control of dust and other emissions, coordination with local emergency and health officials, and establishment of technical protocols for site-specific conditions. The Kin-Buc Health and Safety Plan will be discussed with the public during the presentation of the final design prior to construction.

   At Kin-Buc, both remedial investigations and extensive pre-design investigations have involved subsurface work, such as soil borings and monitoring well installation. These activities have not resulted in any physical hazards to workers or the community. In addition, the first operable unit remedy will involve installation of a slurry wall around the perimeter of the landfill, not excavation of hazardous materials disposed in the landfill. Installation of a cap on the currently uncapped portions of Operable Unit 1 will also not involve excavation of buried wastes, although some grading of the surface will be necessary. Therefore, construction of the Operable Unit 1 remedy will be less hazardous to workers and the community than excavation of the waste materials deposited in the landfill. Finally, EPA will continue to work with the Township of Edison during all stages of site work.

4. **Assemblyman Warsh and a representative of the Middlesex County Environmental Coalition expressed concern about the role of the meadow mat as a semi-confining layer in both the Operable Unit 1 and Operable Unit 2 selected remedies.**

   EPA Response: During the remedial investigations for both Operable

Units 1 and 2, Wehran Engineering observed a layer of organic-rich sediment in between the refuse layer and the sand-and-gravel unit. This organic-rich layer, known as "meadow mat," represents a former marsh environment similar to the current Edmonds Creek marsh. The physical properties of these layers vary somewhat, depending on their exact composition, but the fine-grained, organic matrix generally exhibits very low permeability. At Kin-Buc, the meadow mat layer varies in thickness as well as in the percentage of sand and clay particles. However, because of its low permeability, and the distinct decrease in levels of ground water contamination between the refuse and the sand-and-gravel units, the Kin-Buc meadow mat appears to retard the vertical migration of contaminants. For this reason, it has been described as semi-confining. However, EPA has not relied upon the presence of this unit in its remedy selection for either Operable Unit 1 or 2. The Operable Unit 1 slurry wall will be keyed into the deeper bedrock unit, not the meadow mat, which will provide for complete containment of the landfill.

5. **A representative of the Edison Wetlands Association asked about the collection and disposal of gas generated by the landfill.**

EPA Response: The Operable Unit 1 containment system includes a gas collection system which will ensure that gas pressures within the enclosed landfill will not encourage the migration of landfill gases through the cover system and into the atmosphere. The gas will be drawn off, the condensate fraction will be routed to the leachate treatment facility, and the remaining gas will be treated in an enclosed flare system designed to remove all landfill gas constituents.

B. Risks and Contamination Associated with Operable Unit 2

1. **A representative of the Edison Wetlands Association asked whether EPA had investigated off-site areas of contamination. He stated that he was aware of extensive dumping of wastes in the vicinity of the Kin-Buc site.**

EPA response: On the basis of the first operable unit investigation, EPA divided the site into two operable units. The first operable unit consists of the landfill mounds, Kin-Buc I and II, Pool C, and the portion of the Low-Lying Area adjacent to Kin-Buc I. This area, in which disposal of hazardous wastes has been documented, was considered to be a source of contamination observed in the surrounding environment. A containment remedy was selected to prevent the further release of contaminants into the surrounding area, including the wetlands, the Raritan River, and the ground water. However, the Operable Unit 1 investigation indicated that contaminants had already migrated into the surrounding environment. Therefore, the second operable unit investigation focused on "off-site" contamination in the wetlands, ground water, Edmonds Creek, and Mill Brook/Martins Creek.

EPA's determination of the site boundaries was based on the results of these two investigations, as well as Kin-Buc Inc. company records, and interviews with people who had worked on site or as haulers and transporters. EPA has no information, either technical or documentary, which indicates that there are other areas of contamination related to Kin-Buc. Historical evidence, such as aerial photographs from the 1940s, 1950s, and 1960s, does indicate that a large part of this wetlands area at the end of Meadow Road was filled in with refuse. However, EPA has no evidence to suggest that this refuse was associated with the hazardous waste operations at Kin-Buc. Therefore, the Agency is confident that the areas which comprise Operable Units 1 and 2 represent the full extent of Kin-Buc-related contamination.

2. **A representative of the Edison Wetlands Association expressed concern that recreational use of the Raritan River in the Kin-Buc vicinity was unrestricted.**

EPA response: EPA conducted a risk assessment, using data collected as part of the second operable unit remedial investigation, which evaluated eight exposure scenarios for the Kin-Buc site, including exposure to surface water during recreational activities. EPA concluded that recreational use of the site, which would include boating and swimming, would not pose unacceptable risks to human health. However, as discussed below in more detail, EPA *did* find that consumption of fish caught on or near the site presented an unacceptable risk to human health.

3. **A representative of the Edison Department of Health and Human Resources expressed concern in writing and at the meeting about the conclusion of the Risk Assessment that fish consumption poses unacceptable risks to human health. He requested that EPA make more specific recommendations about the species of fish affected and the geographical extent of the problem. Further, he asked that EPA determine the most effective mechanism for issuing an advisory and notifying the public of the issue. Similar views were expressed by representatives of the Edison Wetlands Association and the Middlesex County Environmental Coalition.**

EPA Response: EPA is currently pursuing this issue in conjunction with the Township of Edison, and has requested that the State of New Jersey Toxics and Biota Committee (composed of representatives from the New Jersey Department of Health and the New Jersey Department of Environmental Protection and Energy (NJDEPE)) review the data and the risk assessment to determine whether such an advisory is necessary, what form it should take, and how it will be enforced. EPA will coordinate the efforts of these state agencies and the Township of Edison in order to ensure that appropriate advisories and/or restrictions are established.

4. **A representative of the Middlesex County Environmental Coalition asked whether the sand-and-gravel unit was part of the Farrington Sand regional aquifer.**

EPA Response: While the sand-and-gravel unit observed at the Kin-Buc site is a water-bearing stratigraphic unit, and can be called an aquifer, it is not part of the Farrington Sand Formation. The Farrington Sand Formation is a Cretaceous formation which overlies the bedrock formations regionally. Although the Farrington has been observed locally, the sand-and-gravel unit, which represents Quaternary channel deposits laid down by the Raritan River, is unrelated. The conclusion reached during the remedial investigations for Operable Units 1 and 2 is that the Raritan may have eroded the Farrington Sand in the site area, leaving the sand-and-gravel unit in contact with the underlying bedrock, which is comprised of the Brunswick and Lockatong Formations.

5. **A representative of the Middlesex County Environmental Coalition asked whether there were any surface water intakes in the vicinity of Kin-Buc.**

EPA Response: Wehran Engineering conducted a search of the NJDEPE Bureau of Water Allocation records and found that seven withdrawal points for ground or surface water exist within a two-mile radius of the Kin-Buc site. No drinking water supply wells were identified. The only surface water intake for drinking water within this radius serves the City of New Brunswick, and is located on the Lawrence Brook, approximately 1.5 miles west and upstream of the site.

6. **A member of the Middlesex County Environmental Coalition inquired whether there were any impacts to the sole source aquifer from the site.**

EPA Response: The Kin-Buc Landfill is located within the boundaries of the New Jersey Coastal Plain Sole Source Aquifer, a protective designation for ground water authorized by Section 1424 (e) of the Safe Drinking Water Act. However, the site has minimal impact on regional ground water quality, despite the contamination observed directly below the landfill. Hydrologic studies performed during the remedial investigation indicate that the net movement of ground water from the bedrock formation in the Kin-Buc vicinity is upwards, into the sand-and-gravel unit, which in turn discharges to the river. In addition, bedrock water quality is currently at acceptable levels. After implementation of the first operable unit containment system, ground water quality at Kin-Buc will gradually improve in all three stratigraphic units.

7. **A representative of the Edison Wetlands Association inquired about the current status of a previously identified drainage feature from which leachate drained into Mill Brook.**

EPA Response: The Operable Unit 1 Remedial Investigation Report described two man-made drainage features, designed for precipitation runoff, which discharged into Mill Brook. Historically, leachate seeps from the Kin-Buc site have been documented as discharging into Mill Brook. However, no leachate seeps are currently observed entering Mill Brook/Martins Creek from the Kin-Buc site. The primary leachate seeps occurred on the eastern side of Kin-Buc I, in the Pool C area, as subsurface oily liquids pooled and drained out of the landfill. This material has been collected and taken off site since 1981 as part of an on-going removal action. Volumes of oily wastes have dropped significantly, and little, if any, such waste is currently seeping into Pool C. Mill Brook/Martins Creek receives significant urban stormwater runoff from the Township of Edison, as well as from local industries and the nearby New Jersey Turnpike, all of which contribute significantly to the levels of polyaromatic hydrocarbons (PAHs) and metals observed in channel sediments. The Operable Unit 2 Remedial Investigation Report concluded that the observed levels of these contaminants may be partially attributable to both stormwater runoff and anthropogenic sources other than Kin-Buc. Any contributions from Kin-Buc will be eliminated by construction of the Operable Unit 1 slurry wall and cap.

8. **A representative of the Edison Wetlands Association described the presence of a day care center in immediate proximity to the Kin-Buc site, and requested that EPA evaluate risks to this facility posed by the site.**

EPA Response: The John F. Kennedy Day Care Center is located at 225 Mill Road, in the Heller Industrial Park, approximately one-half mile from the Kin-Buc Landfill. The location of this facility is well beyond the area of off-site contamination as determined by EPA during both remedial investigations, and the direction of ground water flow is to the south-south west, towards the Raritan River. EPA has no evidence to suggest that children using the day care center would be impacted by the Kin-Buc site in its current state. In addition, during construction of the landfill containment system, dusts and other possible emissions will be carefully monitored and controlled to eliminate risks to the surrounding community.

9. **A representative of the Middlesex County Environmental Coalition asked what score Kin-Buc had received from the original Hazard Ranking System, and whether a listing site inspection had been done.**

EPA Response: The Kin-Buc site received an HRS score of 50.6 in 1982, upon completion of the Site Investigation. The Preliminary Assessment was completed in January 1980. The site was added to the National Priorities List in October 1981.

10. **A resident of Woodbridge Township asked whether the time frames given in the Proposed Plan for each alternative included the design phase.**

EPA Response: The times frames provided for each alternative do include the design period.

11. **A resident from Woodbridge Township asked EPA to explain the term "functional wetlands."**

EPA Response: EPA used the term "functional wetlands" to refer to the relative abundance of plant and animal life observed in the Edmonds Creek Marsh and the adjacent Low-Lying Area, which indicates that this area has a moderate to high ecological value.

12. **A representative from the Edison Wetlands Association inquired about the migration of contaminants from the landfill into the Raritan River. This concern was also expressed by representatives from the Middlesex County Environmental Coalition.**

EPA Response: EPA conducted an eight-week river water sampling program as part of the design of the Operable Unit 1 leachate treatment facility. The purpose of the sampling was to evaluate ambient river water quality in order to develop discharge limits for the treatment plant. While several metals (aluminum, iron, copper and lead) were found in excess of the federal Ambient Water Quality Criteria (AWQC), the levels detected only slightly exceeded the criteria. No organics were detected in the river water. Because the Raritan is a major waterway, there are numerous point sources and non-point sources of pollutants which discharge into the river. In the vicinity of Kin-Buc, there are several major sources of contaminants such as other landfills and industries. In addition, this stretch of the river is estuarine; because of tidal fluctuations, upstream and downstream sampling points cannot be determined locally. For these reasons, EPA determined that it would not be possible to determine the contribution of the Kin-Buc Landfill to pollution in the Raritan River. Since no significant levels of contaminants were detected, and those few inorganics which were observed in exceedance of criteria could not be attributed solely to Kin-Buc, EPA concluded that surface water quality had not been impacted significantly by the landfill. However, to confirm this conclusion and to ensure that both selected remedies remain effective, the Agency plans to implement a ground water and surface water monitoring program.

EPA also evaluated sediment samples in the Edmonds Creek marsh and channel, as well as Mill Brook/Martins Creek. No specific patterns for PAHs could be determined, although PCB distribution patterns clearly pointed to Pool C as the source of these contaminants. Generally, inorganic compounds and some nonvolatile organics tend to attach or sorb to fine-grained particles or organic carbon, whereas volatile organics will volatilize from surface water, or otherwise degrade. However, inorganics were found in higher levels in the mouths of both Edmonds Creek and Martins Creek, where sediments are coarser-grained and low in organic carbon, suggesting that these concentrations reflect river influences rather than site-related sources. Sediment samples from the Raritan River channel were not evaluated for the reasons described in the discussion of surface water sampling. However, data from literature indicates generally high levels of inorganics throughout this portion of the Raritan basin.

13. **A representative of the Edison Wetlands Association asked whether there had been any screening or testing for radioactive substances.**

EPA Response: EPA does not routinely test for radioactive materials unless circumstantial evidence suggests that such materials may be present. EPA currently has no evidence to suggest that radioactive substances were disposed in the Kin-Buc Landfill, although that possibility exists at Kin-Buc, as at all such landfills. However, the Operable Unit 1 remedial action is designed to prevent the migration of all hazardous substances by containing all waste materials deposited in the landfill.

14. **A representative from the Middlesex County Environmental Coalition and a representative of the Edison Wetlands Association expressed interest in whether the Agency for Toxics Substances and Disease Registry (ATSDR) had prepared a health assessment for the Kin-Buc site. The Edison Wetlands Association representative requested that a second ATSDR health assessment be performed, which would incorporate the most recent site data.**

EPA Response: ATSDR was required to perform a health assessment for all National Priorities List sites in the mid-1980s. The Kin-Buc Health Assessment was completed in June 1987. EPA and the Township of Edison have requested that the New Jersey Department of Health, in conjunction with ATSDR, review the Operable Unit 2 data for Kin-Buc and prepare a supplemental health assessment. However, the ATSDR assessments provide a general evaluation of past, current, and future potential site risks, and are intended for use earlier in the Superfund process. The ATSDR health assessment is a qualitative evaluation of potential hazards, whereas EPA's Risk Assessment utilizes site-specific data to quantitatively evaluate health risks. EPA's evaluation uses the most recent toxicity information from human and animal studies in combination with conservative exposure assumptions. For these reasons, EPA believes that the two Risk Assessments conducted by EPA (for Operable Units 1 and 2) provide a conservative and thorough evaluation of human health risks associated with the Kin-Buc site.

C. General Comments

1. **Assemblyman Warsh, Assemblywoman Berman, and State Senator Kyrillos (written comment), as well as the representatives of the Edison Wetlands Association and the Middlesex County Environmental Coalition expressed concerns about the credibility of EPA, due to perceived problems with other waste sites in Middlesex County, such as Edgeboro Landfill, Chemical Insecticide and Renora. These community representatives urged a coordinated effort to address all such waste sites as part of a regional plan, rather than as individual sites.**

EPA Response: EPA appreciates the desire of the community to participate in and resolve Middlesex County's environmental issues, and EPA agrees that, from a technical perspective, addressing the restoration of the area can be achieved by a coordinated approach to addressing all sources of pollution. However, the Superfund regulatory framework mandates that EPA conduct investigations and select remedies for each NPL site. In the case of the Edgeboro Landfill, EPA concluded after careful evaluation that Edgeboro was not eligible for inclusion on the NPL. Therefore, the operation and closure of that landfill remains under the authority of the NJDEPE. However, Superfund Records of Decision have been signed for the Kin-Buc, Chemical Insecticide, and Renora sites. Although technical and administrative issues have delayed implementation of remedial action at Renora and Chemical Insecticide, EPA is actively working to resolve these issues expeditiously and ensure protection of public health and the environment. The individual remedies at each of these three sites will serve to eliminate or reduce migration of hazardous substances from the sites, and EPA will continue to investigate off-site contamination related to each site, as appropriate. For example, this second Record of Decision for the Kin-Buc site addresses the off-site contamination of wetland areas from the Kin-Buc Landfill, and its implementation will contribute to the protection of the regional wetland environment. EPA will continue to maintain open communications with the communities of Middlesex County and local officials with respect to activities at each Superfund site.