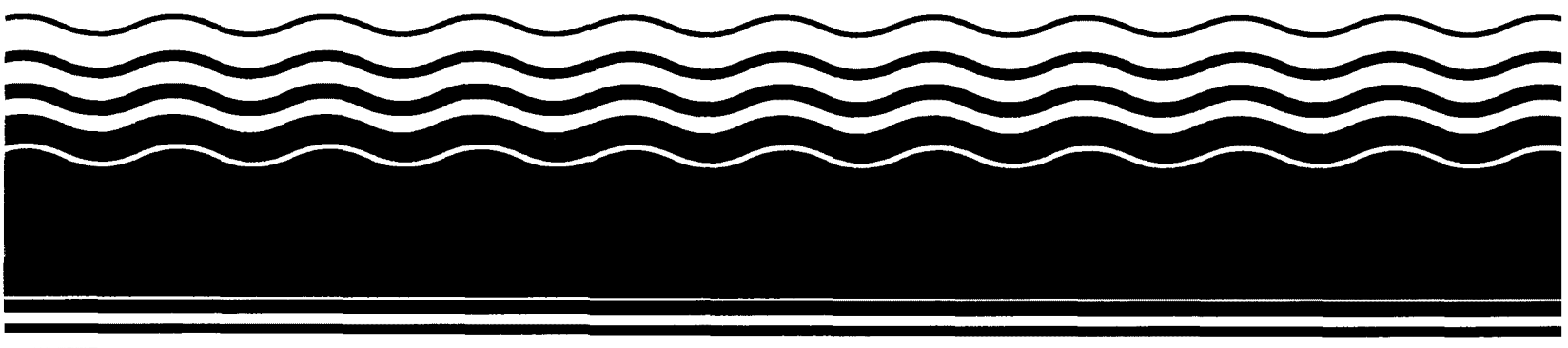
PB96-964017
EPA/ROD/R04-96/274
October 1996

# EPA Superfund Record of Decision:

## Wingate Road Municipal Incinerator Dump and Landfill Site, Fort Lauderdale, FL 5/14/1996



# RECORD OF DECISION
# FOR THE
# WINGATE ROAD MUNICIPAL INCINERATOR AND LANDFILL SITE

## THE DECLARATION

### SITE NAME AND LOCATION

Wingate Road Municipal Incinerator And Landfill Site
Fort Lauderdale, Broward County, Florida

### STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Wingate Road Site in Fort Lauderdale, Florida. This remedial action is chosen in accordance with the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, SARA 42 U.S.C. Section 9601 et. seq., and, to the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the Remedial Investigation and Feasibility Study process for the Wingate Road site. In accordance with 40 CFR 300.430, as the support agency, FDEP has provided EPA with input during the process. Although FDEP has not indicated an objection to the overall approach of the selected remedy, FDEP is unwilling to concur with this ROD because FDEP disputes the remediation goals selected for arsenic and dioxin in soil.

### ASSESSMENT OF THE SITE

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

### DESCRIPTION OF THE REMEDY

This remedy addresses the contaminated media at the site. This remedy addresses the principal threat remaining at the site by capping the landfill. The major components of the selected remedy include:

* construction of a synthetic or clay cap with erosion controls over the landfill,

* excavation of contaminated soil and incinerator ash, and disposal on the on site landfill,
* drainage, treatment, and disposal of water in Lake Stupid,
* excavation of Lake Stupid sediments, and disposal on the on site landfill,
* storm water management
* construction of a vertical barrier between the landfill and Rock Pit Lake,
* natural attenuation for the surface water at Rock Pit Lake,
* decontamination of the buildings and structures,
* ground water, surface water, sediment, and fish tissue monitoring,
* institutional controls and/ or ground water use restrictions within the current site boundary, and
* institutional controls for the maintenance of the site cap, storm water controls, fencing, and signs.

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 to the remedial action, and is cost effective. This remedy utilizes permanent solutions but does not satisfy, for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill, the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principal element because: 1) it would not be cost effective to treat the waste disposed of in the landfill, 2) the selected remedy provides adequate protection to human health and the environment, 3) the selected remedy for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill complies with the Presumptive Remedy for CERCLA Municipal Landfill Sites approved by OSWER Directive 9355.0-49FS and 4) the waste material is not a RCRA hazardous waste.

OSWER Directive 9355.0-49FS establishes that the following are the elements of a presumptive remedy for a municipal landfill: 1) landfill cap, 2) source area groundwater control to contain plume, 3) leachate collection and treatment, 4) landfill gas collection and treatment, and/or 5) institutional controls to supplement engineering controls. The remedy herein selected does not include source area groundwater control to contain plume because there is no known plume migrating from the Site. In addition, the remedy does not include a leachate collection and treatment system because the landfill material will remain in place below the water table. Therefore, it would be futile to have a leachate collection and treatment system as part of this remedy. In the event that groundwater exceedences of Maximum Contaminant Levels (MCLs) are observed beyond the current Site boundary, the groundwater portion of the selected remedy will be

reevaluated.

Because this remedy will result in hazardous substances, pollutants, and contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. These reviews will be conducted every five years or until remediation goals are achieved.

Richard D. Green, Acting Director
Waste Management Division

14 MAY 96
Date

# RECORD OF DECISION
## Decision Summary
## Wingate Road Municipal Incinerator and Landfill NPL Site
## Fort Lauderdale, Broward County, Florida

### 1.0 Site Location and Description

The Wingate Road Municipal Incinerator and Landfill NPL Site (the site) is located at 1300 NW 31st Avenue, Fort Lauderdale, Broward County, Florida (see Figure 1, Site Location Map). The site is bordered on the west by NW 31st Avenue, to the north by a privately owned junk yard, to the northeast by a privately owned lake known as Rock Pit Lake, and to the east and south by residential properties (Figure 2, Study Area Map).

The site is approximately 60 acres in size and includes two inactive incinerator buildings, cooling water treatment structures, an ash and solid waste landfill, a vehicle maintenance area, and various buildings. The study area also includes the cooling water percolation pond, known as Lake Stupid, and Rock Pit Lake which historically received overflow from Lake Stupid. The site is owned and was operated by the City of Fort Lauderdale.

The landfill area is approximately 40 acres in size, 35 feet above sea level (25 feet above surrounding grade), and is densely overgrown with brush and trees. The remaining 20 acres is known as the southern portion of the site. The site is currently leased by the city to Fort Lauderdale Production Central, Inc., which uses the site for film support and production activities.

### 2.0 Site History and Enforcement Activities

The site was purchased by the City of Fort Lauderdale in 1951. The municipal incinerator and landfill operated from 1954 through June 1978. The facility processed approximately 480 tons of municipal solid waste per day. Two incinerators were constructed on site; the "old" incinerator in 1954, and the "new" incinerator in 1966. The old incinerator consisted of two furnaces and did not use cooling water until 1975. The new incinerator became operational in 1966 and included two parallel incinerators and a cooling water percolation pond. The cooling water percolation pond lost permeability due to the buildup of fine ash and was subsequently named Lake Stupid. The city periodically removed the ash from the bottom of Lake Stupid and placed the ash in the landfill or around the banks of the pond. Lake Stupid was then connected to Rock Pit Lake by an overflow ditch located along the eastern edge of the landfill.

The cooling water treatment system was constructed in 1975.

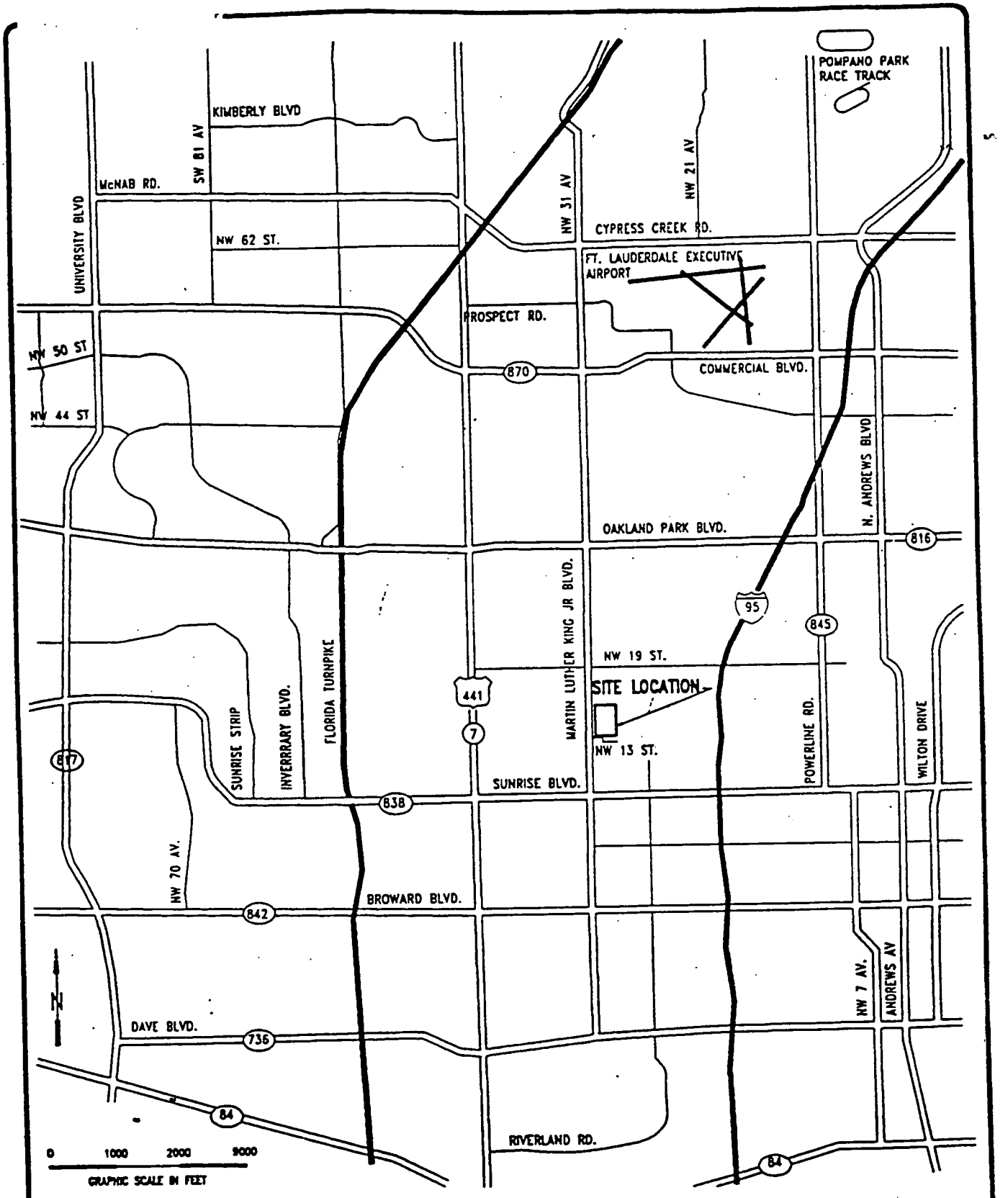



FIGURE: 1

SITE LOCATION

WINGATE ROAD MUNICIPAL INCINERATOR
AND LANDFILL SITE

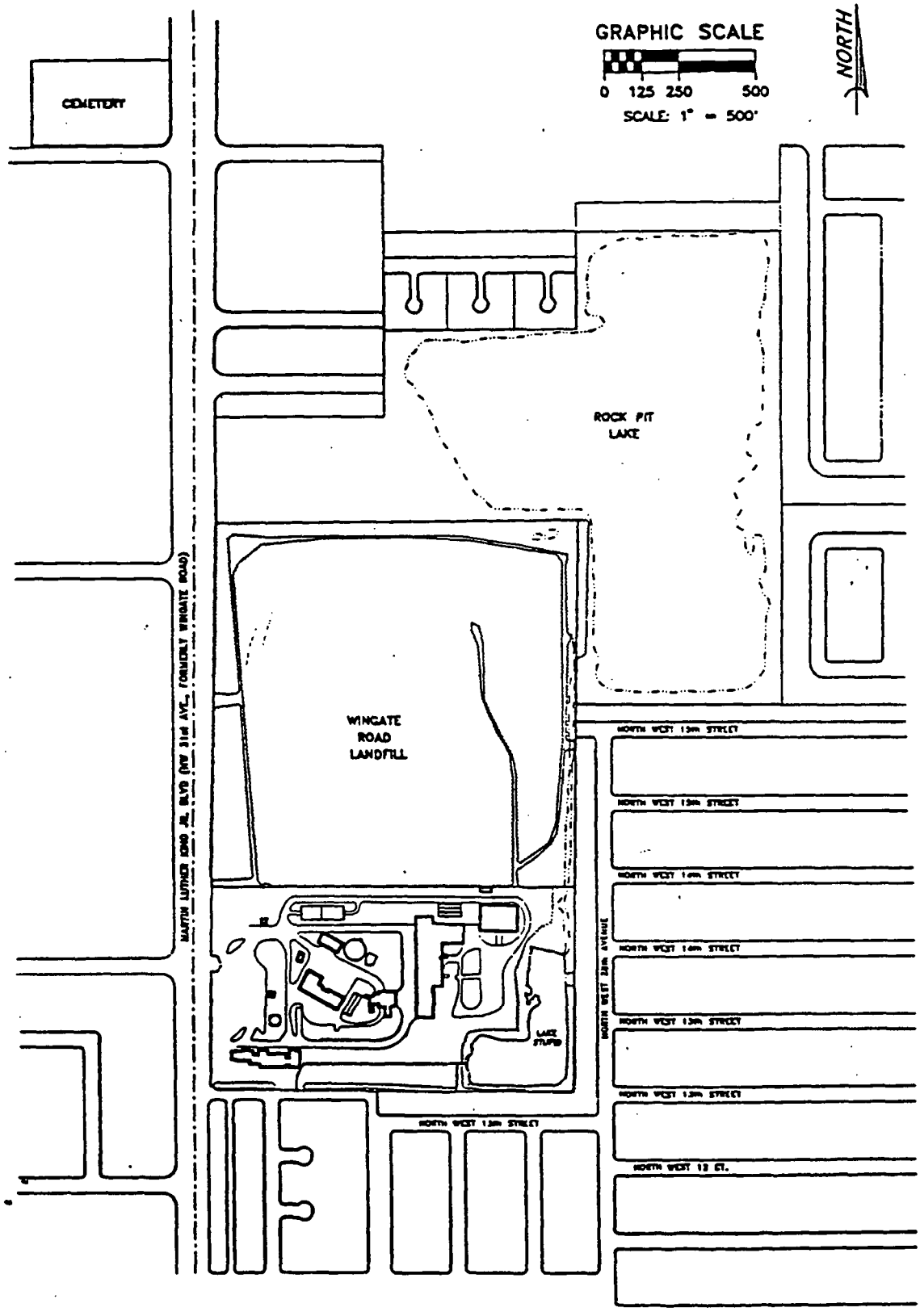



FIGURE: 2

STUDY AREA

WINGATE ROAD MUNICIPAL INCINERATOR AND LANDFILL

The system was designed to remove the ash from the cooling water before the water was discharged to Lake Stupid. The resultant sludge from the water treatment system was disposed of in the landfill along with the ash from the incinerators.

The EPA conducted a site inspection and developed a Hazard Ranking System Report for the site in 1985. The City of Fort Lauderdale began closure of the landfill in 1986 in accordance with Florida Administrative Code (FAC) requirements. The site was placed on the National Priorities List (NPL) in 1990 with a Hazard Ranking System (HRS) score of 31.72. Closure of the landfill was delayed until the Remedial Investigation and Feasibility Study (RI/FS) could be completed.

The City of Fort Lauderdale and the Port Everglades Authority entered into an Administrative Order on Consent (AOC) with the EPA in 1991 to conduct the RI/FS. Four phases of field investigation were conducted from August 1992 through September 1994. Approximately 300 samples of soil, sediment, surface water, ground water, and incinerator ash residue were collected during Phase I. Phase IIa was conducted to assess the distribution of dioxins and furans (dioxin) and included fish tissue samples. Phase IIb was conducted to provide quality assurance regarding the metals data from the Phase I water samples, and to collect additional samples for dioxin analysis from the drainage ditch that historically connected Lake Stupid to Rock Pit Lake. Phase III was conducted in September 1994 to assess the potential impact of off site deposition of flyash from the historic incinerator stack emissions.

The RI/FS analyzed the different remedial alternatives under the nine point criteria that the National Contingency Plan establishes for the selection of a remedy. The RI/FS analysis corroborated that the Presumptive Remedy for CERCLA Municipal Landfill Sites approved by OSWER Directive 9355.0-49FS for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill was the appropriate remedy to be selected for the Site.

## 3.0 History of Community Participation

EPA began its community relations efforts in April 1992 by conducting community interviews and holding a public meeting at the Fort Lauderdale Branch Public Library at 1300 East Sunrise Boulevard. This meeting was held to address concerns of the citizens and to inform them of EPA's planned RI/FS activities. Additional meetings were held with local citizens in March 1993, and again in February 1994 to discuss the results of the Remedial Investigation.

A public comment period for the proposed remedial action was held from December 7, 1994 through January 6, 1995. On December

5, 1994 a Proposed Plan fact sheet was released to the public to inform the public of EPA's findings and to notify the public that they could review details of the RI/FS reports at the Fort Lauderdale Main Library. Additionally, a public meeting was held on December 12, 1994 at the Bass Park Community Center, located at 2750 NW 19th Street in Fort Lauderdale. At this meeting, EPA and the Agency For Toxic Substances and Disease Registry (ATSDR) presented the results of the RI/FS, and answered questions about the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision (ROD). This decision document presents the selected remedial action for the Wingate Road site in Fort Lauderdale, Florida, chosen in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan. The decision for this site is based on the Administrative Record.

## 4.0 Scope and Role of Response Action

This ROD presents the planned remedial activities for the site. The remedy will address the contaminants present in the surface soil, incinerator ash residue, landfilled material, sediment, ground water, and fish tissue associated with the site. The purpose of this remedy is to reduce the risks associated with exposure to contaminated media to health based levels and to protect the surficial aquifer system beyond the current site boundary. This ROD is the only ROD anticipated for this site since the contamination present at the site will be addressed as a single operable unit.

## 5.0 Summary of Site Characteristics

Broward County occupies approximately 1220 square miles of the southern Florida peninsula. The physiography of the county includes coastal sand dunes overlying the Atlantic Coastal Ridge, the everglades, and the sandy flatland located between the Atlantic Coastal Ridge to the east and the everglades to the west. The Wingate Road site is located in the sandy flatland of eastern Broward County.

The topography of the county is flat. Elevations range from zero to 25 feet, with most land at 5 to 10 feet above mean sea level. The land generally slopes slightly to the southeast.

The climate in the area is semi-tropical to tropical with an average annual temperature of 73 degrees (F). Average rainfall is approximately 60 inches per year with most precipitation falling between June and October. January is the driest month, with average rainfall of 2.2 inches, whereas September averages 8.5 inches of precipitation. The predominant wind direction is from

the southeast. The primary drainage features in Broward County include tidal streams, borrow pits, water conservation areas, and manmade canals. The drainage system is controlled by the South Florida Water Management District, the Broward County Water Resources Department, and local drainage districts.

Surface drainage on site is controlled by the site topography, lakes, and paved areas. Precipitation which falls on the southern portion of the site is routed through a storm water management system to Lake Stupid, and percolates from the lake into the ground water. Precipitation which falls on the landfill infiltrates through the landfill material. Lake Stupid and Rock Pit Lake are hydraulically connected to ground water, have no surface water outlets, and apparently do not overflow during storm events. The nearest surface drainage to the site is the North Fork of the New River which passes approximately one half mile south of the site. The Middle River Canal passes approximately two miles north of the site. Both canals flow east to the Intracoastal Waterway.

## 5.1 Regional and Site Hydrogeology

The South Florida Peninsula is underlain by a wedge of sediments that thickens toward the south, exceeding 15,000 feet thick beneath the site. These sediments are underlain by metamorphic and igneous rocks similar to those of the Appalachian region.

The geologic units of interest to this site are three groups of sediments. The upper unit is the Biscayne aquifer which is comprised of a sequence of limestones with varying mixtures of shell and sand. The Biscayne aquifer extends from the water table to depths of 200 feet or more beneath the surface. The Biscayne is a prolific source of water and provides all potable water in Broward County.

Underlying the Biscayne aquifer are 600 to 800 feet of silty, sandy clays and marls which are known as the intermediate confining unit. The confining unit effectively separates ground water circulation within the Biscayne from the Floridan aquifer below.

The Floridan aquifer contains carbonate rocks that extend downward from a depth of approximately 1,000 feet in the area of the site. The Floridan contains confined water with 30 to 60 feet of head above sea level. Water in the Floridan aquifer in this area is highly mineralized and is not suitable for potable water supply.

In the vicinity of the Wingate Road site, the upper portion of the Biscayne aquifer consists of approximately 50 feet of fine

to medium grained quartz sand with stingers of calcareous sandstone. A thin, marly shell bed zone was found at depths of 46 to 66 feet below land surface. A crystalline, sandy limestone was found at 66 feet below land surface; this limestone represents the top of the major water producing zone of the Biscayne aquifer.

Ground water within the Biscayne aquifer generally flows toward the east and southeast. Regional flow can be influenced locally by the effects of pumping wells and by drainage canals. Local ground water flow at the site is influenced by the landfill topography. A slight mounding of the water table develops beneath the landfill, resulting in a radially- outward flow of ground water. The mounding effect does not appear to influence the ground water flow pattern beyond the site.

## 5.2 Nature and Extent of Contamination

The Remedial Investigation included four phases of field investigation which were conducted from August 1992 through September 1994. Approximately 300 samples of soil, sediment, surface water, ground water, and incinerator ash residue were collected during Phase I. Phase I was conducted to assess the nature and extent of contaminants in the four areas of contamination at the site; the landfill, the southern portion of the site, Lake Stupid, and Rock Pit Lake. The Phase I samples were analyzed for purgeable hydrocarbons, semi-volatile organic compounds, pesticides and PCBs, and target analyte list (TAL) metals. Select Phase I samples were also analyzed for dioxin. The results of Phase I identified dioxin in the soil and sediment associated with the site. Phase IIa was conducted to assess the distribution of dioxin. Phase IIb was conducted to provide quality assurance regarding the metals data from the Phase I water samples, and to collect additional samples for dioxin analysis from the drainage ditch that connected Lake Stupid to Rock Pit Lake.

Phase III was conducted in September 1994 to assess the potential impact of off site deposition of flyash from the historic incinerator stack emissions. The purpose of the off site sampling was to determine if dioxin or metals from the incinerator emissions had been deposited in residential areas in concentrations which would pose a risk. Phase III also included sampling of sediment and ash from on site for Toxicity Characteristic Leachate Procedure (TCLP) metals analysis.

### 5.2.1 Surface Soil / Ash Residue Investigation

The primary source areas at the site include the areas and structures which contain ash or ash residue from the incineration

process. The source areas investigated include the incinerator buildings, the landfill, the cooling water treatment system structures, soils, sediments, and the onsite drainfields and disposal areas. A total of 68 surface soil/ ash samples were collected during the Remedial Investigation.

The predominant contaminants identified in the landfill and the onsite surface soils and ash residue are lead, arsenic, benzo(a)pyrene, beryllium, and dioxin (a comprehensive list of all compounds detected above background concentrations is included in the Remedial Investigation and Baseline Risk Assessment reports). As shown on Table 1, lead was detected at concentrations of up to 10,768 parts per million (ppm). The lead concentration was highest in the ash residue sample collected from the flocculation basin, with lead concentrations above clean up goals also being detected in the other water treatment system structures, in the incinerator buildings, and, in the surface soils on the southern portion of the site and on the landfill. Arsenic was detected at concentrations of up to 211 ppm in the central settling basin. Arsenic concentrations above the clean up goal were also detected in the other water treatment structures, and in the incinerator buildings. Benzo(a)pyrene was detected at concentrations of up to 0.99 ppm on the landfill. Benzo(a)pyrene was also detected above the clean up goal in the surface soil on the southern portion of the site and in the east settling basin. Beryllium was detected at concentrations of up to 1.7 ppm in the surface soil on the southern portion of the site. Beryllium was also detected above the clean up goal on the landfill and in the sludge bed. Dioxin was detected at concentrations of up to 0.054 ppm TEQ in the old incinerator building.

Phase III of the Remedial Investigation included collection of twenty (20) surface soil samples from the residential areas surrounding the site. The purpose of the off site sampling was to determine if dioxin or metals from the incinerator emissions had been deposited in residential areas in concentrations which would pose a risk. None of the off site soil samples were found to contain levels of dioxin or metals which exceed the site remediation goals.

Phase III also included sampling of sediment and ash from on site for TCLP metals analysis. Five representative samples were collected from Lake Stupid sediments and from the incinerator buildings and water treatment system structures. None of these samples exceeded the regulatory limits for TCLP metals.

### 5.2.2 Subsurface Soil Investigation

Subsurface soil samples were collected from 21 soil borings on the southern portion of the site. Lead was detected at concentrations of up to 5,360 ppm, and arsenic at up to 31 ppm,

# TABLE 1

## CONTAMINANTS OF CONCERN IN ONSITE SURFACE SOIL/ASH RESIDUE

| CONTAMINANT | FREQUENCY OF DETECTION | RANGE OF DETECTED CONCENTRATIONS | BACKGROUND CONCENTRATIONS |
|---|---|---|---|
| LEAD MG/KG | 67/68 | 1.6-10,768 | 1.5-58.5 |
| ARSENIC MG/KG | 64/68 | 0.2-211 | 1.4 |
| BENZO(A)PYRENE MG/KG | 3/64 | 0.85-0.99 | *ND |
| BERYLLIUM MG/KG | 12/64 | 0.2-1.7 | *ND |
| DIOXINS MG/KG (TEQ) | 25/25 | 0.0000006-0.054 | 0.00000012 |

*ND = NOT DETECTED

in subsurface soil samples collected from the drainage area north of Lake Stupid. Benzo(a)pyrene was detected at concentrations of up to 7.4 ppm in a subsurface sample from the vehicle maintenance area. And, beryllium was detected at concentrations of up to 0.6 ppm in a subsurface soil sample collected from the drainage area north of Lake Stupid.

### 5.2.3 Surface Water Investigation

Water samples were collected from two surface water bodies and associated ditches. Lake Stupid is a shallow pond located in the southeast corner of the site. A ditch was constructed along the east side of the landfill to connect Lake Stupid to Rock Pit Lake. Rock Pit Lake is a borrow pit lake and was constructed in the 1950s and 60s. The lake has nearly vertical sidewalls on the west, east, and south sides; the north side of the lake has a sloping bank. Rock Pit Lake is approximately 60 feet deep. The ditch which connected the lakes was partially plugged after the site operations were stopped.

As shown on Table 2, the predominant contaminants identified in the surface water samples are lead, aluminum, beryllium, antimony, cadmium, copper, silver, zinc, and iron. The chronic ambient water quality criteria (AWQC) for lead was exceeded in all surface water samples collected from Lake Stupid, and in one surface water sample from Rock Pit Lake. Aluminum concentrations exceeded the chronic AWQC in two Lake Stupid water samples, a sample from a drainage area leading to the bank of Lake Stupid, and in the samples from the drainage area leading to Rock Pit Lake. The State of Florida criteria for beryllium was exceeded in three Lake Stupid water samples and in all of the Rock Pit Lake water samples. The AWQCs for antimony, cadmium, copper, silver, zinc, and iron were also exceeded in the two samples collected from the drainage area leading to Rock Pit Lake.

### 5.2.4 Sediment Investigation

Sediments from two surface water bodies and associated ditches were sampled during the investigation (surface water and sediment samples were collected from the same locations). The predominant contaminants identified in the sediments are dioxin, toxaphene, antimony, arsenic, and cadmium. As shown on Table 3, dioxin was detected at concentrations of up to 0.0029 ppm TEQ in the sediment in Lake Stupid. Toxaphene was detected at 2.9 ppm in sample LSD-04, which was collected from the sediment in the ditch located north of Lake Stupid. Antimony was detected at concentrations of up to 390 ppm, arsenic was detected at concentrations of up to 68 ppm, and, cadmium was detected at concentrations of up to 449 ppm in sediment samples from Lake Stupid and the ditch north of Lake Stupid. Antimony and cadmium

# TABLE 2

## CONTAMINANTS OF CONCERN IN SURFACE WATER

| CONTAMINANT ug/l | FREQUENCY OF DETECTION | RANGE OF DETECTED CONCENTRATIONS | BACKGROUND CONCENTRATIONS |
|---|---|---|---|
| LEAD | 8/12 | 11-2,480 | 3.6-25 |
| ALUMINIUM | 5/7 | 150-25,055 | ND |
| BERYLLIUM | 6/10 | 2-3 | 2 |
| ANTIMONY | 6/7 | 10-65 | 61-229 |
| CADIUM | 6/7 | 0.3-37 | ND |
| COPPER | 4/12 | 5-718 | 6-10 |
| SILVER | 2/2 | 10-16 | 8.3-23 |
| ZINC | 10/12 | 20-3,760 | 20 |
| IRON | 12/12 | 27-31,216 | 40-206 |
| MERCURY | 1/2 | 0.9 | ND |

*ND = NOT DETECTED

# TABLE 3

## CONTAMINANTS OF CONCERN IN SEDIMENT

| CONTAMINANT | FREQUENCY OF DETECTION | RANGE OF DETECTED CONCENTRATIONS | BACKGROUND CONCENTRATIONS |
|---|---|---|---|
| DIOXINS MG/KG(TEQ) | 13/13 | 0.0000001-0.0029 | NA |
| TOXAPHENE MG/KG | 1/21 | 2.9 | ND |
| ANTIMONY MG/KG | 16/38 | 8-390 | ND |
| ARSENIC MG/KG | 35/38 | 0.5-68 | 0.3-6.5 |
| CADMIUM MG/KG | 33/38 | 1-449 | 0.5-2 |

*ND = NOT DETECTED

were also found at levels above the remedial goals in Rock Pit Lake sediments.

5.2.5 Fish Tissue Investigation

Fish tissue samples were collected from Lake Stupid and Rock Pit Lake during Phase IIa of the RI. The tissue samples were analyzed for dioxin and mercury. Dioxin was detected in whole body fish tissue samples from Lake Stupid at concentrations of up to 6.62 parts per trillion (ppt) TEQ. Dioxin was detected in whole body fish tissue samples from Rock Pit Lake at concentrations of up to 1.86 ppt TEQ. Fish fillet samples (i.e.; the edible portion of the fish) from Rock Pit Lake contained dioxin at concentrations of up to 0.07 ppt TEQ.

5.2.6 Ground Water Investigation

Thirty eight (38) ground water monitoring wells were sampled during the RI. Well clusters generally include three wells, with one well each to monitor the top of the Biscayne aquifer (approximately 20 feet deep), an intermediate depth (approximately 50 feet deep), and a portion of the producing zone of the aquifer used by water supply wells (90 feet deep). Nine monitoring wells were installed in the area of an underground storage tank excavation located on the southern portion of the site near the vehicle maintenance area. Four private wells were also sampled during Phase IIa of the RI to assess the potential for offsite migration of contaminants from Rock Pit Lake, the landfill, and Lake Stupid.

As shown on Table 4, the predominant contaminants identified in the ground water on site are bis(2-ethylhexyl)phthalate, benzene, lead, antimony, cadmium, aluminum, manganese, and mercury. Bis(2-ethylhexyl)phthalate was detected at concentrations of up to 480 parts per billion (ppb) in monitoring well MW-5B, located at the southern edge of the landfill. Bis(2-ethylhexyl)phthalate was also detected above the federal MCL in monitoring wells MW-2C and MW-10A, located at the eastern edge of the landfill. Benzene was not detected above the federal MCL of 5 ppb (benzene was detected at up to 2 ppb in ground water samples collected from the vehicle maintenance area). Lead was detected at concentrations of up to 49 ppb in monitoring well MW-8A, located on the southern portion of the site immediately west of Lake Stupid. Lead was also detected above the MCL in monitoring wells MW-2A and MW-10A, located at the eastern edge of the landfill. Antimony was detected at 15 ppb in MW-8A. Cadmium was detected at concentrations of up to 39 ppb in well MW-8A. Cadmium was also detected at 6 ppb in MW-10A, located at the eastern edge of the landfill, and at the MCL of 5 ppb in several monitoring wells on the southwestern portion of the site. Additionally,

# TABLE 4

## CONTAMINANTS OF CONCERN IN GROUNDWATER (UG/L)

| CONTAMINANT UG/L | FREQUENCY OF DETECTION | RANGE OF DETECTED CONCENTRATIONS | BACKGROUND CONCENTRATIONS |
|---|---|---|---|
| BIS(2-ETHYLHEXL)PHTHALATE | 8/38 | 5 - 480 | 32 |
| BENZENE | 3/38 | 1 - 2 | ND |
| ALUMINUM | 31/38 | 248 - 76,720 | 290 - 2,012 |
| ANTIMONY | 4/38 | 4 - 15 | ND |
| CADMIUM | 8/38 | 4 - 39 | 5 - 6 |
| LEAD | 19/38 | 2 - 49 | ND |
| MANGANEGE | 34/38 | 2 - 2,800 | 21 - 65 |
| MERCURY | 5/38 | 0.2 - 2.5 | ND |

*ND = NOT DETECTED

aluminum was detected at concentrations of up to 76,720 ppb, manganese was detected at concentrations of up to 2,800 ppb, and, mercury was detected at concentrations of up to 2.5 ppb in the ground water on site.

## 6.0 Summary of Site Risks

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

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) directs EPA to conduct a baseline risk assessment to determine whether a NPL site poses a current or potential threat to human health or the environment in the absence of any remedial action. The baseline risk assessment provides the basis for taking action and indicates the contaminants and the exposure pathways that need to be addressed by the remedial action. This section of the ROD contains a summary of the results of the baseline risk assessment conducted for this site.

## 6.1 Contaminants of Concern

Chemicals which were evaluated in the risk assessment are referred to as chemicals of potential concern (COPCs). The selection of COPCs is based on several factors including chemical toxicity, prevalence, and concentration. Chemicals were included in the Summary of Site Risk section of the Risk Assessment if the results of the risk assessment indicate that a COPC might pose a significant current or future risk. These chemicals are referred to as contaminants of concern (COCs). Chemicals are not included if their individual carcinogenic risk contribution is less than 1E-6 or their noncarcinogenic hazard quotient is less than 0.1 .

## 6.2 Exposure Assessment

Whether a chemical is actually a concern to human health and the environment depends upon the likelihood of exposure, i.e., whether the exposure pathway is currently complete or could be complete in the future. A complete exposure pathway (a sequence of events leading to contact with a chemical) is defined by four elements. An exposure pathway is considered complete if the following four elements are present:

- A source and mechanism of chemical release,

- A retention or transport medium (or media in cases involving media transfer of chemicals),
- A point of potential human contact with the contaminated medium (referred to as the exposure point), and
- A route of exposure (e.g., ingestion) at the contact point.

If all four elements are present, the pathway is considered complete.

An evaluation was undertaken of all potential exposure pathways which could connect chemical sources at the site with potential receptors. All possible pathways were first hypothesized and evaluated for completeness using the above criteria. The current pathways represent exposure pathways which could exist under current site conditions while the future pathways represent exposure pathways which could exist, in the future, if the current exposure conditions change.

The potential current exposure pathways are:

- Incidental ingestion of and dermal contact with surface soil by workers and/or trespassers;
- Incidental ingestion of surface water in Rock Pit Lake by swimmers;
- Ingestion of fish from Rock Pit Lake by nearby residents;
- Incidental ingestion of and dermal contact with subsurface soil by excavation workers;
- Incidental ingestion of incinerator building or water treatment structure ash residue by workers or trespassers.

The potential future exposure pathways are:

- Incidental ingestion of and dermal contact with surface soil by residents;
- Incidental ingestion of and dermal contact with sediment in the drainage area north of Lake Stupid by residents;

- Ingestion of ground water from within the current Site boundary by residents;

- Inhalation of and dermal contact with chemicals in ground water by residents.

## 6.3 Toxicity Assessment

Toxicity values are used in conjunction with the results of the exposure assessment to characterize site risk. EPA has developed toxicity values for many carcinogens and noncarcinogens.

Cancer slope factors (CSFs) have been developed for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CSFs, which are expressed in units of $(mg/kg/day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CSF. Use of this conservative approach makes underestimation of the actual cancer risk highly unlikely. Cancer slope factors are derived from the results of human epidemiological studies or chronic animal bioassays to which mathematical extrapolation from high-to-low dose and uncertainty factors have been applied.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg/day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals that are likely to be without risk of adverse effect. Estimated intakes of chemicals from environmental media can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

## 6.4 Risk Characterization

Human health risks are characterized for potential carcinogenic and noncarcinogenic effects by combining exposure and toxicity information. Excess lifetime cancer risks are determined by multiplying the estimated daily intake level with cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-4}$). An

excess lifetime cancer risk of $1x10^{-4}$ indicates that, as a reasonable maximum estimate, an individual has a one in ten thousand additional (above their normal risk) chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the assumed specific exposure conditions at a site. EPA considers individual excess cancer risks in the range of $1x10^{-4}$ to $1x10^{-6}$ as protective; however, the 1E-6 risk level is generally used as EPA's point of departure when establishing clean up goals at NPL sites.

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose derived for a similar exposure period. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ<1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g., the liver) within a medium or across all media to which a given population may reasonably be exposed. An HI<1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic noncarcinogenic effects due to simultaneous exposure to all COCs are unlikely.

The HQ is calculated as follows:

Non-cancer HQ=CDI/RfD

where:

CDI=Chronic daily intake

RfD=reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic).

As shown on Table 5, the cumulative potential current carcinogenic risk level for workers on the southern portion of the site is 6E-6. The cumulative potential current carcinogenic risk levels for trespassers on the southern portion of the site and on the landfill are 2E-6, and 1E-4, respectively. The main pathways responsible for these risk levels are incidental ingestion of and dermal contact with surface soil, due primarily to the presence of dioxin, arsenic, and beryllium in the soil and ash residue. The cumulative current noncarcinogenic hazard indexes are less than 1. Therefore, noncarcinogenic effects are unlikely under current land use conditions.

# TABLE 5

## SUMMARY OF CUMULATIVE RISK ESTIMATES

| RECEPTOR | CUMMULATIVE RISK ESTIMATES | |
|---|---|---|
| | **Total Upper Bound Excess Lifetime Cancer Risk** | **Cumulative Hazard Index for Noncarcinogenic Effects** |
| **RISKS ASSOCIATED WITH CURRENT LAND-USE CONDITIONS** | | |
| **WORKER** | | |
| Southern Portion | $6x10^{-6}$ | <1 |
| **TRESPASSER** | | |
| Southern Portion | $2x10^{-6}$ | <1 |
| Landfil | $1x10^{-4}$ | <1 |
| Nearby Resident Using Rock Pit Lake | $3x10^{-6}$ | <1 |
| **RISKS ASSOCIATED WITH FUTURE LAND-USE CONDITIONS** | | |
| **CHILD RESIDENT** | | |
| Southern Portion | $1x10^{-5}$ | >1 |
| Drainage Area North of Lake Stupid | $1x10^{-4}$ | >1 |
| **ADULT RESIDENT** | | |
| Southern Portion | $2x10^{-5}$ | <1 |
| Drainage Area North of Lake Stupid | $9x10^{-5}$ | >1 |

The cumulative potential current carcinogenic risk level for nearby residents using Rock Pit Lake is 3E-6, due primarily to the presence of dioxin in fish tissue.

The cumulative potential future carcinogenic risk levels for child residents on the southern portion of the site and on the drainage area north of Lake Stupid are 1E-5 and 1E-4, respectively, with cumulative future noncarcinogenic hazard indexes greater than 1. These levels are due primarily to the presence of benzo(a)pyrene, dioxin, arsenic, and beryllium in surface soil; and, the presence of dioxin, toxaphene, arsenic, antimony, and cadmium in the sediment in the drainage area.

The cumulative potential future carcinogenic risk levels for adult residents on the southern portion of the site and on the drainage area north of Lake Stupid are 2E-5 and 9E-5, respectively, with a cumulative noncarcinogenic hazard index of greater than 1 for the drainage area. These risk levels are due primarily to the presence of dioxin, arsenic, and beryllium.

The potential future carcinogenic risk levels associated with site ground water are 1E-6 for child residents and 3E-6 for adult residents, due primarily to the presence of bis(2-ethylhexyl)phthalate in site ground water. Ground water within the current Site boundary exceeded Maximum Contaminant Levels (MCLs) for bis(2-ethylhexyl)phthalate, aluminum, antimony, cadmium, lead, manganese, and mercury. Ground water at the current site boundary exceeded secondary MCLs (for aluminum and manganese) only. Off site private water wells were not found to exceed ground water MCLs.

A remedial goal of 500 ppm has also been established for lead in surface soil. This level was given in the Baseline Risk Assessment (BRA) as the value derived using exposure default values in the UBK model (draft OSWER Directive #9355.4-08) as referenced in the BRA document.

## 6.5 Environmental Risk

A qualitative risk assessment was conducted to determine if contaminants present on site have impacted or can potentially impact flora and fauna in the area. The results of the comparison of chemical concentrations in surface soil with toxicity reference values (TRVs) suggest the potential for impacts to invertebrates from the presence of some metals on the southern portion of the site and the landfill. Potential impacts to small mammals and birds from the ingestion of earthworms were also evaluated. On the southern portion of the site, the estimated total dose a shrew would receive from the ingestion of earthworms and soil is greater than the TRV for cadmium, suggesting that impacts to shrews could potentially occur as a result of exposure

to cadmium in this area. In the landfill area, the estimated total doses of dioxin and cadmium are greater than the TRVs, suggesting potential impacts to shrews in this area. Potential impacts to sensitive aquatic species in Lake Stupid are also possible as a result of lead and aluminum in the lake water. Apparently, there are no endangered species in the area.

## 6.6 Uncertainties

At all stages of the risk assessment, conservative estimates and assumptions were made so as not to underestimate potential risk. Nevertheless, uncertainties and limitations which may lead to over- or under- estimation of risk are inherent in the risk assessment process.

## 7.0 Description of Alternatives

The following alternatives represent a range of distinct actions for addressing human health and environmental concerns. The analysis presented below reflects the fundamental components of the various alternatives considered feasible for this site. Five remedial alternatives have been identified for evaluation:

Alternative 1. No action

Alternative 2. Restricted access

Alternative 3. Soil cover

Alternative 4. Single barrier landfill cap

Alternative 5. Double barrier landfill cap

## 7.1 Alternative 1: No Action

Under the no action alternative, the site would be left "as is" and no funds would be expended to actively control or cleanup the site related contamination. The potential risks posed by the presence of contamination would not be minimized by this alternative.

The remaining alternatives all require ground water use controls in the form of a deed notice for ground water inside the current site boundary. Additionally, the alternatives require site monitoring for up to 30 years.

## 7.2 Alternative 2: Restricted Access

Alternative 2 would include engineering controls to restrict access to the site, and ground water monitoring for up to 30 years. A fence would be constructed around Lake Stupid and Rock Pit Lake to limit access to surface water. The incinerator buildings would be sealed to restrict access. All entrances, windows and openings of each building would be closed off with brick, concrete, or metal in a secure and permanent fashion. The water treatment system structures would be decontaminated. The method of decontamination would be determined by the construction of each structure. Typically, the ash residue would be scraped from the walls and floors and the contaminated surfaces would be pressure washed. The collected decontamination water would be treated for disposal.

## 7.3 Alternative 3: Soil Cover

Alternative 3 would include actions to reduce human contact with the ash within the landfill, and to minimize potential migration of contaminants through storm water runoff. A minimum of 30 inches of native soil would be placed on the 40 acre landfill, and grading would be modified to control surface water runoff and infiltration, and to reduce leachate development. Lake Stupid would be backfilled to eliminate contact with sediments and to eliminate potential ecological exposure pathways. The lake water would be removed for off-site treatment and disposal. Residual ash from the southern portion of the site would be excavated and placed in the landfill prior to construction of the soil cover. The buildings and structures would be sealed and decontaminated. This alternative would also include ground water monitoring for up to 30 years.

## 7.4 Alternative 4: Single Barrier Cap

Alternative 4 would be designed to reduce human contact with the landfill material, control erosion, and reduce infiltration and leachate production. A landfill cap would be designed to meet the requirements of Chapter 17-701 and 17-702 of the Florida Administrative Code (FAC), including a single liner landfill cap. A storm water management plan would be prepared to design the grading plan, design the retention and detention ponds, and to determine the discharges for storm water runoff. Lake Stupid would be drained and excavated to eliminate human contact with the sediments, and to eliminate the potential ecological exposure pathways. The water would be treated and disposed of, and the sediments would be excavated and placed on the landfill prior to construction of the landfill cap. Excavation of Lake Stupid sediments shall continue horizontally until the remaining sediment achieves the maximum contaminant concentrations noted in section 9 below. Vertically, the excavation shall continue to a depth of 24 inches, or until the remedial goals have been met,

whichever depth is less. The excavated areas will be backfilled with clean soil. A vertical barrier would be constructed between the landfill and Rock Pit Lake. The vertical barrier would prevent the migration of contaminants to Rock Pit Lake from the landfill. It is expected that the surface water of Rock Pit Lake would return to health based levels through natural attenuation.

Residual ash and contaminated soils from the southern portion of the site would be excavated and placed on the landfill. Soil excavation shall continue horizontally until the remaining soil achieves the maximum contaminant concentrations noted in section 9 below. Vertically, the excavation shall continue to a depth of 24 inches, or until the remedial goals have been met, whichever depth is less. The excavated areas will be backfilled with clean soil.

The buildings and structures on the southern portion of the site would be decontaminated and/or demolished, depending on the planned use of the building locations and on the practicability of decontaminating the buildings. The rubble and debris from any demolished buildings and/ or process structures which require demolition due to remediation or construction considerations will be crushed and disposed of in the landfill. This alternative would also include ground water monitoring, surface water monitoring and monitoring of sediment and fish in Rock Pit Lake for up to 30 years.

## 7.5 Alternative 5: Double Barrier Cap

Alternative 5 would include a landfill cap designed to reduce human contact with the landfill material, control erosion, and reduce infiltration and leachate production. The landfill cap would be designed to meet the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), including a double liner landfill cap. Any demolished buildings, structures, and excavated soils would be placed on the landfill prior to construction of the landfill cap. A storm water management plan would be prepared to design the grading plan, design the retention and detention ponds, and determine the discharges for storm water runoff. Lake Stupid would be drained and excavated to eliminate human contact with the sediments, and to eliminate the potential ecological exposure pathways. The water would be treated and disposed of, and the sediments would be excavated and placed on the landfill prior to construction of the landfill cap. Excavation of Lake Stupid sediments shall continue horizontally until the remaining sediment achieves the maximum contaminant concentrations noted in section 9 below. Vertically, the excavation shall continue to a depth of 24 inches, or until the remedial goals have been met, whichever depth is less. The excavated areas will be backfilled with clean soil. A vertical barrier would be constructed between the landfill and Rock Pit

Lake. The vertical barrier would prevent the migration of contaminants to Rock Pit Lake from the landfill. It is expected that the surface water of Rock Pit Lake would return to health based levels through natural attenuation.

Residual ash and contaminated soils from the southern portion of the site would be excavated and placed on the landfill. Soil excavation shall continue horizontally until the remaining soil achieves the maximum contaminant concentrations noted in section 9 below. Vertically, the excavation shall continue to a depth of 24 inches, or until the remedial goals have been met, whichever depth is less. The excavated areas will be backfilled with clean soil.

Soils from the Liquid Disposal Area located west of Lake Stupid would be excavated. Soils from the drainfields on the southern portion of the site would be excavated and placed on the landfill. The buildings and structures on the southern portion of the site would be decontaminated and/ or demolished, depending on the planned use of the building locations and on the practicability of decontaminating the buildings. The rubble and debris from any demolished buildings and/ or process structures which require demolition due to remediation or construction considerations will be crushed and disposed of in the landfill. This alternative would also include ground water monitoring, surface water monitoring and monitoring of sediment and fish in Rock Pit Lake for up to 30 years.

## 8.0 Comparative Analysis of Alternatives

The comparative analysis of the alternatives proposed for the site are presented in this section. The alternatives are evaluated against one another by using the following nine criteria:

- Overall protection of human health and the environment.
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
- Long term effectiveness and permanence.
- Reduction of toxicity, mobility, or volume through treatment.
- Short term effectiveness.
- Implementability.
- Costs.
- State Acceptance.
- Community Acceptance.

The NCP categorizes the nine criteria into three groups:

(1) Threshold criteria: The first two criteria, overall protection of human health and the environment, and

compliance with ARARs (or invoking a waiver), are the minimum criteria that must be met in order for an alternative to be eligible for selection.

(2) Primary balancing criteria: The next five criteria are considered primary balancing criteria and are used to weigh major trade-offs among alternative cleanup methods.

(3) Modifying criteria: State and community acceptance are modifying criteria that are formally taken into account after public comment is received on the proposed plan. State and community acceptance are addressed in the responsiveness summary of the ROD.

1. Overall Protection of Human Health and the Environment

With the exception of the no action alternative, all of the alternatives would provide some degree of protection for human health and the environment. However, Alternative 2 would not eliminate the contaminant exposure pathways, and would rely on engineering controls (such as fences, warning signs, etc.) to minimize the possibility of direct contact with the contaminated media. Alternative 3, while offering some degree of protection, lacks a vertical barrier which would separate the landfill contents from Rock Pit Lake and thereby prevent further erosion of landfill material into the lake. Furthermore, alternative 3 would address residual ash above the clean up goals but would not address the hot spots (contaminated soil, contaminated sediment, etc.) on the southern portion of the site.

Alternatives 4 and 5 provide protection by eliminating the potential routes of direct exposure to the contaminants, primarily through excavation and capping. It is expected that contaminant levels in surface water, fish tissue, and the sediment in Rock Pit Lake would decrease over time since the source material would be contained beneath the landfill cap. However, as with all alternatives, the contents of the landfill would remain in contact with ground water. Alternatives 4 and 5 would eliminate vertical infiltration above the water table, thus providing the degree of protection practicable at this site given that the source material will remain in contact with ground water.

2. Compliance with ARARs

Alternatives 1 and 2 would not comply with action-specific or chemical-specific ARARs. Subtitle D of the Resource Conservation and Recovery Act (RCRA) requires closure of the landfill with a cover of equivalent permeability to the surrounding soil. The Florida Administrative Code (FAC) Chapter

17-701 requires closure of Type I landfills with a multi-layer cap including a gas collection layer, a drainage layer, and a low permeability drainage layer. Storm water management is required by FAC Chapter 17-725. Alternatives 1 and 2 would not decrease levels of ground water contamination which currently exceed MCLs.

Alternative 3 could comply with RCRA subtitle D requirements and the Alternate Procedures of the State landfill closure requirements. Alternatives 4 and 5 would comply with Federal and State action-specific and chemical-specific ARARs. Federal RCRA Subtitle D and State Chapters 17-701, 17-702, and 17-725 action-specific ARARs would be achieved under alternatives 4 and 5. Achievement of risk based goals would also be achieved under alternatives 4 and 5.

3. Long-Term Effectiveness and Permanence

The soil cover in Alternative 3 would provide long term reduction of risk by reducing the potential for exposure to the landfill material. However, the soil cover would not be as effective in the long term as the Alternative 4 and 5 landfill caps. Excavation and backfilling of Lake Stupid would reduce the potential for exposure to the lake sediments. Landfilling of the incinerator ash residue would reduce the potential for exposure to this material. However, the soil cover would not provide for long term protection of ground water because the permeable soil cover would allow precipitation to continue to migrate through the landfill.

Under alternatives 4 and 5, contamination would be further reduced through removal of the source areas outside of the landfill and control of the storm water and ground water migration pathways. However, for each alternative, the contents of the landfill would remain in contact with ground water. The multi-layer cap would maintain its integrity with less maintenance than a soil cover. The construction of a vertical barrier between the landfill and Rock Pit Lake and control of storm water would reduce the contaminant migration to Rock Pit Lake, allowing for natural attenuation to reduce the contamination in Rock Pit Lake to health based levels. Under Alternative 5, the double liner cap would be expected to maintain its integrity longer than a single liner cap without maintenance. However, with proper maintenance and institutional controls that would protect the integrity of the cap, both alternatives 4 and 5 should be equally protective.

4. Reduction of Toxicity, Mobility, and Volume Through Treatment

Alternative 3 would reduce the toxicity and mobility of the ash residue in the incinerator buildings and water treatment

system structures by placing the material on the landfill prior to construction of the soil cover. However, this alternative would not reduce the toxicity of the landfilled material or Lake Stupid sediments. Alternative 3 also would not reduce the toxicity or mobility of the contaminated soils on the southern portion of the site.

Alternatives 4 and 5 would reduce the toxicity and mobility of contaminants from the hot spots (contaminated soils, sediments, and ash residue) by placing this material on the landfill prior to construction of the landfill cap.

None of the alternatives employ treatment that reduce toxicity, mobility, or volume as a principal element because: 1) it would not be cost effective to treat the waste disposed of in the landfill, 2) the selected remedy provides adequate protection to the human health and the environment, 3) complies with the Presumptive Remedy for CERCLA Municipal Landfill Sites approved by OSWER Directive 9355.0-49FS for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill and 4) the waste material is not a RCRA hazardous waste.

OSWER Directive 9355.0-49FS establishes that the following are the elements of a presumptive remedy for a municipal landfill: 1) landfill cap, 2) source area groundwater control to contain plume, 3) leachate collection and treatment, 4) landfill gas collection and treatment, and/or 5) institutional controls to supplement engineering controls. The remedy herein selected does not include source area groundwater control to contain plume because there is no known plume migrating from the Site. In addition, the remedy does not include a leachate collection and treatment system because the landfill material will remain in place below the water table. In the event that groundwater exceedences of Maximum Contaminant Levels (MCLs) are observed beyond the current Site boundary, the groundwater portion of the selected remedy will be reevaluated.

5.Short-Term Effectiveness

Alternatives 3, 4, and 5 each would present some potential risks to remediation workers and the environment during implementation. These risks would be controlled during remedial action by restricting access in the construction area and implementing a Health and Safety Plan. Additionally, the community would be temporarily affected by the clearing and grubbing of the landfill, exposure to fugitive dust during clearing and grubbing, and increased traffic and noise. Dust generation would be monitored and dust emissions would be controlled during remediation. Under alternatives 4 and 5, residents on the east side of the landfill may be impacted by construction of the landfill cap, depending on how the cap is

designed (the east toe of the landfill cap may encroach on residential properties in this area). Protectiveness will be achieved as soon as the contaminated soils, ash and sediments are excavated, landfilled and a cap is constructed on the landfill and as soon as Lake Stupid is drained and the water treated and disposed of. Regarding Rock Pit Lake, protectiveness is expected to be achieved through natural attenuation although an adequate estimate of how long it will take to achieve protectiveness cannot be established. However, Rock Pit Lake will be monitored as established in Section 9.0 (Selected Remedy), Sub-section E (Compliance Testing) and based on the results of the monitoring, EPA, in consultation with FDEP, may reevaluate the remedy.

6. Implementability

Under alternative 3, the soil cover construction, dewatering and backfilling of Lake Stupid, and the decontamination and sealing of the buildings and structures are technically feasible. Services and materials are currently available to complete this work. Under alternatives 4 and 5, construction of the landfill caps, removal of hot spots, dewatering and dredging of Lake Stupid, and the decontamination and/or demolition of the buildings and structures can be implemented. Services and materials are currently available to complete this work. These alternatives would require compliance with storm water management regulations. If the slope of the landfill along the east side of the site encroaches on residential properties, it may be necessary to relocate some residents and acquire their property. However, this necessity will depend on, and may be eliminated by, the details of the remedial design.

7. Cost

A summary of the present worth costs (Capital and Operation & Maintenance) for each of the alternatives is presented below:

| Alternative | Description | Capital Cost In Thousands | O&M Cost 30 Years In Thousands | Total - Capital & 30 Yr O&M In Thousands | Construction Period |
|---|---|---|---|---|---|
| Alt. 1 | No Action | $0 | $91 | $91 | Not Applicable |
| Alt. 2 | Restricted Access | $949 | $1,547 | $2,496 | Not Applicable |
| Alt. 3 | Soil Cover | $12,361 | $3,696 | $16,057 | 1 Year |
| Alt. 4 | Single Barrier Landfill Cap | $12,575 | $3,431 | $16,006 | 2 Years |
| Alt. 5 | Double Barrier Landfill Cap | $19,675 | $3,431 | $23,106 | 2 Years |
| | | | | | |

8. State Acceptance

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has been the support agency during the Remedial Investigation and Feasibility Study for the Wingate Road Municipal Incinerator and Landfill site. In accordance with 40 CFR 300.430, as the support agency, FDEP has provided EPA with input during the process. Although FDEP has not indicated an objection to the overall approach of the selected remedy, FDEP is unwilling to concur with this ROD because FDEP disputes the remediation goals selected for arsenic and dioxin in soil.

9. Community Acceptance

The concerns of the community are discussed in detail in the

Responsiveness Summary, which is part of this ROD.

## 8.1 Synopsis of Comparative Analysis of Alternatives

All of the alternatives, except for Alternative 1 (No Action), would provide some degree of overall protection of human health and the environment. Alternatives 4 and 5 would comply with ARARs. Alternative 4 represents the best balance among the criteria used to evaluate remedies. Alternative 4 is believed to be protective of human health and the environment, would comply with ARARs, would be cost effective, and does not employ treatment that reduces toxicity, mobility, or volume as a principal element because: 1) it would not be cost effective to treat the waste disposed of in the landfill, 2) the selected remedy provides adequate protection to the human health and the environment 3) complies with the Presumptive Remedy for CERCLA Municipal Landfill Sites approved by OSWER Directive 9355.0-49FS) for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill and 4) the waste material is not a RCRA hazardous waste.

## 9.0 SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives and public and state comments, EPA has selected Alternative 4, Single Barrier Site Cap, as the remedy for this site. At the completion of this remedy, the risk associated with this site has been determined to be in the range from $1x10^{-4}$ to $1x10^{-6}$ which is considered by EPA to be protective of human health and the environment. The State of Florida prefers 1E-6.

The total present worth cost of the selected remedy, Alternative 4, is estimated at $16,006,159. This includes capital costs of $12,574,674. and present worth O&M costs of $3,431,485.

## A. Source Control

### A.1 Major Components of Source Control

Source control will address the contaminated media at the site. The primary component of the source control is the landfill cap. Source control shall also include excavation of ash residue, soils, and sediments, placement of the excavated material on the landfill, and backfilling of the excavated areas with clean fill.

All surface soil and sediment on the southern portion of the site which exceeds any of the remedial goals will be excavated and placed on the landfill prior to construction of the landfill cap. Any

residual ash or ash residue on the site (such as that located in the buildings and structures, on the ground surface, in the soils, in Lake Stupid, in the sediments and soils adjacent to Lake Stupid, in the Lake Stupid drainage area, in the sludge bed and settling basins, etc.) will be excavated to the levels of the performance standards shown in Section 9.A.2 below. This material will be placed on the landfill prior to construction of the landfill cap. The excavations will be backfilled with clean fill.

The single barrier landfill cap will be designed to reduce human and environmental contact with landfilled material, control erosion, reduce infiltration and leachate production, and manage storm water in accordance with state and federal standards. This site cap will be designed to meet the requirements of Subtitle D of RCRA and Chapters 17-701 and 17-702 of the FAC. The cap will be designed with a gas layer and drainage layers. The cap will be constructed of a low permeability barrier layer, and a soil layer that includes topsoil or soil to support vegetative cover. The remedial design will include an investigation of the geotechnical characteristics for the site material to support design of the cap. Design of the cap should include consideration for future use of the property. Institutional Controls may be required to assure the integrity of the cap.

The bushes and trees on the landfill will be cleared, grubbed, and/or cut down. The cleared wood and vegetation debris will be mulched, composted, and placed on the landfill prior to construction of the landfill cap. Debris from any demolished buildings and/ or process structures which require demolition due to remediation or construction considerations will be crushed and placed over the cleared landfill area. Excavated soil will be placed over the building debris on the landfill, and may be used to enhance grading, prior to capping.

In accordance with Chapter 17-725 of the FAC, a storm water management plan will be prepared to design the grading plan, determine the storm water flow rate from the cap, size the channels, and determine the discharges for storm water runoff. Retention and/or detention ponds will be designed around the landfill. A proposed site plan for Alternative 4 is shown on Figure 3, however, placement of the retention pond may be modified during the remedial design based on the future use of the site and on the details of the design.

Grading and vegetation of the soil cover will be used to control erosion. Geotextile fabric will be utilized for erosion control on the landfill slope adjacent to Rock Pit Lake. A vertical barrier will be constructed between the landfill and Rock Pit Lake to reduce migration of hazardous substances, pollutants and contaminants from the landfill to Rock Pit Lake. Once migration ceases, it is expected that the levels of contaminants exceeding health based levels in the surface water in Rock Pit Lake will decrease to these levels through natural attenuation.

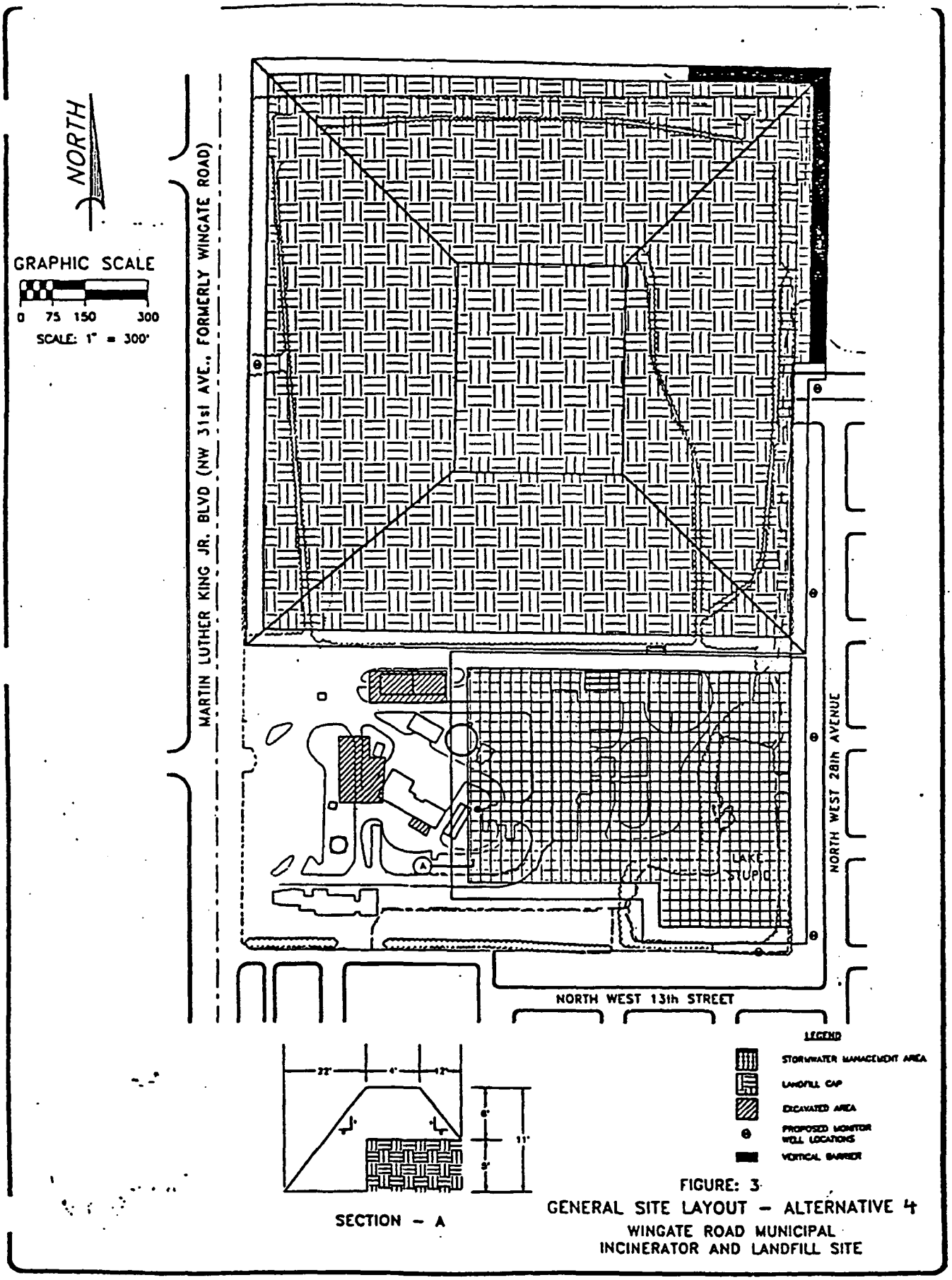



FIGURE: 3
GENERAL SITE LAYOUT - ALTERNATIVE 4
WINGATE ROAD MUNICIPAL
INCINERATOR AND LANDFILL SITE

Lake Stupid will be drained and excavated to eliminate human contact with the sediments, and to eliminate the potential ecological exposure pathways. The water will be treated and disposed of, and the sediments will be excavated and placed on the landfill prior to construction of the landfill cap. The sediment may also be dried prior to placement. The excavated area will be backfilled with clean soil.

The incinerator buildings and the buildings and structures utilized for waste water treatment will be decontaminated. The method of decontamination will be determined by the construction of the building or structure. Typically, the residue/ash will be scraped from the walls and floors and placed on the landfill prior to construction of the cap to achieve the soil/ ash clean up goals.

All fencing and warning signs will be maintained, as well as the site cap and storm water management system. The site will be periodically inspected for vandalism. A maintenance and inspection punch list will be developed and completed for submittal with the inspection reports. The site will periodically be mowed and bushes and trees trimmed.

Closure of the landfill under Alternative 4 may provide suitable land area for future beneficial use of the property that will not affect the integrity of the cap or other components of the remedy or monitoring system. EPA encourages the responsible parties to consider beneficial land uses during the remedial design. Some community preferences for future land use are included in the Responsiveness Summary.

## A.2 Performance Standards

Soil excavation shall continue horizontally until the remaining soil achieves the following maximum contaminant concentrations. Vertically, the excavation shall continue to a depth of 24 inches, or until the remedial goals have been met, whichever depth is less. The excavated areas will be backfilled with clean soil. The following remedial goals have been established for ash residue and surface soil:

| | |
|---|---|
| Lead | 500 mg/kg (ppm) |
| Arsenic | 23 mg/kg (ppm) * |
| Benzo(a)pyrene | 0.13 mg/kg (ppm) |
| Beryllium | 0.034 mg/kg (ppm) |
| Dioxin | 0.0006 mg/kg (ppm) TEQ * |

* EPA considers 23 ppm arsenic and 0.0006 ppm TEQ dioxin to be protective of human health and the environment as these levels fall within EPA's risk range. However, on September 29, 1995, FDEP issued guidance suggesting a cleanup goal for arsenic of 0.7 ppm which is more stringent than the selected remediation goal.

Additionally, FDEP has stated a preference for 0.000006 ppm TEQ dioxin which would meet a 1E-6 risk, and which is more stringent than the selected remediation goal. Attainment of the more stringent levels may be necessary to obtain FDEP's concurrence with deletion of this site from the National Priorities List in the future.

Excavation of Lake Stupid sediments shall continue horizontally until the remaining sediment achieves the following maximum contaminant concentrations. Vertically, the excavation shall continue to a depth of 24 inches, or until the remedial goals have been met, whichever depth is less. The excavated areas will be backfilled with clean soil. The following remedial goals have been established for sediments. These levels are also established to evaluate the effectiveness of the landfill closure on the sediments in Rock Pit Lake:

| | |
|---|---|
| Dioxin | 0.0013 mg/kg (ppm) TEQ |
| Toxaphene | 1.8 mg/kg (ppm) |
| Antimony | 67 mg/kg (ppm) |
| Arsenic | 46 mg/kg (ppm) |
| Cadmium | 170 mg/kg (ppm) |

B. Ground Water Remediation

Section 300.430(f)(5)(iii)(A) of the NCP states that performance shall be measured at appropriate locations in the ground water. EPA has determined that remediation levels should be attained at and beyond the edge of the waste management area when waste is left in place. In accordance with the NCP and OSWER Directive 9283.1-2 "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, December 1988", since the contaminated source material will be left in place, this waste management area boundary can be defined as the current (60-acre) site boundary.

The ground water component of the selected remedy requires no remedial action within the current Site boundary other than ground water use restrictions in the form of a deed notice. Therefore, ground water inside the current Site boundary should not be used for potable water supply. Based on available information, ground water outside the current site boundary is protective of the human health and the environment and requires no action at this time but will be monitored in accordance with State FAC Chapters 17-701 and 17-702 landfill closure requirements. Should exceedences of landfill closure ARARs or ground water ARARs (including the performance standards in Section 9.B.1) be observed outside of the current site boundary; EPA, in consultation with FDEP, will reevaluate the effectiveness of the ground water component of the selected remedy.

B.1 Performance Standards

Site related ground water contamination which exceeds federal and/or state ground water standards, including those listed in the following table, will be evaluated. The following remedial goals have been established for ground water outside the current Site boundary:

| | | | |
|---|---|---|---|
| Bis(2-ethylhexyl)phthalate | 6 | ug/l | (ppb) |
| Benzene | 1 | ug/l | (ppb) |
| Aluminum | 50 | ug/l | (ppb) |
| Antimony | 6 | ug/l | (ppb) |
| Cadmium | 5 | ug/l | (ppb) |
| Lead | 15 | ug/l | (ppb) |
| Manganese | 50 | ug/l | (ppb) |
| Mercury | 2 | ug/l | (ppb) |

C. Surface Water Monitoring

Site related surface water contamination which exceeds Ambient Water Quality Criteria (AWQC) will be evaluated to confirm the effectiveness of the landfill closure in mitigating the surface water migration pathway. The acute and chronic AWQC for lead (96/ 3.6 ppb), aluminum (750/ 87 ppb), antimony (88/ 30 ppb), cadmium (3.9/ 1.1 ppb), copper (19/ 13 ppb), silver (4.8/ 0.12 ppb), zinc (127/ 115 ppb), iron (1000 ppb, chronic), mercury (2.4/ 0.012 ppb), and beryllium (0.13 ppb), shall apply to the site related surface waters.

D. Fish Tissue Monitoring

Site related fish tissue contamination in Rock Pit Lake which exceeds remedial goals will be evaluated to confirm the effectiveness of the landfill closure in mitigating this migration pathway. The following remedial goal has been established for fish filet tissue in Rock Pit Lake:

Dioxin 0.02 ng/kg (ppt, parts per trillion) TEQ

E. Compliance Testing

Ground water, surface water, sediment, and fish tissue monitoring shall be conducted at this site for 30 years. The effectiveness of the remedy will be reevaluated in consultation with FDEP, based on the results of the monitoring. A zone of discharge may be established in accordance with the state landfill closure regulations. Additional monitoring wells will be necessary to monitor ground water outside of the current Site boundary. The monitoring wells will be sampled and the samples analyzed quarterly for the first two years for FAC Chapter

17-701 parameters, as well as the site related contaminants noted in Section B.1 above. The monitoring frequency for the remaining years will be determined based on the analytical results of the first two years.

Sediment in Rock Pit Lake shall be monitored for the contaminants noted in Section A.2 above. Surface water in Rock Pit Lake shall be monitored for AWQCs for the contaminants noted in Section C above. Sediment and surface water samples will be collected and the samples analyzed quarterly for the first two years. The monitoring frequency for the remaining years will be determined based on the analytical results of the first two years.

Fish tissue in Rock Pit Lake will be monitored for dioxin and lead concentrations. Fish samples will be collected and the samples analyzed semi-annually for the first two years. Analysis will include whole-body analysis of a forage species and filet analysis of a sport species. The monitoring frequency for the remaining years will be determined based on the analytical results of the first two years.

## 10.0 STATUTORY DETERMINATIONS

EPA has determined that 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 to the remedial action, and is cost effective. EPA has also determined that this remedy utilizes permanent solutions but does not satisfy the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principal element because: 1) it would not be cost effective to treat the waste disposed of in the landfill, 2) the selected remedy provides adequate protection to the human health and the environment, 3) complies with the applicable provisions of the Presumptive Remedy for CERCLA Municipal Landfill Sites approved by OSWER Directive 9355.0-49FS for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill and 4) the waste material is not a RCRA hazardous waste. However, the remedy satisfies the bias against off-site land disposal of untreated wastes to the extent practicable.

### 10.1 Protection of Human Health and The Environment

The selected remedy will protect human health and the environment by reducing or preventing further migration of and exposure to contaminants. The selected remedy should reduce the contaminant concentrations in surface water, sediment, and fish tissue through capping of the ash and soil contamination. The long-term cancer risk posed by the ash and soil will be reduced to within EPA's acceptable risk range of $1x10^{-4}$ to $1x10^{-6}$ and the non carcinogenic risk would be

reduced to the EPA goal of 1.

## 10.2 Compliance With ARARs

Implementation of this remedy will comply with State landfill closure ARARs and will assure that Federal and State drinking water standards outside the current site boundary are not exceeded.

As presented in section 9.A.1, the source control component of the selected remedy includes in place closure of the landfill. The landfill material is currently buried to approximately 30 feet below the water table. To the extent technically practicable, capping the source material will minimize leachate and contaminant migration above the water table. However, horizontal flow of ground water through the source material below the water table will continue, thus attainment of ground water MCLs within the current site boundary is not technically feasible.

Ground water outside of the current site boundary will be monitored for compliance with the Federal and State ground water ARARs including those identified in Section 9.B.1, as well as Sate landfill closure ARARs.

Section 300.430(f)(5)(iii)(A) of the NCP states that performance shall be measured at appropriate locations in the ground water. EPA has determined that remediation levels should be attained at and beyond the edge of the waste management area when waste is left in place. In accordance with the NCP and OSWER Directive 9283.1-2 "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites, December 1988", since the contaminated source material will be left in place, this waste management area boundary can be defined as the current (60-acre) site boundary.

The ground water component of the selected remedy requires no remedial action within the current site boundary other than ground water use restrictions to avoid drinking water wells from being installed in this area. Therefore, ground water inside the current site boundary should not be used for potable water supply. Ground water outside the current Site boundary requires no action at this time but will be monitored in accordance with State FAC Chapters 17-701 and 17-702 landfill closure requirements. Should exceedences of landfill closure ARARs or ground water ARARs (including the performance standards in Section 9.B.1) be observed outside of the current site boundary; EPA, in consultation with FDEP, will reevaluate the effectiveness of the ground water component of the selected remedy.

## 10.3 Cost Effectiveness

The selected remedy, Alternative 4, is a cost effective remedy.

The total estimated present worth cost of this alternative is $16,006,159 which includes capital costs and operation and maintenance costs. EPA has determined that the cost of implementing the remedy is appropriate given the threat posed by the site contaminants.

## 10.4 Use of Permanent Solutions and Treatment Technologies

The selected remedy utilizes permanent solutions but does not satisfy the statutory preference for remedies that employ treatment that reduce toxicity, mobility, or volume as a principal element because: 1) it would not be cost effective to treat the waste disposed of in the landfill, 2) the selected remedy provides adequate protection to the human health and the environment, 3) complies with the applicable provisions of the Presumptive Remedy for CERCLA Municipal Landfill Sites approved by OSWER Directive 9355.0-49FS for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill and 4) the waste material is not a RCRA hazardous waste.

## 10.5 Preference for Treatment as a Principal Element

The selected remedy does not satisfy the preference for treatment because: 1) it would not be cost effective to treat the waste disposed of in the landfill, 2) the selected remedy provides adequate protection to the human health and the environment, 3) complies with the Presumptive Remedy for CERCLA Municipal Landfill Sites approved by OSWER Directive 9355.0-49FS for that portion of the Site consisting of material already placed in the landfill and for the material to be placed in the landfill and 4) the waste material is not a RCRA hazardous waste.

Because this remedy will result in hazardous substances, pollutants and contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. These reviews will be conducted every five years or until remediation goals are achieved.

## 11.0 DOCUMENTATION OF SIGNIFICANT CHANGES

Alternative 4 of the Feasibility Study envisioned additional work to be performed in order to accommodate the storm water management system on the southern portion of the site. This work would include :

* Excavating/ treating soils from the liquid disposal area located east of the new incinerator building,

* Excavating/ treating soils contaminated with petroleum in the vehicle maintenance area,

* Excavating/ treating soils from drainfields associated with the truck wash area, the old incinerator building, and the east drainfield located east of the new incinerator building, and,

* Demolishing the incinerator buildings and water treatment system structures after they have been decontaminated and placing the demolition debris on the landfill prior to construction of the landfill cap.

Treatment of soils will not be necessary since samples of the source material did not exceed the regulatory limits for TCLP metals, as noted in Section 5.2.1 above, and since the soils are not a RCRA listed hazardous waste. However, all soils in excess of the remedial goals will be excavated and placed beneath the landfill cap to eliminate the direct contact exposure pathway.

Additionally, the Feasibility Study envisioned that the area of petroleum contamination in the vehicle maintenance area would be remediated as part of the Remedial Action. However, CERCLA prevents EPA from taking remedial action on petroleum contamination. Therefore, the petroleum contaminated area must continue to be addressed through FDEP and the Broward County Office of Natural Resource Protection (ONRP) during the Remedial Design phase. If this area has not been addressed by the City and ONRP prior to the completion of the Remedial Design, EPA will proceed with the selected remedy for this site (i.e.; the petroleum contaminated area will still need to be addressed through ONRP). It should be noted that the selected remedy may include construction in this area which may necessitate excavation for construction of storm water management controls or other components of the remedial action. In this event, the excavated soils will be disposed of in the landfill prior to construction of the landfill cap.

The storm water management system design will be addressed in detail in the remedial design. If building demolition is necessary in order to accommodate adequate storm water controls, or in order to achieve any of the remedial goals established in this Record Of Decision, or because decontamination of the buildings/ structures is not practicable; then such work may be carried out in accordance with Alternative 4 of the Feasibility Study.

## RESPONSIVENESS SUMMARY

The U.S. Environmental Protection Agency (EPA) held a public comment period from December 7, 1994 through January 6, 1995 for interested parties to comment on EPA's Proposed Plan for the Wingate Road Municipal Incinerator and Landfill Site (the site). EPA conducted a public meeting at the Bass Park- Andrew De Graffenreidt Community Recreation Center in Fort Lauderdale, Florida on December 12, 1994, during the public comment period. During this meeting, representatives of EPA presented the results of the site investigation and EPA's preferred alternative for addressing the site related contamination.

A summary of EPA's response to comments received during the public comment period, known as the responsiveness summary, is required under Section 117 of CERCLA. EPA has considered all the significant comments made during the public comment period and answers them in this responsiveness summary in determining the final selected remedy presented in the Record of Decision.

This responsiveness summary consists of the following sections:

A. Background of Community Involvement and Concerns: this section provides a brief history of community interest and concerns regarding the site.

B. Summary of Significant Questions and Comments Received During the Public Comment Period and EPA's Responses: This section presents both oral and written (if any) comments submitted during the public meeting and public comment period, and provides the responses to these comments.

### A. Background of Community Involvement and Concerns

In accordance with Sections 113 and 117 of CERCLA, EPA has conducted community relations activities at the site to ensure that the public remains informed of the continuing progress. During the investigation, EPA has held meetings with state and local officials and with the public to advise them of the progress at the site.

A community relations plan was developed to establish EPA's plan for community participation during the investigation. Prior to the initiation of the RI/FS, EPA held an Availability Session in Fort Lauderdale to present the activities scheduled for the RI to the public. Following completion of the RI field work, EPA held an Availability Session to inform the public of the results of the RI. Following completion of the FS, a Proposed Plan Fact Sheet was mailed to local residents and public officials in December 1994. This fact

sheet outlined EPA's preferred alternative for addressing the contamination at the site. Additionally, the Administrative Record for the site, which contains site related documents including the RI and FS reports and the Proposed Plan, was made available for public review at the information repository at the Broward County main library in Fort Lauderdale. Notices of the availability of the Administrative Record for the site were published in the Westside Gazette Newspaper on December 1st and 8th, 1994, and in the Broward Times Newspaper on December 2nd and 9th, 1994.

A 30 day public comment period was held from December 7, 1994 through January 6, 1995 to solicit public input on EPA's preferred remedial alternative. In addition to the comment period, EPA held a public meeting at the Bass Park- Andrew De Graffenreidt Community Recreation Center in Fort Lauderdale on December 12, 1994. The purpose of this meeting was to discuss the remedial alternatives under consideration and to answer any questions concerning the Proposed Plan for the Wingate Road site. The meeting was attended by approximately 50 area residents and public officials. Comments were received from citizens of Fort Lauderdale, city officials, and the Florida Department of Environmental Protection (FDEP). With the exception of the cleanup levels for arsenic and dioxin in soils, FDEP has verbally expressed agreement with the selected remedy.

EPA's response to the comments received at the meeting or during the comment period are summarized in Section B below. A transcript of the public meeting was prepared by a certified court reporter, and this transcript is part of the Administrative Record upon which the remedy selected in the Record of Decision is based.

Following the issuance of the final Record of Decision, EPA will continue to keep the community informed about progress at the site through fact sheets and informational meetings as needed. Additionally, design and construction documents pertaining to the implementation of the remedy will be placed in the information repository at the Broward County main library.

B. Summary of Significant Questions and Comments Received During the Public Comment Period and EPA's Responses.

1. Comment: Is it safe for people to eat fish from Rock Pit lake?

Response: Yes. Fish samples were collected and analyzed during the investigation. The fish filet samples collected from Rock Pit Lake contained a maximum dioxin concentration of 0.07 parts per trillion (ppt) TEQ, which is below the level considered safe by ATSDR. If the dioxin concentration had exceeded 25 ppt TEQ, then a fishing advisory may have been called for. Additionally, EPA generated a site specific, risk assessment based level of 0.02 ppt TEQ which would fall within the acceptable risk range of 1E-4 to 1E-6; 0.07 ppt also falls within

this range.

2. Comment: Is there a correlation between the concentrations detected and the ground water sampling locations? For instance, if ground water was sampled close to Rock Pit Lake, was it more concentrated than something two blocks away or three blocks away?

Response: The highest levels of ground water concentrations were found in two places; one being in three wells located along the eastern edge of the property, and the other being at the southern edge of the landfill. Samples collected from off site private wells did not exceed primary drinking water standards.

3. Comment: Is it safe to use Lake Stupid for recreational purposes?

Response: No. The sediment within and adjacent to Lake Stupid requires remediation in order to mitigate future risk. Also, the water samples collected from Lake Stupid exceed EPA's ambient water quality criteria.

4. Comment: What is considered to be a normal level of contamination in landfills? How can EPA compare the concentrations found ?

Response: There are no normal or set levels of contamination for landfills. The concentrations are compared to the normally existing background conditions in this area of Fort Lauderdale. Background samples were collected from areas which would not have been impacted by the site. Results from analysis of those samples are compared to concentrations found on site to evaluate the site's impact relative to naturally occurring background conditions.

5. Comment: Is the data presented in the Proposed Plan the total data? Did EPA require TCLP testing?

Response: The proposed plan is a summary. There is more information in the Remedial Investigation, but this is a summary of the conditions at the site. The Remedial Investigation report can be found in the Administrative Record in the information repository at the Broward County main library. The administrative record contains the complete data set. Toxicity Characteristic Leachate Procedure (TCLP) analysis was performed on samples of the incinerator ash to determine whether contaminants would leach from the ash. The samples passed the TCLP test.

6. Comment: Can you determine after you do a risk assessment whether or not there are certain types of cancers caused by certain chemicals found at this type of site or maybe were produced by this site over a

course of time?

Response: That is very difficult because one would have to look at an individual's entire life history. One person in every four in the United States gets cancer, whether they live near a hazardous waste site or not. A lot of it has to do with lifestyle, genetics, occupation, and some has to do with exposure, but we would have to be able to pinpoint what each person was exposed to, and whether that chemical causes a certain cancer or illness. EPA's risk assessment predicts the potential for increased cancer risk to the general population, not to specific individuals.

7. Comment: Due to the fact that City employees worked at the incinerator, could the records of the health and well being of those employees who worked at the site be gathered to find out what kind of health problems may have occurred in their lifetimes?

Response: That does not come under the jurisdiction of ATSDR or EPA. There is a government agency that does look into that; the National Institute of Occupational Safety and Health (NIOSH). Additionally, the Florida Department of Health and Rehabilitative Services (HRS) may be able to help with that. The commentor was informed to have former employees at the facility make the request for a study directly to either NIOSH or HRS. EPA has notified HRS of this concern.

8. Comment: Would the clean up alternatives potentially effect any of the neighborhoods around the site?

Response: Yes. Alternatives four and five could potentially effect three homes on the east side of the landfill. These homes could be effected by construction of the landfill cap because they are so close to the landfill. However, the effect, if any, will not be known until the Remedial Design is done. The cap might be able to be designed in a way that would not effect those properties.

9. Comment: Do local residents have to worry about the sediment from the site potentially effecting them, in that could the wind blow it off site and potentially hurt them?

Response: During clean up the contractors doing the work generally take every precaution possible for dust suppression. Dust control measures are used and air monitoring equipment is used to detect if dust or contaminants are going into the community above a safe level. These events are taken into consideration when preparing the Remedial Design.

10. Comment: Is the site fenced?

Response: Yes. However, both ATSDR and EPA have said on numerous occasions that the gates at the site should be kept closed to minimize contact with contaminated media.

11. Comment: Will there be a wall between the landfill and Rock Pit Lake?

Response: Yes, under Alternatives four and five there would be an impermeable barrier between the landfill and the lake.

12. Comment: Can we use the no action alternative?

Response: For this site, no. In this case, an action is necessary since the site poses potential for risk due to long term exposure to contaminated media.

13. Comment: Does the site pose a health threat to the community now?

Response: As long as there is no contact with contaminated material, no. However, the threat at this site is associated with direct contact with and incidental ingestion of contaminated media under current and future land use scenarios.

14. Comment: Why can't we use Alternative 5 instead of Alternative 4?

Response: Although Alternative 5 has an added feature (an extra liner), both alternatives 4 and 5 are protective of human health and the environment. The cap included in the design for Alternative 4 would contain all of the contaminants from the southern portion of the site and from the landfill itself. And, EPA will perform a Five-Year-Review once every five years, including a physical check of the cap and the ground water monitoring system, and all other components of the Remedial Action to make sure it remains protective. Based on the protectiveness of Alternative 4, EPA determined that it was not cost effective to add an additional liner, which was included in alternative 5, at a cost of approximately $7 million more.

15. Comment: Can you calculate past contaminant concentrations or risk levels?

Response: No. We can calculate current and future risk, but we can not go back in time and calculate past levels of risk. ATSDR can look into probable past exposure, but not levels of contamination or risk.

16. Comment: Several commentors asked what beneficial use the site might be put to following the remedial action. They mentioned ideas

such as a golf course, a cultural arts center, a theatre, and a nature area.

Response: Given that the site is in a residential area, EPA agrees that future land use that will not adversely affect the integrity of the selected remedy should be considered. The future use of the site will ultimately depend on how the city decides to use the property. Under CERCLA, EPA can only require that threats to human health and the environment be addressed. It is not known at this time whether the examples noted above would be practicable. However, EPA will encourage the responsible parties to consider and plan for future beneficial use of the property during the remedial design phase.

17. Comment: FDEP expressed concern with the arsenic cleanup level of 23 parts per million (ppm) in soil and the dioxin cleanup level of 0.0006 ppm TEQ in soil. FDEP has stated a preference for 0.56 ppm or background, whichever is greater, for arsenic; and 0.000006 ppm TEQ for dioxin which would meet a 1E-6 risk.

Response: EPA's remediation goals of 23 ppm arsenic and 0.0006 ppm dioxin in soil yield a risk within the acceptable risk range as defined by 40 CFR 300.430(e)(2). EPA is aware of FDEP's guidance concerning 0.7 ppm arsenic for soil dated September 29, 1995, and FDEP's stated preference concerning 0.000006 ppm dioxin for soil. However, these levels are not considered to be Applicable or Relevant and Appropriate Standards (ARARs) as defined in 40 CFR 300.400 because they have not been promulgated by the State.

EPA is aware of FDEP's long standing preference for attaining risk no greater than 1E-6 for carcinogens. However, the Superfund provides EPA with flexibility in developing remediation goals which attain risk between 1E-4 and 1E-6. Use of a risk range is a necessary tool for the risk management process to account for factors such as toxicological uncertainty and/or confidence. FDEP's preference was also factored into the risk management process prior to establishing the remediation goals.

EPA acknowledges FDEP's preferred cleanup goals and the potential need to attain these goals for NPL deletion of the site in the future. Although lower cleanup levels are not necessary to meet EPA's selected remediation goals at this site, the State may independently pursue an agreement with the PRPs to address the lower goals. A negotiated agreement between the PRPs and FDEP could be incorporated into the design and implementation of EPA's selected remedy.