902012

Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

Village of Cuba
Municipal Waste Disposal Site
Town of Cuba, Allegany County
Site Number 9-02-012

June 2000

902012

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Commissioner*

NEW YORK STATE
DEPARTMENT OF

ENVIRONMENTAL
CONSERVATION

Record Of Decision Available

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The Record of Decision, or ROD, for the Cuba Landfill Site documents the State's selection of a final remedial action for the site. The Record of Decision is available for you to review at the document repositories listed below. The Record of Decision summarizes site investigations, cleanup alternatives evaluated by the State, and comments received from the public about the selected cleanup alternative.

Cuba Village Hall
17 East Main Street
Cuba, NY 14727

NYSDEC Region 9 Office
270 Michigan Ave
Buffalo, NY 14203

NYSDEC Central Office
50 Wolf Road - Room 348
Albany, NY 12233

FACT SHEET

Village of Cuba Landfill

July 2000

Site #9-02-012

State Announces Cleanup Plan for the Village of Cuba Municipal Waste Disposal Site

* * *

On [DATE] the New York State Department of Environmental Conservation (NYSDEC) in conjunction with the New York State Department of Health (NYSDOH) issued a Record of Decision (ROD) outlining a cleanup plan for the Village of Cuba Municipal Waste Disposal (Landfill) Site, investigations, cleanup alternatives evaluated by the State, and comments received by the public. The chosen remedy, outlined in the Record of Decision, includes:

●Construction of a new landfill cap which will comply with the requirements of 6 NYCRR Part 360. The 24 acre cap would consist of:

- 12 inches of soil over the existing cover;
- a low permeability geomembrane;
- a geocomposite drainage layer;
- 24 inch soil barrier protection layer; and,
- a 6 inch vegetative growth cover.

●Construction of a surface and shallow groundwater diversion trench on the north side of the landfill to eliminate up-gradient flows from entering the landfill;

●Installation of a phytoremediation leachate control system, consisting of hybrid poplar trees at the southern toe of the landfill slope;

●Physical controls to limit access to the site; and

●Long-term operation and maintenance of the site including monitoring of groundwater and surface water to ensure the effectiveness of the remedy.

Estimated construction cost for the selected remedy is $4,327,000 and estimated annual Operation and Maintenance (O&M) of $38,000.

About the Cuba Landfill Site:

The Cuba Municipal Waste Disposal Site is a former municipal landfill that accepted household, commercial and industrial waste from the early 1950's until closing in 1981. The site was listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 site in 1994. A Class 2 site is defined by the NYSDEC as posing a significant risk to human health and/or the environment. In response, the NYSDEC completed a Remedial Investigation (RI) to determine the nature and extent of contamination, and a Feasibility Study (FS) Report to analyze methods to address contamination. A Proposed Remedial Action Plan was presented to the public at a January 19, 2000 public meeting held at the Village of Cuba Offices. A responsiveness summary has been prepared that responds to comments received at the public meeting and to written comments received during the comment period. The reponsiveness summary is available as an appendix to the ROD.

Next Step:

The next step in the remedial process is for the Department to negotiate a legal agreement (Order on Consent) with the Potentially Responsible Parties (PRPs) for this project which will cover the design, construction and operations of the site's remediation. These negotiations with the PRPs for the site may take six months or more to complete. If the negotiations are unsuccessful then the project may be referred to the State Superfund for completion. The remedial design normally takes 6-12 months to complete prior to the start of remedial construction. Best estimate for the start of remedial construction would be the 2002 construction season.

For More Information:

The public is encouraged to review the Record of Decision and other site-related documents which are available for review at the at the document repositories listed in the box on the first page of this fact sheet.

You are encouraged to contact representatives of the NYSDEC or the NYSDOH at any time with questions, comments or concerns.

For Questions About:

➢ **The Cleanup:**

Mr. Gary E. Kline, P.E.
Project Manager
NYSDEC
50 Wolf Road - Room 348
Albany, NY 12233-7010
(518) 457-5636 or
1-800-342-9296 (leave a message and someone will return the call.

or

Mr. Michael Podd
Citizen Participation Specialist
NYSDEC - Region 9
270 Michigan Ave.
Buffalo, NY 14203
(716) 851-7220

➢ **Site-Related Health Concerns:**

Mr. Mark VanValkenburg
Chief, Western Section
NYSDOH
547 River Street
Troy, NY 12180
1(800) 458-1158, Ext 27860

or

Mr. Mark VanDeusen
Outreach Unit
NYSDOH
547 River Street
Troy, NY 12180
1(800) 458-1158, Ext 27530

DECLARATION STATEMENT - RECORD OF DECISION

Village of Cuba Municipal Waste Disposal Site
Town of Cuba , Allegany County, New York
Site No. 9-02-012

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Village of Cuba Municipal Waste Disposal Site (Cuba Landfill) class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Cuba Landfill inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Cuba Landfill and the criteria identified for evaluation of alternatives, the NYSDEC has selected containment of the Cuba Landfill as the selected remedy in accordance with NYSDEC TAGM #4044 Accelerated Remedial Actions at Non-RCRA Regulated Landfills and 6 NYCRR Part 360. The components of the remedy are as follows:

- A remedial design program to verify the components of the conceptual design and provide details necessary for constructing the selected remedy.
- Construction of a new landfill cap to comply with 6 NYCRR Part 360 consisting of a geomembrane, geocomposite drainage layer, barrier protection layer and vegetative cover;
- Construction of a diversion trench on the north side of the landfill;

- Installation of a phytoremediation leachate control system, consisting of poplar trees, on the southern toe of the landfill.

- A long-term groundwater monitoring program to verify the effectiveness of the selected remedy.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element.

6/28/00
Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

TABLE OF CONTENTS

Record Of Decision

Village of Cuba Municipal Waste Disposal Site
Town of Cuba, Allegany County, New York
Site No. 9-02-012
June 2000

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) has selected a remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the Village of Cuba Municipal Waste Disposal Site (Cuba Landfill). As more fully described in Sections 3 and 4 of this document, the Cuba Landfill accepted household, commercial and industrial waste resulting in the disposal of a number of hazardous wastes, including spent halogenated solvents, spent cleaning solutions from electroplating operations, PCB capacitors and paint sludges, some of which were released or have migrated from the site via landfill leachate to the property immediately south of the landfill. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- A significant threat to human health associated with potential exposure to leachate and downgradient off-site springs contaminated with Volatile Organic Compounds (VOCs) and PCBs.

- A significant threat to the environment and adverse environmental damage from the persistent contravention of groundwater standards for multiple hazardous contaminants.

In order to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous waste disposed at the site has caused, the following remedy is proposed:

- Installation of a NYCRR Part 360 low permeability cap with passive gas venting, upgradient surface and shallow groundwater diversion, phytoremediation system for control of leachate, and long-term groundwater monitoring.

The selected remedy, discussed in detail in Section 8 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD), in conformity with applicable Standards, Criteria, and Guidance (SCGs). The SCGs for Cuba Landfill include the Presumptive Remedy approach for closure of municipal solid waste landfill sites in accordance with the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4044 "Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills" revised March 1992, and USEPA Guidance Document "Presumptive Remedy for CERCLA Municipal Landfill Sites", dated September 1993 (EPA 540-F-93-035). The presumptive remedy

approach reduces the number of source control technologies and alternatives that are evaluated for municipal solid waste landfills and requires at a minimum, capping of the landfills in accordance with 6 NYCRR Part 360 solid waste regulations.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Cuba (V) Landfill Site is located in the Town of Cuba, Allegany County, New York (Figure 1). The site is composed of two contiguous parcels of property totaling approximately 40 acres. The Village of Cuba currently owns both parcels. The site is bordered on the west and the north by Deep Snow Road. An unnamed intermittent tributary of the North Branch of Van Campen Creek defines the eastern border, and forested private property borders the south side. The site slopes steeply from north to south and consists mainly of tall grasses and brush. Several dozen partially settled disposal trenches are evident running both east-west and north-south across the site. Access to the site is from the unpaved Deep Snow Road off Jackson Hill Road.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

From the early 1950's until 1981, the Cuba Landfill Site accepted household, commercial and industrial waste, including industrial waste from the Acme Electric Corporation. Acme Electric has identified several listed hazardous wastes generated by the facility and disposed of at the Cuba Site between 1952 and 1981. These wastes included spent halogenated solvents used in degreasing operations, plating bath sludges, spent stripping and cleaning bath solutions, PCB capacitors and paint sludges. No records of the quantities of the waste disposed of by Acme are available.

Wastes were deposited in trenches approximately 10-15 feet wide by 4-10 feet deep and several hundred feet long. Filled trenches were covered by six to 18 inches of site derived silty soils.

The Village of Cuba has owned the property since November, 1967. Prior to 1967 the property was leased by the Village from Ida Barber. The facility was issued a sanitary landfill permit in 1979 by the NYSDEC and was inspected on a regular basis by the DEC from 1979 until the Village completed an approved closure plan in 1987.

3.2: Remedial History

In October 1990 URS Consultants, Inc. prepared a Phase 1 - Preliminary Site Assessment (PSA) for the NYSDEC to determine if the site qualified for the NYS Registry of Inactive Hazardous Waste Disposal Sites. The report recommended additional sampling be conducted in order to determine if the site should be classified as a Class 2. In January 1994, Engineering Science, Inc. prepared a Phase II PSA report for NYSDEC. The Phase II PSA included installation and sampling of four (4) monitoring wells, and sampling of surface water, leachate, and surface soils.

The results indicated the presence of VOCs in on-site groundwater and leachate. Based on the results from the Phase II investigation, and the confirmed disposal of hazardous waste including solvents, plating wastes, PCB capacitors and paint sludges, the site was reclassified from Class 2a to a Class 2 site in 1994. A Class 2 site is defined by the NYSDEC as posing a significant threat to human health and/or the environment

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and/or the environment posed by the presence of hazardous waste, the NYSDEC has recently conducted a Remedial Investigation/Feasibility Study (RI/FS).

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in two (2) phases. The Phase I was conducted during the summer and fall of 1997. Phase II of the investigation was conducted during spring 1998 under high groundwater conditions. A report entitled "Remedial Investigation Report", Cuba Municipal Waste Disposal Site, has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- Geophysical survey to define the limits of the waste;
- Installation of soil borings and monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Excavation of test pits to observe subsurface conditions and collect landfill leachate for analysis;
- Surface soil sampling, groundwater seep sampling and sediment sampling from two nearby streams;
- Residential well sampling conducted by the New York State Department of Health to ensure that existing residential wells have not been impacted by the site;
- Fish and Wildlife Impact Analysis, and;
- Qualitative Health Risk Assessment to evaluate potential risks to human health.

To determine which media (soil, groundwater, etc.) contain contamination at levels of concern, the RI analytical data were compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Cuba Site are

based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of NYS Sanitary Code. For soils, NYSDEC TAGM 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. Guidance values for evaluating contamination in sediments are provided by the NYSDEC "Technical Guidance for Screening Contaminated Sediments, dated January 1999.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain areas and media of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

Site Surface Features

The Cuba Landfill is situated on the steep south-facing slope of Jackson Hill at elevation 2220 feet above mean sea level which is one of the most prominent hills in the region. The upper portion of the site is over 100 feet higher than the southern toe of the slope of the landfill.

Landfilling was performed by digging trenches into the side of the hill. Trenches range from 100 to 1200 feet long and were dug in both north-south and east-west orientation. Serious differential settlement (1-3 feet) of the trenches has occurred that maximizes infiltration, erosion, and exposure of waste. Surface water flowing down hill to the south is retained by the trenches causing leachate seeps at the toe of the slope.

In general, the soil cover on the hill slope is thin. Bedrock outcrops with groundwater springs are apparent immediately south of the landfill.

Site Geology and Hydrology

The geology of the Cuba Landfill has been determined by reviewing available literature and by observations at three test pits and seven soil borings constructed on or near the site during the RI. Overburden thickness at the site is variable. Generally, the thickness of the soils is thin and ranges from 2 to 10 feet. Unconsolidated soil consists of silt with little gravel and trace sand. Soil thickness increases down-slope and south of the site. Borings into the bedrock beneath the site confirmed that the bedrock is highly fractured, thinly bedded brown, gray and green-grey shale with less common siltstone. Most fractures are horizontal and are parallel to the bedrock bedding planes.

Groundwater flow characteristics of the site were assessed through observations of soil and rock characteristics during drilling, installation of groundwater monitoring wells, pumping tests, in-situ hydraulic conductivity tests, measurement of water level depths for the determination of water elevations and groundwater sampling. Groundwater flow is generally to the south, however groundwater flow is dominated by bedrock fractures and precipitation/recharge events and therefore complex.

4.1.1 Nature of Contamination

As described in the RI Report, many soil, groundwater, sediment, and leachate samples were collected at the site to characterize the nature and extent of contamination. Figure 2 shows monitoring well and sampling locations.

The primary groundwater and leachate contaminants which exceed their SCGs are Volatile Organic Compounds (VOCs), and Polychlorinated Biphenyls (PCBs). VOCs detected in exceedence of SCGs include vinyl chloride, chloroethane, dichloroethane, dichloroethene, trichloroethane, trichloroethene, and chlorobenzene. The presence of these chemicals is consistent with the history of industrial and municipal waste disposal at the site. PCBs were sporadically detected at very low levels in leachate and groundwater springs samples.

4.1.2 Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern for various contaminants in groundwater, leachate, and groundwater springs; and compares the data with the SCGs for the site. Analytical results obtained for groundwater, leachate and spring samples are compared to NYSDEC Class GA groundwater standards and guidance values. Surface, and subsurface soil sample results were compared to the levels recommended by the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) Number 4046, Determination of Soil Cleanup Objectives and Cleanup Levels (Jan. 1994). The spring water analysis is compared to Class GA groundwater standards since the source of this surface water is groundwater that surfaces downgradient of the site. The following are the media which were investigated and a summary of the findings of the investigation.

Groundwater

Two rounds of groundwater samples were collected from 10 monitoring wells. All wells were screened in the upper weathered bedrock due to the thin non-water bearing overburden at the site. Both groundwater sampling rounds were analyzed for VOCs, Semi-Volatile Organic Compounds (SVOCs), PCBs, pesticides, and metals. Ten VOCs were detected in the groundwater above NYSDEC Class GA standards, as shown on Table 1. The Class GA standards are set to be protective of groundwater for use as a potable water supply. Monitoring wells with the highest total VOCs were MW-3 (723 ppb), MW-4 (164 ppb), and MW-6 (353 ppb). MW- 3 and 4 are located on the downgradient edge of the landfill property, MW-6 is located within the interior of the landfill.

PCB compounds were found above SCGs (0.09 ppb) at MW-6 and MW-7. MW-6 is located in the interior portion of the landfill and MW-7 is a deeper bedrock well located downgradient (south) of the site. Aroclor 1016 was found in MW-6 at 0.42 ppb. Aroclor 1242 at 0.46 ppb and Aroclor 1254 at 0.27 ppb were identified in samples from MW-7. No SVOCs, or pesticides were detected in groundwater above SCGs.

Leachate

Twelve leachate samples were collected during the RI. Leachate samples were identified as liquid exhibiting orange staining that accumulated in downgradient landfill trenches. Samples consisting of relatively clear, unstained surface water collected off site and downgradient of the landfill, were reported as groundwater springs.

The 12 leachate samples were collected from the downgradient side of the landfill (toe of slope). Twenty test pits were excavated to accumulate leachate for sampling. VOCs were detected in exceedance of SCGs in five of the twelve samples. Total VOC concentration in leachate ranged from 10 to 100 ppb. The highest individual concentration for a single VOC was 63 ppb for 1,1,1-trichloroethane. No SVOCs and only one pesticide compound, endrin at 14 ppb, was detected above SCGs. Three PCB compounds were detected above SCGs in four of the twelve leachate samples. The maximum reported PCB concentration for a leachate sample was Aroclor 1260 at 19 ppb. The results of the inorganic (metal) analysis for the leachate samples demonstrate exceedance for iron, lead and manganese. Leachate analytical results are shown on Table 1.

Groundwater Springs

Ten (10) groundwater springs were sampled downgradient of the landfill during the RI. The springs are wet areas of bedrock outcropping, are generally low flow (< 1gpm) and are somewhat isolated by the heavily wooded area. The springs are not used as a source of potable water. Analysis of springs SP-1 and SP-2, located 200 feet off the south east corner of the landfill, identified detections above SCGs for several compounds as shown on Table 1. Total VOCs detected were 228 ppb at SP-1 and 368 ppb at SP-2. The pesticide endrin (SCG of non-detect) at a concentration of 0.021 ppb was detected at SP-1 and the PCB compound Aroclor-1260 was detected above the SCG of 0.09 ppb at a concentration of 0.93 ppb at both SP-1 and SP-2. This was the only PCB compound detected at either location and no PCBs were detected at the remaining spring sampling locations. Inorganic analysis of the spring samples resulted in exceedence of SCGs for iron and manganese at most sampling locations. Groundwater spring analytical results are shown on Table 1.

Surface Water Sediment

Surface water sediment samples were collected at five locations in nearby creeks. Both upgradient and downgradient sampling results did not exhibit contamination by any site contaminant above SCGs.

Surface Soils

Twelve surface soil samples were collected during the RI. No VOCs were detected at any of the oil sampling locations. Only one SVOC and one PCB compound were detected slightly above SCGs at one sampling location. No other SVOC and PCB compounds were detected at any of the other surface soil sampling locations. Inorganic analysis of the surface soil samples detected concentrations of metals that are generally comparable to background soil samples.

Subsurface Soil

Subsurface soil samples were collected from the interior of the site from borings at MW-5 and MW-6. These samples were selected because they are located outside of or between landfill trenches and are representative of unsaturated overburden from the interior of the landfill. No VOCs, SVOCs, PCBs, or pesticides were detected above SCGs. Metals were found to be consistent with site background concentrations. Each subsurface sampling location, including the subsurface borings and the test pit locations, were screened for organic vapors with a photoionization detector and a combustible gas indicator. The results indicate that methane gas generation does not currently pose a problem at the landfill.

Residential Wells

One residential water supply was sampled in 1998 during the RI. In August 1999, the New York State Department of Health (DOH) collected samples from five nearest private drinking water wells located downgradient of the site. The nearest well is located over 1000 feet southwest of the landfill and over 800 feet from the nearest spring exhibiting site contamination. Based on the analytical results of the samples the DOH determined that all the private supplies are suitable for all domestic purposes.

4.2 Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6 of the RI Report.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- ingestion of groundwater springs and/or landfill leachate containing contaminants;
- ingestion of groundwater containing landfill contaminants; and
- dermal contact of contaminated leachate and/or springs.

The RI sampling has confirmed that the concentrations of landfill contaminants are of concern for groundwater springs, leachate and groundwater only in close proximity to the landfill. Although the potential for human exposure to these contaminants exists, it is not expected that they present a significant health risk under current conditions. However, should conditions change or new private groundwater wells be installed near the landfill, exposures could become a concern.

Analytical results indicate the presence of VOC contamination in groundwater at levels sufficiently elevated to cause concern should groundwater near the landfill be used as a potable water supply. Existing private wells downgradient of the landfill were tested by the DOH in 1999, and found to be acceptable for all domestic uses.

4.3 Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures which may be presented by the site. The Fish and Wildlife Impact Assessment, included in the RI, presents a more detailed discussion of the potential impacts to fish and wildlife from the site. A completed exposure pathway for area wildlife is the ingestion of contaminated groundwater springs. Wildlife exposure is limited since many of the springs demonstrate intermittent flow and the concentration of the contaminants is low.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Potential Responsible Parties (PRP) for the site, documented to date, include:

- Acme Electric Corporation
- Village of Cuba

The PRPs declined to implement the RI/FS at the site when requested by the NYSDEC. However, a settlement agreement has since been reached with the Acme Electric Corporation.

Order on Consent

Date	Index
6/27/99	#B9-0461-94-09

Subject : Site #902012, Order On Consent, Acme Electric Corporation Respondent.

This Order on Consent provides for Acme to make payment to the Department of Environmental Conservation in satisfaction of the Department's past and future claims against Acme for the recovery of lawfully incurred site related response costs.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- *Eliminate, to the extent practicable, direct human or animal exposure to waste in the landfill;*
- *Eliminate, to the extent practicable, the migration of contaminants from the landfill to groundwater;*
- *Reduce, control, or eliminate to the extent practicable the generation of leachate within the landfill mass.*
- *Eliminate, to the extent practicable, ingestion of groundwater affected by the site that does not attain NYSDEC Class GA Ambient Water Quality Criteria; and*
- *Eliminate, to the extent practicable, off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria.*

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy should be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Cuba Landfill were identified, screened and evaluated in the report entitled "Feasibility Study Report-Cuba Municipal Waste Disposal Site"; prepared for the New York State Department of Environmental Conservation by Dvirka and Bartilucci Consulting Engineers. The FS for the Cuba Site was prepared in accordance with the federal Comprehensive Emergency Response Act, and the New York State Superfund Program, including NYSDEC guidance for presumptive remedy for municipal landfills as prescribed in the Technical and Administrative Guidance Memorandum (TAGM HWR-90-4030) for "Selection of Remedial Actions at Inactive Hazardous Waste Sites" and "Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfill" (TAGM HWR-90-4044). TAGM #4044 establishes **containment** as the presumptive remedy for municipal landfill sites. This TAGM is similar to the federal Presumptive Remedy Guidance and both were considered in the PRAP. Components of the presumptive remedy to be considered for a specific site are: landfill cap, leachate collection and treatment, groundwater control, landfill gas collection and treatment, and institutional controls to supplement engineering controls.

Landfill cap: The FS prescribed a 6 NYCRR Part 360 (solid waste) low permeability landfill cap. The present soil cover over the landfill trenches has severely weathered and settled resulting in exposure of waste, infiltration of precipitation and excessive leachate generation. The Part 360 cap will provide isolation of the buried waste and any contaminated soil. The cap will be approximately 24 acres and comprise from bottom to top, a minimum of 12 inches of soil cover over waste, 60-mil high density polyethylene (HDPE) geomembrane, geocomposite drainage layer, 24 inch soil barrier protection layer, and a 6-inch vegetative growth medium (Figure 4). Placement of this cap would be effective in reducing leachate generation and mobility of contaminants. All other presumptive remedy components were evaluated under the assumption that a Part 360 landfill cap would be implemented.

Leachate collection and treatment: The FS Report included a water balance to establish the current amount of groundwater flow through the Cuba Landfill Site and the expected flow after construction of the presumptive remedy of capping. The placement of a low permeability cap (99% efficient) will significantly reduce leachate generation. In addition, various methods of leachate control for the Cuba Site were evaluated. Included in the evaluation were groundwater diversion, leachate collection and treatment at the local waste water treatment facility, and phytoremediation.

Given the logistics of the site and its ease of installation, low cost and potential effectiveness, a surface and shallow overburden groundwater diversion system installed in conjunction with the cap anchor on the north side of the landfill will be a common element of all remedial alternatives that include installing a Part 360 cap. The diversion system will eliminate nearly all surface and shallow groundwater from upgradient of the landfill from entering the landfill mass. Total flow thro[illegible]he landfill mass after placement of a new cap and groundwater diversion is estimated at less [illegible]2 gallons per minute or approximately 2000 gallons per day. The resulting amount of potentially recoverable leachate from the overburden at the landfill's toe of slope is estimated at less than 400 gallons per day.

Phytoremediation is a developing technology in which vegetation is used to remediate contaminants in groundwater, leachate and soil. In the process, the vegetative cover removes contaminants from the aqueous media and/or soil, and converts the contaminants to non toxic compounds. In addition the vegetative cover allows for the transfer of oxygen to the root zone for the enhancement of aerobic degradation of organic contaminants and through an increase of organic carbon in the shallow root zone, the migration of organic chemicals and metals is reduced. Significant research has been completed using hybrid poplar trees. These trees are extremely fast growing and appear to tolerate high concentrations of organics. The rooting system of these trees typically extends to a depth of 6 to 8 feet below ground surface. In addition to the trees value as a remediation technology, the trees often are used as a buffer zone for many landfills.

Due to the shallow depth of leachate in the overburden at the Cuba Landfill and the presence of organic contaminants in the leachate at the site, phytoremediation at the toe of the slope at the Cuba Landfill will be considered an applicable remediation technology for containment/treatment of leachate.

Landfill gas collection: Due to the absence of significant landfill gas production at the Cuba Landfill, an active gas collection system was not evaluated. However, passive venting would be incorporated into the cap design. It is expected that the volume of vented gas will be minimal and not require treatment.

Groundwater control: It is expected that installation of a low-permeability cap over the Cuba Landfill and the groundwater diversion trench would significantly decrease the production of leachate and the mobility of contaminants to groundwater. Current levels of groundwater contamination adjacent to the site, though above SCGs, are relatively low and currently localized. Contaminants were not detected in the nearest downgradient private wells. Since there are no completed exposure pathways, active groundwater controls were not evaluated for the Cuba Landfill Site. Continued post remedial groundwater monitoring will be recommended for each of the remedial alternatives.

Based on the evaluations of the presumptive remedy components presented in the FS Report, the NYSDEC has prepared five remedial alternatives for this site. A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

The potential remedies are intended to effectively reduce and control the migration of contaminants from the landfill waste into groundwater, and to reduce the contamination in groundwater migrating off-site to meet groundwater standards.

Alternative 1: No Action

Present Worth:	*$0*
Capital Cost:	*$0*
Annual O&M:	*$0*
Time to Implement:	*No time required*

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It would allow the site to remain in an unremediated state. This alternative would allow the site to further deteriorate, resulting in increased infiltration, higher leachate generation and further erosion and exposed waste. This alternative would not provide any additional protection to human health or the environment.

Alternative 2: Institutional Actions

Present Worth	*$ 452,000*
Capital Cost:	*$103,000*
Annual O&M:	*$ 11,000*
Time to Implement:	*2 Months*

Alternative 2 would consist of institutional actions for the landfill. It would provide for routine inspections and maintenance of the existing landfill cover, and long-term groundwater monitoring. Physical controls would be installed around the landfill to limit access.

Alternative 3: Capping, Groundwater Diversion Trench and Long-term Monitoring

Present Worth:	*$5,045,000*
Capital Cost:	*$4,281,000*
Annual O&M:	*$ 38,000*
Time To Implement:	*6 Months*

This alternative would include construction of a modified 6 NYCRR Part 360 cap on approximately 24 acres of the landfill (Figure 3). The cap will consist of a low permeable layer, overlain by a barrier protection layer and top soil. The modification in the Part 360 cap will be the inclusion of a passive gas venting system in lieu of an active gas recovery system. The passive venting system would be sufficient for off-gasing of methane due to the age of the landfill, and the current low rate of methane gas production. A groundwater diversion trench would be installed at the upgradient or north side of the landfill. The diversion trench would be filled with highly permeable material, such as stone or gravel to intercept surface water and shallow groundwater before it enters the landfill, and route it around the landfill mass.

Physical controls would be installed around the perimeter of the landfill to limit access. Long-term groundwater monitoring would be implemented. The monitoring program would include the installation of early detection wells to establish whether contaminants are migrating toward private water supplies. A program of routine inspections and necessary maintenance of the landfill cap would be instituted.

Construction of the new cap and diversion trench would significantly reduce leachate generation and migration of contaminants to surface water and groundwater. Groundwater and leachate would be allowed to naturally attenuate to meet groundwater standards.

Alternative 4: Capping, Groundwater Diversion Trench, Groundwater/Leachate Collection via Subsurface Drains with Off-Site Treatment and Long-term Monitoring

Present Worth:	*$ 5,677,000*
Capital Cost:	*$ 4,457,000*
Annual O&M:	*$ 82,000*
Time to Implement	*6 months*

This alternative would include in addition to the remedial elements of Alternative 3, installation of a shallow overburden leachate collection trench at the landfill's toe of slope. Construction of a leachate collection system would mitigate off-site migration of residual leachate and any potential contact with contaminated leachate. Collected leachate would be trucked off-site for treatment.

Alternative 5: Capping, Groundwater Diversion Trench, Leachate Phytoremediation and Long-term Monitoring

Present Worth:	*$5,091,000*
Capital Cost:	*$4,327,000*
Annual O&M:	*$38,000*
Time to Implement:	*6 Months*

This alternative would include in addition to the remedial elements of Alternative 3, the installation of a phytoremediation system at the southern toe of the landfill slope for control and remediation of leachate in the shallow overburden. Phytoremediation of leachate would mitigate off-site migration of residual leachate while reducing potential contact with contaminated leachate.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. **Compliance with New York State Standards, Criteria, and Guidance (SCGs).** Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Alternatives 1 and 2 would not be consistent with 6 NYCRR Part 360 regulations for post-closure maintenance of the Cuba Landfill. Present site exceedence of chemical SCGs for groundwater would remain due to the continued infiltration of precipitation through the existing landfill cover into the waste mass, causing contaminant migration to groundwater and the generation of landfill leachate.

Alternatives 3, 4 and 5 would quickly comply with Part 360 SCGs for the Cuba Landfill and would allow chemical specific SCGs to eventually be met. Construction of a new cap on the landfill and upgradient groundwater diversion trench will significantly reduce infiltration into the landfill, allowing contaminant levels in groundwater to decrease through attenuation. Though groundwater SCGs would not be achieved within the landfill itself within a reasonable time, these SCGs are expected to be achieved in groundwater outside the landfill. *Alternatives 4 and 5* have the added benefit of residual leachate collection and treatment that will speed the groundwater recovery process and expedite the attainment of SCGs outside the landfill.

2. **Protection of Human Health and the Environment.** This criterion is an overall evaluation of each alternative's ability to protect public health and the environment. Alternative 1 would not provide any additional protection from potential threats to human health and the environment posed by the unremediated Cuba Landfill.

Alternative 2 would provide some additional protection. Regular maintenance of the existing landfill cover and site fencing would help prevent future exposure to waste. Groundwater monitoring would provide early detection for downgradient private water supplies.

Alternative 3 would meet the criteria for protection of human health and the environment. Installation of a new cap would eliminate most infiltration through the landfill and potential exposure to landfill waste. Groundwater contamination would be expected to decrease through natural attenuation and eventually meet groundwater standards outside the landfill. Any future threat to human health would be expected to decline. However, since there would be no leachate collection, the hillside topography of this landfill would create some potential for a small quantity of leachate migration to the south. This residual quantity of leachate may pose a small incremental threat to human health and the environment.

Alternatives 4 and 5 would meet the criteria for protection of human health and the environment. In addition to protectiveness provided by the new landfill cap and groundwater diversion, leachate control would provide an additional degree of protection by eliminating the potential for exposure to any residual quantity of leachate migration off-site.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. **Short-term Effectiveness.** The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternatives 1 and 2. Since no remedial activities would occur, these alternatives would have little or no short-term impacts. However, these alternatives would not meet the remedial objectives in any reasonable time frame.

Alternatives 3, 4 and 5. These alternatives would include some short-term impacts common to normal construction work. With the proper implementation of a remedial construction worker health and safety plan and construction quality assurance plan, there would be minimal impacts to human health and the environment. During construction, an increase in truck traffic would occur and nuisance dust and erosion would be possible. These impacts can be controlled with normal construction precautions. Any waste that will be generated during construction will be properly handled, disposed on-site under the cap or off-site, if necessary. Implementation of these alternatives would quickly achieve the remedial objectives.

4. **Long-term Effectiveness and Permanence.** This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 has no long-term effectiveness. There would be no monitoring or maintenance and no additional protection against infiltration of water through the waste mass, or erosion of the cover resulting in exposure to buried waste. The landfill would continue to deteriorate and potential exposures would increase. Therefore, the long-term effectiveness and permanence is very low.

Alternative 2 would not be effective over the long-term. Infiltration of water through the waste mass would continue at the current rate and contaminants would continue to be released to the environment. Erosion of the existing cover would be controlled if properly maintained. Therefore, the long-term effectiveness and permanence of this alternative is low.

Alternative 3: Construction of a new landfill cap and groundwater diversion trench would not treat or remove any waste from the site. However, with reduced infiltration through the landfill, groundwater contaminants would gradually decrease and production of leachate would be drastically reduced. The new cap would be effective in minimizing direct contact exposure to landfill waste. The long-term effectiveness and permanence of this alternative is moderate to high.

Alternatives 4 and 5: In addition to construction of a new landfill cap and groundwater diversion trench as discussed above, both of these alternatives provide leachate control measures, either by a collection trench or phytoremediation.

Leachate generation is expected to be significantly reduced through the installation of the cap and groundwater diversion trench. It is expected that only small amounts of leachate will be generated after completion of remedial construction. However, because of the side hill topography and underlying bedrock structure, some leachate seepage at the south end of the landfill remains possible. Although phytoremediation of leachate is a developing technology and not as proven as a leachate collection trench, the long-term effectiveness of both *Alternative 4 and 5* is high based on the anticipated leachate volume.

5. **Reduction of Toxicity, Mobility or Volume.** Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives 1 and 2 would not reduce the toxicity, mobility, or volume of wastes at the site.

Alternative 3, 4 and 5 would not significantly reduce toxicity or volume of waste at the site. However, the cap and groundwater diversion would restrict infiltration into the landfill and significantly decrease the mobility of contaminants. Additionally, *Alternatives 4 and 5* have residual leachate control elements that further reduce the mobility of site contaminants and contaminant treatment components that would provide a limited reduction in toxicity.

6. **Implementability.** The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternatives 1 and 2 are both easily implementable.

Alternatives 3, 4 and 5 involve some construction, however implementation would be easily accomplished. The technology is simple, materials are readily available as are qualified contractors. Alternative 4 provides for a leachate collection trench which would be slightly more intrusive during construction and would also require construction of a long-term truck access for leachate removal and O&M implementation.

7. **Cost.** Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

8. **Community Acceptance** - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and how the Department will address the concerns raised. Several comments were received pertaining to the construction of a new landfill cap. A number of comments suggested that a less rigorous cap consisting of soil cover over the landfill trenches would be as effective at substantially less cost than placement of a geomembrane over the entire landfill. The Department believes that covering the trenches with more soil will not meet the requirements of 6 NYCRR Part 360, nor will it significantly reduce the amount of leachate that is generated at the landfill. Additionally, a similar approach was used when the landfill was closed in 1987 and it has not been an effective long-term solution. Infiltration will readily occur between the trenches and dessication cracks will continue to compromise the cover over the waste. A detailed response to this comment is provided in the responsiveness summary.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative 5 (capping, groundwater diversion, phytoremediation) as the remedy for this site. The remedy will consist of installation of a modified 6 NYCRR Part 360 low permeability cap with passive gas venting, upgradient surface and groundwater diversion, phytoremediation of leachate, and long-term groundwater monitoring.

This recommendation is based upon the evaluation of the five alternatives developed for this site. *Alternatives 1 and 2* would fail to comply with the threshold criteria for compliance with SCGs, particularly 6 NYCRR Part 360. *Alternatives 1 and 2* are rejected on this basis.

Alternatives 3, 4 and 5 would all comply with the threshold criteria. In addition, all three alternatives are similar with respect to the majority of the balancing criteria. The only major differences between these three alternatives is the handling of the anticipated small quantity of residual leachate, and cost.

Alternatives 4 and 5 would provide an additional degree of protectiveness through the control of post remedial residual amounts of leachate. *Alternative 5* should be sufficiently effective to meet the remedial objectives for the site at *significantly* lower cost as compared to *Alternative 4.*

The estimated present worth cost to implement the selected remedy is $5,091,000. The cost to construct the remedy is estimated to be $4,327,000 and the estimated average annual operation and maintenance cost for 30 years is $ 38,000.

The elements of the selected remedy are as follows:

1) A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS will be resolved including the possible use of on-site materials. Design details will be evaluated for cost control measures to insure the cost effectiveness of the remedy.

2) Construction of a new landfill cap which will comply with 6 NYCRR Part 360. The 24 acre cap would consist of, from bottom to top, a minimum of 12 inches of soil cover over waste, 60-mil high density polyethylene (HDPE) geomembrane, geocomposite drainage layer, 24 inch soil barrier protection layer, and a 6-inch vegetative growth medium. Gas vents and/or trenches will be installed to vent gas from the waste mass. Placement of this cap will be effective in reducing leachate generation and mobility of contaminants.

3) Construction of a surface and groundwater diversion trench on the north side of the landfill to eliminate upgradient flow from entering the waste mass.

4) Installation of a phytoremediation leachate control system, consisting of hybrid poplar trees at the southern toe of the landfill slope. If leachate quantities are not reduced as expected and/or if the phytoremediation system fails to meet objectives, conventional leachate remediation, as proposed in Alternative 4, could be reevaluated and implemented if appropriate.

5) Physical controls will be installed around the landfill to limit access.

6) Since the remedy would result in untreated hazardous waste remaining at the site, a long-term groundwater monitoring program would be instituted. This program will allow the effectiveness of the selected remedy to be monitored and will be a component of the operation and maintenance for the site. Early detection bedrock monitoring wells will be installed between the landfill and downgradient private water supplies to verify the effectiveness of the remedy and insure continued protection of the nearby private homes' potable supply of water.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- A local repository for documents pertaining to the site was established at the Village of Cuba Municipal Office.
- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.
- A fact sheet dated August 1997 announcing the start of the RI activities.
- A fact sheet dated April 1998 providing results from the RI.
- A fact sheet dated January 2000 describing the Proposed Remedial Action Plan.
- A meeting notice dated January 3, 2000 inviting the public to meeting concerning the PRAP.
- A public meeting was held on January 19, 2000 in which results of the RI/FS and PRAP were presented and public comment accepted.
- In February 2000 a Responsiveness Summary was prepared and made available to the public, to address the comments received during the January 10 public meeting and comment period for the PRAP.

Table 1
Nature and Extent of Contamination

MEDIA	CLASS	CONTAMINANT OF CONCERN	Maximum Concentration Detected (ppb)	Number and percentage of samples exceeding SCG	SCG Class GA Standards (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Total Xylenes	240	2/10%	5
		Chloroethane	51	2/10%	5
		1,1-Dichloroethene	11	8/40%	5
		1,1-Dichloroethane	100	2/10%	5
		1,2-Dichloroethene	99	1/5%	5
		1,1,1-Trichloroethane	240	9/45%	5
		Trichloroethene	290	4/20%	5
		Benzene	3	2/10%	1
		Tetrachloroethene	8	1/5%	5
		Ethylbenzene	76	2/10%	5
		Total VOCs	723	-	10*
Groundwater	PCBs	Aroclor 1016	0.42	1/5%	0.09
		Aroclor 1242	0.46	1/5%	0.09
		Aroclor 1254	0.27	1/5%	0.09
Leachate	VOCs	Chlorobenzene	9	1/8%	5
		Vinyl Chloride	19	3/25%	2
		Chloroethane	8	2/17%	5
		1,1-Dichloroethane	34	5/42%	5
		1,2-Dichloroethene	30	2/17%	5
		1,1,1-Trichloroethane	63	2/17%	5
		Trichloroethene	15	2/17%	5
		Total VOCs	102	-	10*

Table 1 Cont.
Nature and Extent of Contamination

MEDIA	CLASS	CONTAMINANT OF CONCERN	Maximum Concentration Detected (ppb)	Number and percentage of samples exceeding SCGs	SCG Class GA Standards (ppb)
Leachate	PCBs	Aroclor 1242, 1254, 1260	19	3/25%	.09
Leachate	Inorganics (metals)	Iron	48,900	12/100%	300
		Manganese	5,360	12/100%	300
		Sodium	30,900	2/14%	20,000
		Lead	34	1/7%	25
Groundwater Springs	VOCs	Total VOCs	368	-	10*
		1,1-Dichloroethene	7	1/10%	5
		1,1-Dichloroethane	46	4/40%	5
		1,2-Dichloroethene	51	2/20%	5
		1,1,1-Trichloroethane	83	5/50%	5
		Trichloroethene	180	2/20%	5
Groundwater Springs	PCBs	Aroclor - 1260	0.93	2/20%	0.09
Groundwater Springs	Inorganics (metals)	Iron	20,300	8/80%	300
		Manganese	5,360	8/80%	300

* TAGM 4046 value based on groundwater protection.

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
Alt. 1 - No Action	$0	$0	$0
Alt. 2 - Institutional Action	$103,000	$11,000	$452,000
Alt. 3 - Cap, Groundwater diversion, Long-term monitoring	$4,281,000	$38,000	$5,045,000
Alt. 4 - Cap, Groundwater diversion, Leachate collection and treatment, Long-term monitoring	$4,457,000	$82,000	$5,677,000
Alt. 5 - Cap, Groundwater diversion, Phytoremediation of leachate, Long-term monitoring	$4,327,000	$38,000	$5,091,000

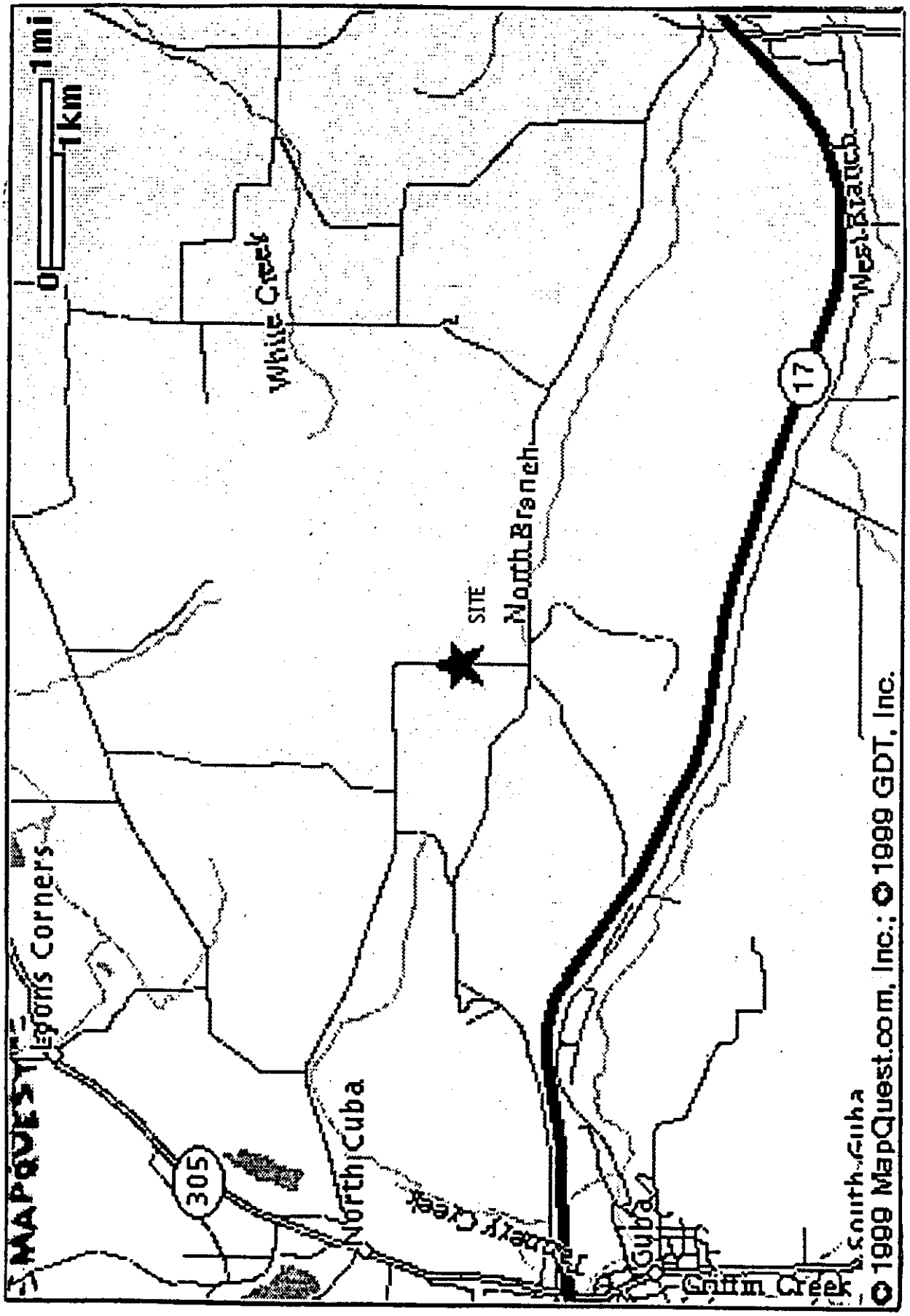
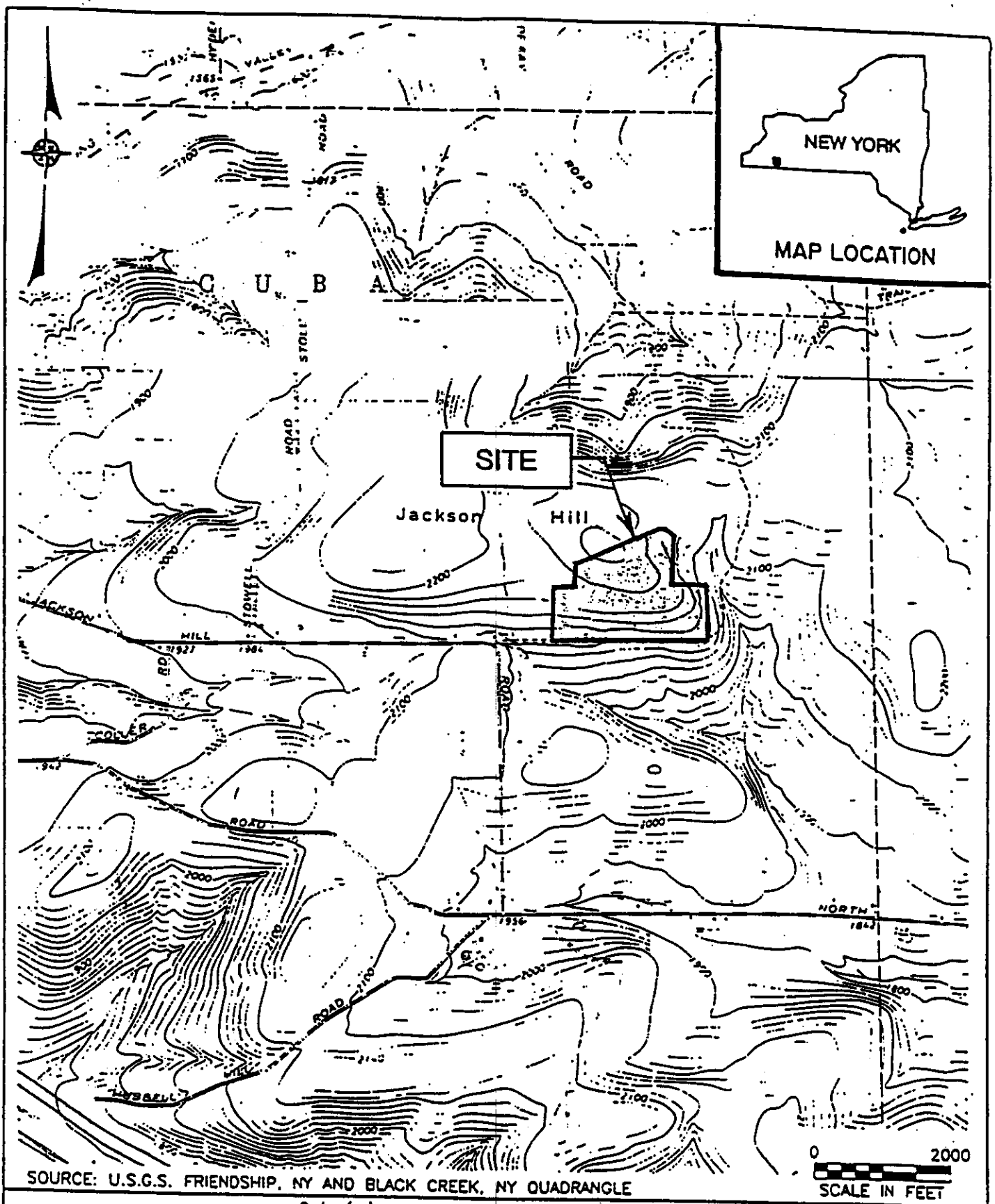


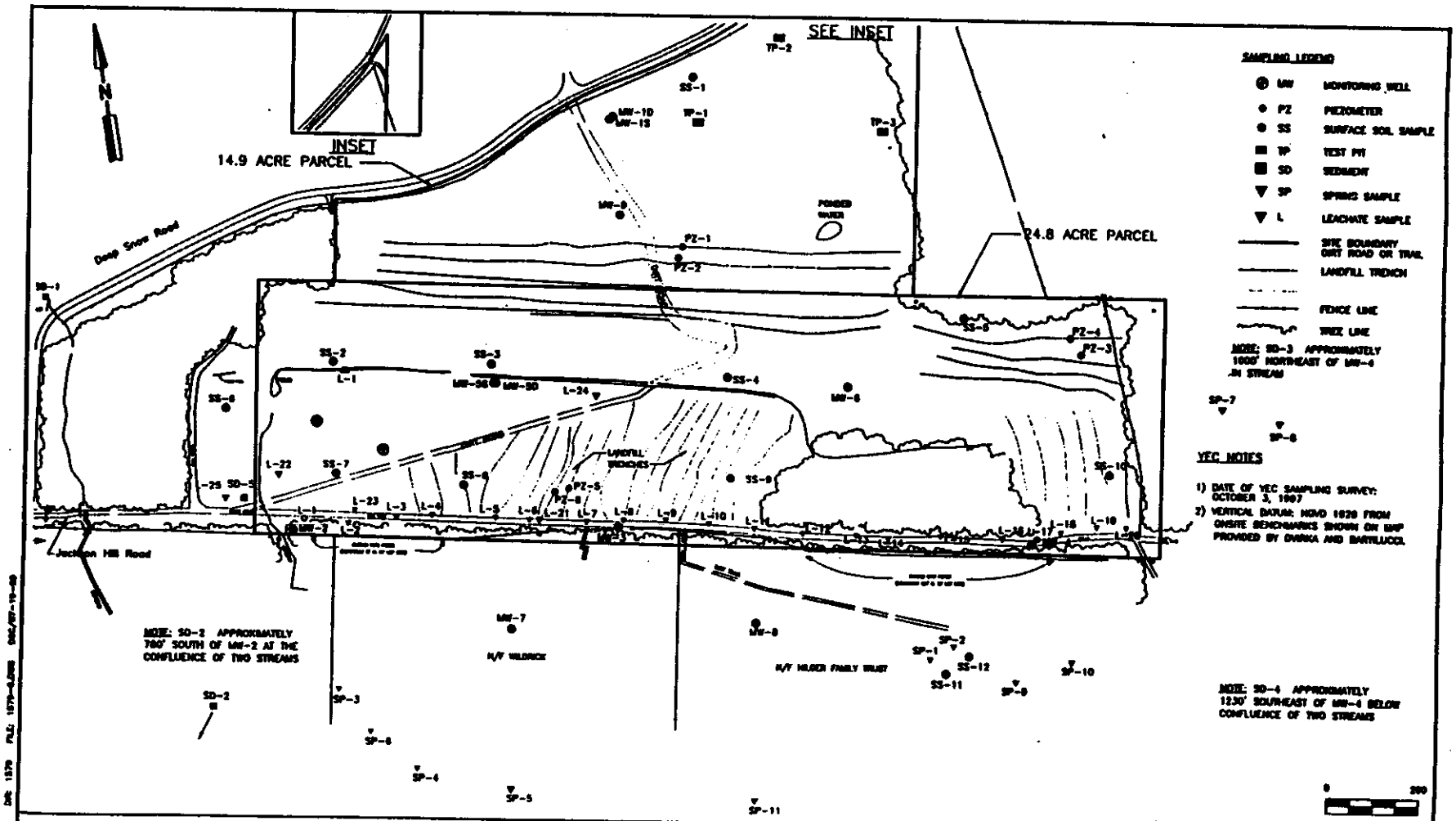
FIGURE 1. - SITE LOCATION



Cuba(v) MUNICIPAL WASTE DISPOSAL SITE
Town OF CUBA, NEW YORK

SITE LOCATION MAP

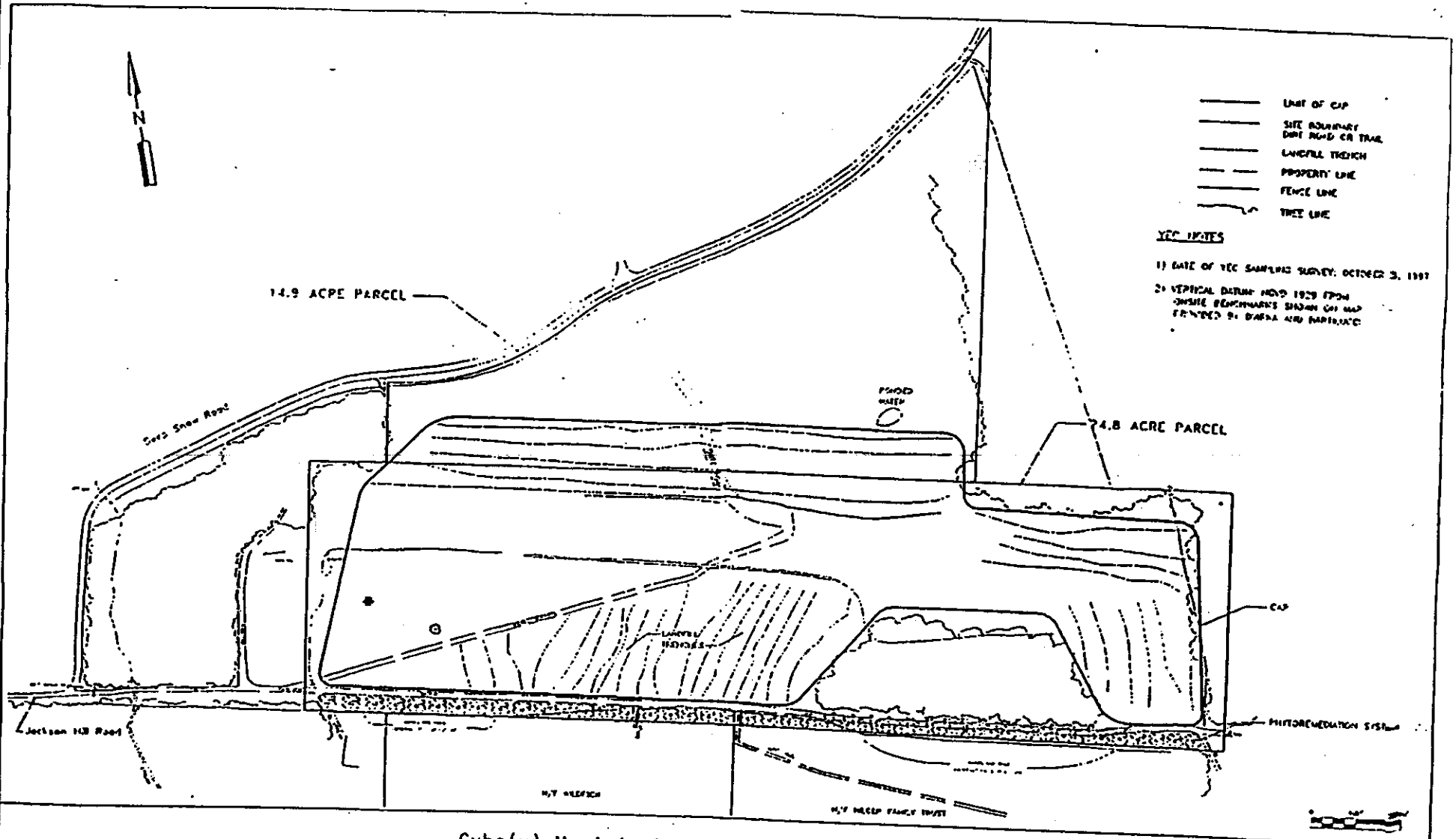
FIGURE 1 A



CUBA MUNICIPAL WASTE DISPOSAL SITE
VILLAGE OF CUBA, NEW YORK

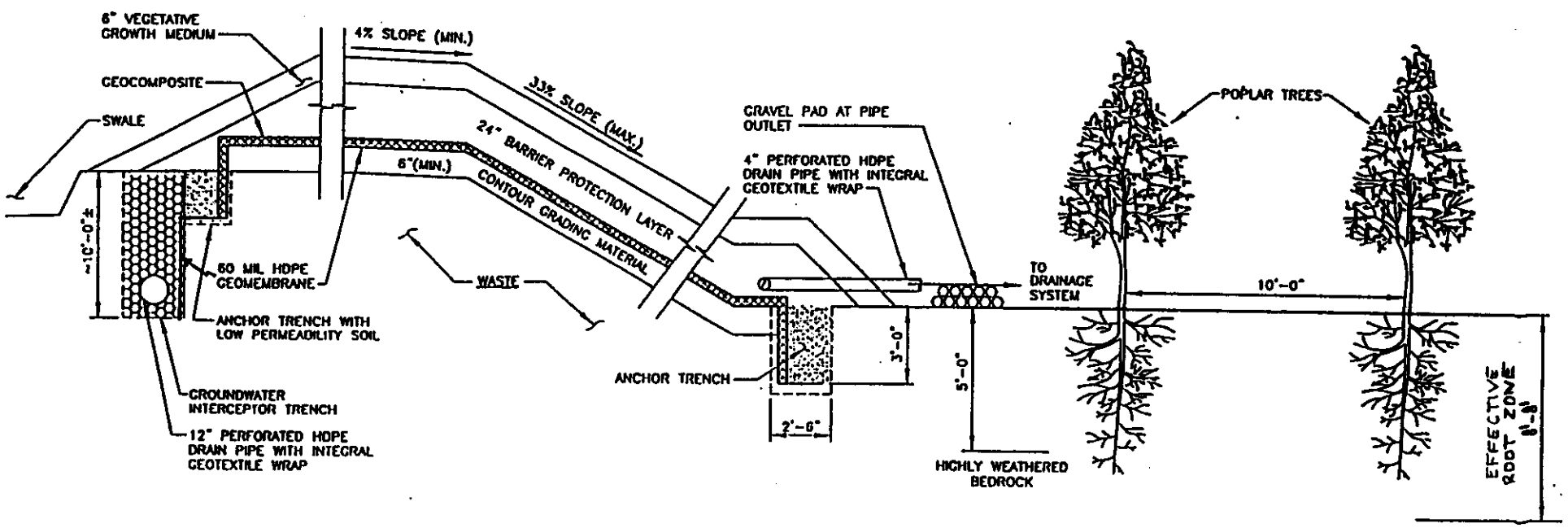
SAMPLING LOCATIONS

FIGURE 2



Cuba(v) Municipal Waste Disposal Site
LIMIT OF CAP AND LOCATION OF PHYTOREMEDIATION SYSTEM

Figure 3



NOT TO SCALE

CUDA MUNICIPAL WASTE DISPOSAL SITE
VILLAGE OF CUDA, NEW YORK

CAP CROSS-SECTION AND LOCATION OF POPLAR TREES

FIGURE 4

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Cuba Municipal Waste Disposal Site
Site No. 9-02-012
Allegany County, New York

The Proposed Remedial Action Plan (PRAP) for the Cuba Municipal Waste Disposal Site (Cuba Landfill) , was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on December 31, 1999. This Plan outlined the preferred remedial measure proposed for capping and leachate control at the Cuba Landfill.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on January 19, 2000 which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. Written comments were received from Jesse Dewe, Wilderness Rd., Friendship, NY and Terry Richman Esq, Underberg and Kessler, Rochester, NY. Ms. Richman forwarded comments on the proposed plan prepared by Haley and Aldrich Consulting Engineers and Clark Patterson Associates both from Rochester, NY. The public comment period for the PRAP ended on February 7, 2000.

This Responsiveness Summary responds to all questions and comments raised at the January 19th public meeting and to the written comments received.

The following are the comments received at the public meeting, with the NYSDEC's responses:

Comment 1. How many poplar trees are you going to plant?

Response 1. As currently estimated, 2000 hybrid poplar trees will be planted in a one acre area (25' x 1600') at the south toe of the landfill.

Comment 2. What make these trees a hybrid?

Response 2. Research conducted by leading Agricultural Cooperative Extension Agencies and major universities have developed a variety of poplar trees that offers a unique physiology marked by robust growth rate, rapid establishment of a dense canopy and deep rooting system while being tolerant of high organic contaminant concentrations.

Comment 3. Why not use weeds instead of trees?

Response 3. The poplar trees offer several advantages over the use of native vegetation. The trees' ability to uptake large quantities of water through a deep rooting system will outperform other forms of vegetative cover.

Comment 4. Did you look at just using trees rather than capping the landfill?

Response 4. The DEC believes that the proposed phytoremediation system for leachate control will only be effective if the landfill is capped and overall leachate generation reduced.

Comment 5. Is there a health hazard from the trees?

Response 5. No, organic contaminants taken up by the trees breakdown naturally through metabolic processes within the tree. Pollutants degrade, incorporate in the plant tissues and are used as nutrients.

Comment 6. Will you monitor leachate by the trees?

Response 6. Yes, a monitoring program to examine the effectiveness of the phyto-remeditation system to control leachate will be implemented after remedial construction.

Comment 7. The landfill closure is governed by rules not law. Why not just change the rules so you can just use trees instead of requiring a 360 day cap?

Response 7. 6 NYCRR Part 360 is an SCG for landfill closure in New York. This rule was finalized only after extensive statewide public participation. The trees are designed to treat only leachate and groundwater, they will not prevent exposure to waste disposed in the landfill.

Comment 8. If the trees are so cheap and effective, why not plant them now?

Response 8. The effectiveness of the phytoremediation system proposed for residual leachate control is predicated on eliminating a vast majority of the source of leachate through the installation of an upgradient groundwater diversion and landfill cap.

Comment 9. Will there be enough water for the trees if you cap the landfill?

Response 9. A water balance was performed during the RI/FS that estimated the pre and post remedial amount of leachate available at the toe of the landfill. It was determined that the post remedial leachate would be sufficient to support the 2000 proposed poplar trees.

Comment 10. Are there any plans to do tree planting in the area of the off-site springs?

Response 10. No, it is anticipated that the combination of the diversion trench, landfill cap, and phytoremediation system will significantly reduce the quantity of the off-site springs and over time improve the quality of off-site groundwater.

Comment 11. I own property close to the landfill that has a beaver population. Will the beavers be attracted to the poplar trees.

Response 11. The activities of beavers could certainly affect the poplar trees. Measures such as fencing in the phytoremediation system to prevent wildlife access will be evaluated during design.

Comment 12. Where will the water in the diversion ditch go? Will the ditches be able to handle the water during heavy runoff events?

Response 12. During design, an area wide surface water flow model will be used to design the diversion trench and to insure nearby streams east and west of the site are capable of receiving the flow. Erosion protection for the trench outlets will be incorporated as needed.

Comment 13. Is there any remedial action planned for offsite areas?

Response 13. There are no plans for remediation of off-site areas. Off-site impacts can be effectively addressed through the implementation of the on-site remedial plan. Implementation of the selected remedial plan will effectively cut off the source of contamination resulting in improvement of off-site groundwater through natural attenuation.

Comment 14. If there is no risk from the landfill, why spend the money?

Response 14. Implementation of the proposed remedial plan will eliminate the potential for exposure to on-site waste and reduce potential exposure to contaminated leachate. Down gradient water supplies will be protected from further migration of groundwater contamination.

Comment 15. Is it necessary to cap the whole site?

Response 15. Do to the nature of waste disposal in dug trenches it is necessary to cap the whole site. The Department evaluated waste consolidation during the FS. Consolidation was factored out due to the possible short-term impacts of excavating, handling waste and cost.

Comment 16. What direction does the groundwater flow?

Response 16. Groundwater generally flows to the south of the site.

Comment 17. Did you run drainage models to see what would happen if you just filled in the trenches?

Response 17. No, the Department does not generally model remedial plans that would not meet the threshold criteria used to evaluate remedial alternatives.

Comment 18. Where is the money coming from to pay for the plan?

Response 18. After the Record of Decision is issued for the site, attorneys for the DEC will offer responsible parties the opportunities to undertake the design and construction. Should these negotiations prove unsuccessful, the project will likely be referred to the State Superfund for implementation.

Comment 19. Is there an existing threat to on-site wildlife?

Response 19. Contaminants of concern at the Cuba Landfill are volatile organic compounds (VOCs), pesticides and PCBs. These contaminants have been identified in groundwater, off-site springs and soil. In general, contaminant concentration are fairly low. Exposure to contaminants occurs when an exposure pathway is complete. Completed exposure pathways for wildlife would include ingestion of contaminated leachate or springs. Implementation of the proposed remedial plan will eliminate the route of exposure and reduce the chemical concentrations.

Written Comments

Letter #1

A letter dated February 5, 2000 was received from Terry M. Richman, Esq., counsel for the Village of Cuba. The letter included attachments from the Village's technical advisors Clark Patterson Associates (CPA) and Haley and Aldrich of New York (H & A). The cover letter states that the above technical advisors believe there is an effective alternative remedial action which would meet statutory and regulatory goals and directives, but which would be significantly less costly.

Response:

The Department has thoroughly reviewed the comments presented by both CPA and H&A. To summarize, both CPA and H&A state that the 6 NYCRR Part 360 composite cap is an unnecessary element of the Proposed Remedial Action Plan (PRAP). Each propose that the the Department consider simply covering the area of the landfill trenches with more soil.

With regard to the applicability of NYCRR Part 360 as an SCG for the Cuba site, the Department believes that alternatives proposed by CPA and H&A are not as protective as the 360 composite cap and therefore a waiver is not justified. DEC rejects the concept of simply covering the trenches with more soil. This was done in 1987 and it has not been effective. Surface water would continue to percolate through and around the trenches resulting in unacceptable quantities of leachate. NYSDEC TAGM # 4044 Accelerated Remedial Actions at Class 2 Non-RCRA Regulated Landfills, sets forth capping requirements for municipal landfills that have received hazardous waste. TAGM #4044 is an SCG for the Cuba site and offers the technical considerations for capping to be evaluated during the remedy selection process. The TAGM states that RCRA capping requirements will be sufficiently addressed by a properly designed cap which, at a minimum, would meet the Part 360 capping requirements for a typical non-RCRA regulated landfill. Therefore, for most Class 2, Non-

RCRA regulated landfills, a properly designed cap which meets or exceeds the Part 360 capping requirements is appropriate.

The design of the cap must therefore include a low permeability barrier, sufficient frost protection to protect the low permeability layer, account for the subsidence of the waste, run-off controls etc. Both the CPA and H&A commenters have failed to address the State requirement to proceed under the provisions of NYSDEC TAGM #4044 for developing the Cuba remedial plan.

Also, H&A states that "historic non-compliance with NYSDEC landfill closure is not a criterion driving the current remedial action". Approval by the DEC of the original soil cover was made under less rigorous environmental standards at the time, and was without the knowledge that potentially large quantities of RCRA listed hazardous waste were disposed in landfill trenches by local industry. It was ascertained during the course of the remedial investigation that the degree of the landfill trench subsidence and the presence of large trees on the landfill would indicate a lack of landfill maintenance. The Department believes that the presence of listed hazardous waste and the current landfill conditions certainly provide no justification to close a landfill less stringently that what is currently required for non-hazardous waste municipal landfills.

The issue of the cost of a Part 360 cap was a central theme for the commenters. The Department has evaluated several recent bids for landfill closure in western New York in developing the cost estimate for the Cuba Landfill. The cost estimate will continue to be refined and the Department will continue to seek the most cost effective approach for implementing the selected plan throughout the remedial design. The selected plan already includes a cost saving

modified approach to the Part 360 closure requirements. The plan eliminates the gas venting layer in favor of passive venting and proposes to replace the piped leachate collection system with an innovative phytoremediation system, resulting in significantly lower capital and O&M cost. The use of on-site materials will again be evaluated and during the remedial design.

Letter #2

An undated letter was received on February 7, 2000 from Ms. Jesse Dewe, Wilderness Rd. Friendship, NY which asked to identify whose private wells were tested, what was found and how is contamination being removed for safe use.

Response:

The New York State Department of Health has conducted routine monitoring of five nearby residential drinking water supply wells. The locations were selected based on their proximity to the landfill. As a matter of privacy the owners of the wells are notified individually of the results and the names and addresses of the owners are not routinely disclosed to the general public. However, it can be reported that no site contaminants were detected at any of the locations and all wells were deemed suitable for all household purposes.

APPENDIX B

Administrative Record

1) Preliminary Site Assessment - Cuba Municipal Waste Site, Vol. 1 and 2, Engineering Science, January 1994.

2) Registry Site Classification - Cuba Municipal Waste Disposal Site, NYSDEC, March 1994.

3) Remedial Investigation and Feasibility Study Work Plan - Cuba Municipal Waste Disposal Site, Dvirka and Bartilucci, May 1997.

4) Order On Consent, Index #B9-0461-94-09, Site #9-02-012: Acme Electric Corporation Respondent; Settlement Pertaining to the Remedial Program at the Cuba (V) Inactive Hazardous Waste Disposal Site, June 1997.

5) Remedial Investigation Report - Cuba Municipal Waste Disposal Site, Dvirka and Bartilucci, July 1999.

6) Feasibility Study Report - Cuba Municipal Waste Disposal Site, Dvirka and Bartilucci, December 1999.

7) Proposed Remedial Action Plan - Cuba Municipal Waste Disposal Site, NYSDEC, December 1999.

8) Responsiveness Summary to the January 10, 2000 Public Meeting - Cuba Municipal Waste Disposal Site Proposed Remedial Action Plan, March 2000.