4707

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO
EPA/ROD/R01-86/017		

4. TITLE AND SUBTITLE	5. REPORT DATE
SUPERFUND RECORD OF DECISION Baird & McGuire, MA	September 30, 1986
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO
	11. CONTRACT/GRANT NO
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report
	14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Baird & McGuire site encompasses approximately twenty acres in Holbrook, Norfolk County, MA. Wetlands occupy approximately 44 percent of the site with approximately 66 percent of the site lying within a 100-year flood plain. Baird & McGuire, Inc. (BMI) operated a chemical mixing and batching company from 1912 to 1983. Between 1954 and 1977 the company was fined at least 35 times by the EPA for numerous violations. Consultants to the Town of Holbrook reported that BMI's disposal practices from 1959 to 1962 were the source of ground water and wetlands contamination. In February 1982 a citizen's complaint of an oily substance on the Cochato River initiated a site inspection which reported surface water, ground water, and wetlands contamination. BMI was also found to be in violation of hazardous substance hauling practices. In March 1983 heavy rains caused a breach of the creosote collection lagoon resulting in an EPA-initiated Immediate Removal Action. This action included: the removal of approximately 1,000 cubic yards of contaminated soils, construction of a clay cap, installation of a ground water interception/recirculation system, and erection of limited fencing. In May 1983, Holbrook revoked BMI's permit to store chemicals and ordered it to dismantle the existing storage facilities. Dioxin, detected in surficial soil samples in July 1985, prompted an EPA-initiated second removal response involving the installation of 5700 feet of fencing and extensive soil, ground water, surface
(See attached sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field Group
Superfund Record of Decision Baird & McGuire, MA Contaminated Media: gw, soils Key contaminants: VOCs, organics, PAHs, dioxin, pesticides, metals		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 84
	20. SECURITY CLASS (This page) None	22. PRICE

16. ABSTRACT (continued)

water, and air sampling. The primary contaminants of concern include: VOCs, organics, PAHs, dioxin, pesticides, and metals.

The selected remedial action includes: excavation in "hot areas" to remove approximately 191,000 cubic yards of contaminated soils; onsite incineration of excavated soils; ground water extraction and onsite treatment with discharge to an onsite aquifer; restoration of wetlands at excavated areas; construction of levees; relocation of the Unnamed Brook; ground water monitoring; and air quality monitoring. The estimated capital costs are $44,386,000 with 30-year O&M costs of $4,132,000.

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

SITE: Baird & McGuire, Holbrook, Massachusetts

DOCUMENTS REVIEWED

I am basing my decision primarily on the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Baird & McGuire Site:

1. Baird & McGuire On-Scene Coordinator's Report; Holbrook, Massachusetts, March, 1983 - July, 1984; Prepared by the U.S. EPA Region I.

2. Installation and Monitoring of Interim Groundwater Containment System, Baird & McGuire Site, Holbrook, Massachusetts; August, 1985. Prepared for the U.S. EPA, Region I by Goldberg-Zoino & Associates, Inc. Newton Upper Falls, Massachusetts.

3. Remedial Investigation Report, Baird & McGuire Site, Holbrook, Massachusetts, Volumes I, II and III; May 22, 1985. Prepared for the U.S. EPA Region I, by GHR Engineering Associates, Inc. New Bedford, Massachusetts, sub-contractor to the NUS Corp, Pittsburgh, PA.

4. Remedial Investigation Phase II, Baird & McGuire Site, Holbrook, Massachusetts; June 27, 1986. Prepared for the U.S. EPA Region I, by GHR Engineering Associates, Inc. New Bedford, Massachusetts, sub-contractor to the NUS Corp, Pittsburgh, PA.

5. Feasibility Study Report, Baird & McGuire Site, Holbrook, Massachusetts; July 18, 1986. Prepared for the U.S. EPA Region I, by GHR Engineering Associates, Inc. New Bedford, Massachusetts, sub-contractor to the NUS Corp, Pittsburgh, PA.

6. EPA Supplement to the Baird & McGuire Feasibility Study Report of July, 1986; August, 1986. Prepared by the U.S. EPA, Region I.

7. Summary of Remedial Alternative Selection (attached).

8. Community Relations Responsiveness Summary (attached).

9. The National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300; November 20, 1985.

DESCRIPTION OF SELECTED REMEDY

- Excavations in "hot areas" to remove approximately 191,000 cubic yards of contaminated soils.

- Treatment of contaminated soils utilizing on-site thermal destruction. A test burn and air quality modeling will occur during design.

- Groundwater extraction and treatment at on-site treatment plant. Treated groundwater will be discharged to the extent feasible to the aquifer on-site. If other discharge points are necessary, the treatment plant will be modified.

- Restoration of wetlands where contaminated soils are excavated.

- Temporary flood protection through the construction of levees.

- Relocation of the Unnamed Brook.

- Groundwater monitoring on-site and off-site.

- Air quality monitoring during remedial construction and implementation of thermal destruction.

OPERATION AND MAINTENANCE

Operation and maintenance (O&M) will be a necessary component of the management of migration alternative. Actual operation of the thermal destruction unit and the operation of the groundwater extraction and treatment system are considered to be part of the remedy until the soil is remediated. If, after soil remediation, groundwater treatment cleanup levels have not been attained, then, after an additional one year of operation of the extraction and treatment system, 100% of the O&M cost responsibilities will belong to the State. O&M will continue until the groundwater treatment levels are attained. Additional O&M will consist of site maintenance, sludge and waste carbon disposal, and monitoring.

DECLARATIONS

Consistent with the Comprehensive Environmental Response Compensation, and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300), I have determined that the excavation and on-site treatment of contaminated soils and the extraction and treatment of contaminated groundwater is a cost effective complete and permanent remedy and provides adequate protection of public health and welfare and the environment at the Baird & McGuire site. This remedy is considered to be an on-site remediation. The need for off-site actions will be determined in the future.

The Commonwealth of Massachusetts has been consulted and agrees with the remedy.

9/30/86
Date

Michael R. Deland
Regional Administrator - EPA - Region I

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

FOR THE

BAIRD & MCGUIRE SITE

HOLBROOK, MASSACHUSETTS

September 29, 1986

U.S. Environmental Protection Agency

Region I

Boston, Massachusetts

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ATTACHMENTS

Appendix A - Consistency with State Environmental Laws

Community Relations Responsiveness Summary

Site Location and Description

The Baird and McGuire site is located in northwest Holbrook, Norfolk County, Massachusetts at 775 South Street. The site represents the area within the EPA security fence erected in 1985. The Baird and McGuire property itself is less than 8 acres in size and is occupied by an office building, tank farm, laboratory building, mixing vat building and storage building. The total size of the site represents approximately 20 acres.

Baird and McGuire's process buildings, tank farm, and office buildings are situated on a hillside which steeply slopes to the north and east. (See Figures 1, 2 and 3)

The process buildings consist of a one story masonry laboratory building, a two and one-half story mixing building (metal and wood construction) and a storage building. The mixing, laboratory building and tank farm are to be demolished as a result of Initial Remedial Measures (IRM's) (July, 1985). The tank farm consists of 33 above ground tanks varying in capacity from 2,000 gallons to approximately 12,000 gallons. Eight underground tanks have been identified with capacities varying from unknown to 5,000 gallons. The underground tanks will be either filled with concrete or removed as part of the IRM. Twenty-five additional tanks exist within the mixing and laboratory buildings. Their capacities vary from 100 gallons to 13,000 gallons.

The facility is surrounded by deciduous and coniferous woodlands. Elevations range from about 170 feet MSL (mean sea level datum) in the southwestern corner of the site, to about 130 feet MSL to the northeast and in the central portion of the Site. From this 130 feet MSL elevation, the topography slopes gently to 119 feet MSL at the Cochato River. These relatively flat, wet and poorly drained central and eastern portions of the site are characterized by dense, deciduous wooded wetland vegetation. Similar wooded wetlands are situated to the southeast of the facility.

Based on the results of the wetland boundary delineation, wetlands occupy approximately 44 percent of the site. Approximately 66 percent of the site lies within the 100 year floodplain elevation of 126.9 feet.

To the east of the facility, primarily on property owned by Newcan Company, there exists a clay capped area. This area was formerly a 200 foot wide clearing which was utilized for waste disposal purposes and for the collection of a black-oily liquid which was present in low-lying areas. This area exists within the 100 year floodplain. Approximately 1000 yd^3 of material was removed from the clearing prior to the installation of the clay cap and a groundwater collection/recirculation system. These improvements were part of the EPA removal action of 1983-84.

Land use in the general vicinity of the site (i.e., to the north and south of the site along South Street; on Center and Union Streets, all or part of which are in Randolph, and in the Cochato Industrial Park located to the northeast of the site) is intensely industrial/commercial. The types of businesses which now or formerly operated in this area include: metal engraving, metal finishing, paint production, machine shop work, metal plating, metal fabrication, fuel storage for distribution, auto repair, chemical storage, materials research, spray painting, roofing, printing, leather cutting and grading, and assorted distribution services.

The area west of South Street and the Baird & McGuire site is primarily residential. Another residential community is located along the north shore of Lake Holbrook some 2,000 feet to the southeast of the site. (See Figure 1)

The Holbrook/Randolph South Street Well Field lies immediately to the south of the site (within 1,500 feet). Undeveloped open space currently lies to the east-southeast of the site. (See Figure 1)

The predominant surface water feature of the site is the Cochato River. It is a Class B stream and flows from south to north through the Towns of Holbrook, Randolph and Braintree. It is located approximately 500 feet from the Baird & McGuire facility and forms the eastern perimeter of the site. Two unnamed brooks, one flowing from west to east across the northern portion of the site (known as the "unnamed" brook) and the other from west to east (designated tributary C-2) in the wetlands south of South Street Well No. 1, empty into the Cochato. Wetlands situated along the western bank of the Cochato, to the east of the former waste disposal area, receive site drainage which empties into the Cochato River.

There are two lakes within 0.5 miles of the site. Lake Holbrook, one of the sources of the Cochato River, is 2000 feet upstream of the site. About 2100 feet downstream of the site, the Cochato flows by Sylvan Lake. In flood conditions, water from the Cochato enters Sylvan Lake via an elevated inlet. Also downstream, approximately 3500 feet from the site, is a major wetland. This wetland is one of many typically smaller wetlands found along the entire length of the river.

Approximately 2.5 miles downstream of the site, the Cochato River flows past the Richardi Reservoir, which serves as a local supplementary water supply. Richardi Reservoir is adjacent to the Cochato River. A surface water intake, the level of which is controlled by splash boards in the river exists to deliver water from the Cochato River to Richardi Reservoir; however, this surface water intake has been closed since February 1983. In addition to the remaining surface water sources, there is a

substantial amount of groundwater flow into the reservoir such that water is periodically pumped from Richardi Reservoir into Upper Reservoir, which in turn feeds Great Pond. Both Upper Reservoir and Great Pond, which are outside of the Cochato River basin, provide public water supply for the Towns of Holbrook, Randolph and Braintree.

North of Richardi Reservoir the Cochato River joins the Monatiquot River, which flows to the Weymouth Fore River, which ultimately discharges into Massachusetts Bay.

The groundwater resources in the area have been utilized in the past as a municipal water supply source in two locations. The South Street Well Field (1.8 mgd) is located 1500 feet south and cross gradient from the site. The last of the three production wells at South Street was shut down in 1982 due to volatile organic chemical contamination. The Donna Road well field (.5 mgd) is located 1-2 miles southeast and upgradient from the site. It consists of 16 well points driven to a depth of 30 to 40 feet. These wells were shut down due to high iron and manganese levels in 1979.

Other known users of the groundwater in the area are the Accurate Metal Finishing Company on South Street and a private well on English Road in Holbrook. These users are within 2,000 feet of the site.

Site History

Baird & McGuire, Inc. operated a chemical mixing and batching company from 1912 until 1983. It formulated a variety of products, including disinfectants, soaps, floor wax and pesticides. Baird & McGuire, Inc. is a corporation incorporated under the laws of Massachusetts. Between 1957 and 1983, Baird Realty Co, Inc. was the record owner of the Baird & McGuire site. In 1983, title transferred to Baird & McGuire, Inc. (Baird Realty Co., Inc. was subsequently known as the Ann E. Realty Trust, Inc.). Cameron M. Baird was President and Treasurer of Baird & McGuire, Inc. while his brother Gordon acted as Chairman of the Board.

EPA became involved with Baird & McGuire in the period between 1954 and 1977 when the company was fined at least 35 times for numerous violations of the Federal Insecticide, Fungicide and Rodenticide Act of 1947. The charges were brought against the company due to mislabeling, improperly registering and adulterating their products.

Waste disposal practices employed by Baird & McGuire were first documented in Northeast Consultants Reports to the Town of Holbrook between 1959 and 1962. These reports refer to contamination from the plant to wetlands via "drain lines." The reports concluded that contamination from Baird & McGuire's disposal practices was the source of contamination of the South Street Wellfield. Other early documentation of illegal disposal practices includes a citizen's complaint to DEQE regarding an odorous discharge to a wetland in 1975.

In May 1981, the DEQE performed a site inspection and documented a number of questionable disposal practices. These included a laboratory sink which discharged into a parking lot which drained to a nearby brook, a storage tank which showed evidence of previous overflows (stained soils), and an uncovered "beehive" cesspool.

In February 1982, a citizen's complaint of an oily substance on the Cochato River initiated another DEQE site inspection. This inspection reported the following: the tank farm was not lined or diked, which allowed contaminated surface water runoff to reach the adjacent brook; sewage waste, process waste and surface water runoff were collected in an open "beehive" cesspool which contributed to groundwater contamination; wastewater which contained hazardous constituents was collected and dumped into a Metropolitan District Commission (MDC) sewer by a hauler not permitted to transport hazardous substances; and a pipe was identified as discharging a black oily substance to wetlands.

During February through April, 1982, Baird & McGuire voluntarily implemented a series of remedial actions. These included: installing a catch basin near the tank farm to intercept surface water runoff; filling of the "beehive" cesspool with concrete and replacing it with a sump and storage tank; installing booms

on the Cochato River and unnamed brook to prevent oil runoff downstream; removing a discharge pipe and application of absorbent pads to the wetland to soak up the oil; and installation of a creosote collection system and construction of a clay dike around the creosote lagoon to prevent a release of contaminants in flooding conditions.

The site was scored on the Hazardous Ranking System in August, 1982 by EPA's contractor, Ecology and Environment, Inc. It was proposed on the National Priorities List (NPL) in October 1982 with a total score of 66.35 (score for groundwater was 100.00, surface water was 56.36 and air was 0). It currently ranks 14 out of a total 888 current or proposed sites on the NPL. (June, 1986 Fed. Reg.)

In March 1983, heavy rains resulted in a breach of the creosote collection lagoon. This constituted a release of a pollutant which may have presented an imminent or substantial threat to the public health or the environment. EPA responded by initiating an (immediate) removal action under Section 104 (a)(1) of CERCLA. In the course of the removal action, EPA removed approximately 1000 cubic yards of contaminated soils, constructed a clay cap, installed a groundwater interception/recirculation system, and erected limited fencing.

On May 2, 1983, the Board of Selectmen of Holbrook revoked Baird & McGuire's permit to store chemicals at the site and ordered it to dismantle its existing storage facilities. As a result of this order, Baird & McGuire was forced to cease operations.

In July, 1985, site sampling detected the presence of dioxin in surficial soils. This prompted EPA to reactivate its removal program. The second removal response installed 5700' of fencing and performed extensive sampling of soil, groundwater, surface water and air to better delineate the extent of dioxin contamination.

A cost recovery action was filed in the fall of 1983 under Section 107 of CERCLA against Baird & McGuire, Inc. and related individuals, seeking recovery of costs expended by EPA for the removal action and expected to be expended during the remedial action. The litigation is in the process of being settled. The defendants include Baird and McGuire, Inc., Cameron Baird, Gordon Baird, and the Ann E. Realty Trust, Inc., all of whom are considered site owners and/or operators. Settlement negotiations have occurred and are ongoing. Settlement appears likely but has not been finalized. Because of the defendants' financial status and the high cost of the remedy, the Government's recovery will be for substantially less than the total amount expended in the clean-up.

Current Site Status

The populations which were studied to determine risk through potential exposure scenarios are those who either live or work near the site and those who are served by the Great Pond Reservoir system.

Populations Near the Site

The population of people who live near the site was calculated by taking concentric circles of 1000 feet, between 1000 feet and 2000 feet and between 2000 feet and 1 mile from the site and correlating the circles with census data. In addition, telephone contacts were made with area employers to obtain the number of workers in the area. The populations for these areas are estimated as follows:

	Within 1000 ft	Between 1000 and 2000 ft	Between 2000 ft and 1 mile
Residential	117	826	9067
Non-residential	280	178	
Total	397	1004	9067

EPA has also determined the population served by the Great Pond Reservoir. Great Pond Reservoir serves inhabitants of the towns of Holbrook, Randolph and Braintree. Great Pond formerly received some water from the Cochato River after dilution and holding in the Richardi Reservoir and Upper Reservoir. The Richardi Reservoir is located 2.5 miles downstream from the Baird & McGuire site. The sluice gates on the Richardi Reservoir have been closed since February, 1983, so water from the Cochato is no longer used as part of the drinking water supply.

Population Served by Great Pond	
residential	77,841
non-residential	114,841
Total	192,682

The routes of exposure which may affect the population near the site are through exposure to groundwater, dry soils, muck, contaminated fish, surface water, or through swimming. Out of a total of 102 contaminants detected at the site, a list of 53 critical contaminants has been determined. This list can be found attached as Tables 1 and 2. The critical contaminants are compounds which have the greatest toxicological potency and have been detected in the highest frequency.

Refer to the FS Tables 2-19 through 2-78 for a presentation of the calculated risk to adults and children through the above

routes of exposure for the critical contaminants in each of the risk assessment zones (see Figure 4). A complete discription of these zones is contained in the text further on in this section.

The hydrogeologic factors which affect the soil and groundwater contamination are complex and varied throughout the site.

Geology and Hydrogeology

The geologic site features are representative of processes associated with glaciation. The observed features are bedrock, till, outwash deposits of stratified sands, gravel and silts, organic soils and fill materials.

The bedrock underlying the Baird & McGuire site is mapped as the Salem Gabbro-Diorite. It is a metamorphosed igneous rock believed to be of Precambrian age (older than 600 million years). The rock is described as a fine to medium grained, massive, dark greenish-gray metaquartz diorite and metadiorite. Field observation of bedrock cores indicate an intrusion of Dedham Granodiorite into the Salem Gabbro-Diorite. The Dedham is described as massive medium to coarse-grained pink granite and quartz monzonite believed to be of Precambrian age.

The bedrock underlying the site is fractured and shows indication through monitoring well and rock core observations of groundwater movement through the fractures. The topography of the bedrock ranges from 129 feet above MSL to less than 20 feet above MSL. In general, the top of competent bedrock appears to slope downward from South Street toward a closed depression or bowl located along seismic line 4 (see Figure 5). A bedrock valley extends northwestward from this bowl. The wall of the valley is steep on the northern side, and relatively gentle on the southern side; the valley apparently ends near well 910. A lesser valley extends northeastward from the "bowl"; the extent of this valley to the northeast is not known. A buried bedrock hill is located between the Holbrook-Randolph Well Field and the Cochato River.

The top of the dense glacial till/weathered bedrock shows less relief than does the top of competent bedrock. The deep bowl or depression described above appears to be filled with a significant thickness (up to 60 feet) of glacial till and/or weathered rock, and lesser thicknesses of till and/or weathered rock are present elsewhere at the Site.

The characteristics of the soil and bedrock of Baird & McGuire in terms of hydrogeology are critical to an understanding of the fate of contaminants which have entered the aquifer. Hydraulic conductivities for the principle overburden units are summarized below:

Material	Hydraulic Conductivity Range ft/day	Average ft/day	Average cm/sec
Silty sands, sand & silt	1.0 - 6.0	3	$1x10^{-3}$
Fine to medium, fine to coarse sands	10 - 100	45	$1.6x10^{-2}$
Glacial till	1 - 20	10	$3.5x10^{-3}$

These conductivities represent horizontal "permeabilities." In stratified deposits such as the sands, silts, and silty sands observed at the Site, anisotropic conditions will prevail (i.e., vertical hydraulic conductivities will be significantly lower than horizontal). The average ratio of horizontal to vertical hydraulic conductivity is estimated to be between 10:1 and 20:1.

Transmissivities of groundwater through bedrock have been estimated to be at 0.3 to 3 feet/day.

Use of Groundwater

The current uses of groundwater resources in the vicinity of the site are a private drinking water well approximately 3000 feet southeast and upgradient of Baird & McGuire and a process water well 500 feet northwest and crossgradient at Accurate Metal Finishing. The private drinking water well has been determined to be safe to drink since it is free of detectable contaminants.

A past use of groundwater resources in the vicinity of the site was the Holbrook Municipal South Street Well Field (1.8 mgd). The well field consisted of three wells located within 1500 feet of Baird & McGuire. Well No. 3 is located 1000 feet from Baird & McGuire and is the closest well to the site. It was closed in 1959 when phenols were detected shortly after it was put into service. Well No. 2 was permanently closed in 1980. Well No. 1 was closed in 1982 due to volatile chemical contamination. The appropriate groundwater class for the aquifer underlying the Baird & McGuire site and vicinity is Class II (classification based on EPA's Groundwater Protection Strategy). This class represents a current and potential source of drinking water and waters having other beneficial uses.

Climate

The main climatic factor affecting site contamination is precipitation. Precipitation is fairly evenly distributed throughout the year, with a total annual record mean of 45 inches, and normal monthly precipitation ranging between 3.0 to 5.1 inches.

Snow can be expected from November through early April. Of the total annual precipitation, approximately 14 percent occurs as snow or sleet. "Northeasters", which are coastal storms accompanied by high winds and heavy precipitation in the form of snow or rain, are regionally significant weather events.

Man-made Barriers

Man-made barriers currently are used to control the migration of contamination from the site. The barriers are the groundwater interception/recirculation system and temporary capping performed under the EPA's removal program during 1983 and 1984. According to GZA's report on "The Installation and Monitoring of Interim Groundwater Containment System", calculations suggest that the cap and containment system has reduced discharge of pollutants from the site by 85-95 percent. The groundwater interception/ recirculation system was designed for a one year operation. The present system has been in operation for two years and expects to be operating for an additional one to two years until the permanent remedy can be implemented.

The temporary impervious capping was designed to divert clean runoff from precipitation away from the site and to limit direct infiltration. It also reduced the potential for direct contact with contaminated soils.

Migration

Contaminated substances have migrated and continue to migrate through groundwater and surface water routes. The groundwater contamination ultimately discharges into the Cochato River. However, according to GHR, this contamination is being effectively attenuated by organic soils and sediments on the river bottom, biodegraded by anaerobic and aerobic bacteria and diluted by surface water so as to prevent the measurable degradation of water in the Cochato River. The sediments of the Cochato River could be considered to be a natural barrier in containing site contamination. A slight seepage of contaminated groundwater is also occurring into a sewer line which is located on the far side (east) of the Cochato River.

Migration of contamination through surface water is primarily via stormwater runoff. Uncapped contaminated soils have in the past eroded, and continue to do so, and are transported during storm events. The wetlands surrounding the site show the greatest evidence of contaminated particulate transport via surface water. Sediment contamination of the Cochato River and unnamed brook near the site and downstream from the site can be attributed to Baird & McGuire surface water runoff.

Extent of Contamination

The presentation of soil contamination data is based primarily on the results of 73 soil samples taken during the Remedial Investigation (RI) and 217 soil samples taken during the RI Addendum field programs. During these sampling events, organic and inorganic chemicals belonging to all the major classes of HSL constituents, including dioxin and herbicides, were detected.

This identification and characterization of the soil contaminants is documented in Sections 5.20-5.21.5 of the RI and Sections 5.40-5.42.5 of the Addendum to the RI. From the data in these Sections, the areal and vertical extent of soil contamination is developed.

Zones

Since the Site is not homogeneous in terms of geology, soils, hydrology or contamination, it has been divided into eleven distinct Zones described below: (See Figure 7)

1. Zone 1, an upland portion of the Site, contains the tank farm and the abandoned buildings which were used for offices, storage, mixing and laboratory facilities;

2. Zone 2, fenced and capped after EPA removed approximately 1,000 cubic yards of contaminated soils in 1984, contains the primary former on-Site disposal area;

3. Zone 3 contains the ephemeral stream called the unnamed Brook;

4. Zone 4N (N for North) contains low-lying areas and wetlands along the Cochato River downstream of Zone 2 to Mear Road;

5. Zone 4S (S for South) contains low-lying areas and wetlands along the Cochato River upstream of Zone 2;

6. Zone 5 contains an area of suspected overland flow along the dirt access road from Zone 1 towards Town Well No. 3;

7. Zone 6 represents the Cochato River and a narrow strip of wetland along each side from the southerly (upstream) border of the EPA security fence downstream to Mear Road;

8. Zone 7 represents areas across the Cochato River from Zones 2,3 and 4N (this Zone has no distinct eastern boundary);

9. Zone 8 represents the area to the south of the main Site, which contains the closed Town Wells Nos. 1, 2 and 3 (this Zone has no distinct southern boundary);

10. Zone "Up" represents the upstream portion of the Cochato River from the dam/weir at Lake Holbrook to Zone 6;

11. Zone "Down" represents the Cochato River downstream of Zone 6 (this Zone has no distinct downstream boundary).

The analytical results for soils at the surface and at various depths for the zones are summarized in Tables 5-1 through 5-13 (RI Addendum). The compounds listed in the tables are the critical contaminants for the site. The critical contaminants were selected based on their toxicological potency, concentration and frequency detected in different environmental media. The determination of critical contaminants can be found in Section 2.32 of the Feasibility Study (FS). (See Table 1 for a listing of the critical contaminants.)

The number of contaminants found at the site, the media in which they exist and the fact that the contaminants are not individually separate from one another all are factors which eliminate the possibility of reuse or recycling of substances on the site.

Soil Contamination Evaluated by Zone

In Zone 1, the extent of contamination of soils is surficial and at depth. Since this was the facility area, this zone exhibits the highest contamination levels found anywhere on the site. Soil areas of particular concern are in the tank farm, beneath the buildings, behind the mixing building and north of the laboratory building. High concentrations of volatile organics, base neutrals, acid extractables and pesticides (percent levels in some samples) exist. Contaminant distribution shows no discernible decrease in total contaminant level with depth, meaning that the soil is contaminated down to bedrock. Bedrock depth varies in Zone 1 from exposed bedrock to approximately 15 feet below the surface.

In Zone 2, soils contamination exists to a depth of at least 30 feet. Concentrations do not decrease with depth so the soils to bedrock are contaminated. Contaminants detected were volatile organics, base neutrals (primarily coal tar derivations), acid extractables (primarily phenols) herbicides and pesticides (percent levels in some samples).

Zone 3 contamination represents the sediment of the unnamed brook. The predominant contaminants detected in the sediments were the base neutrals, pesticides, volatile organics and arsenic. Contamination exists to a depth of at least 15 feet. Contamination decreases with depth in this zone.

Of the compounds detected in Zone 4S and 4N soils, pesticide contamination exists in the highest frequency. Other contaminants detected in lower frequency are volatile organics, base neutrals (coal tar derivitives) and metals. Contamination of soils in 4N can be attributed to Baird and McGuire due to the

presence of Baird & McGuire indicator compounds, chlordane and dieldrin in the samples and the relative higher concentration of contaminants compared to off-site wetland areas.

Soil contamination in parts of 4S differ because two Baird and McGuire indicator pesticides, chlordane and dieldrin, were not detected south of borings B-75 and B-76. (See Figure 6.) Pesticide contamination in this part of 4S can be attributed to Norfolk County mosquito spraying or other sources.

In general, pesticide contamination detected in 4N and 4S is concentrated in the organic-rich topsoils (0-4 feet depth). The volatile, base neutral and acid extractable compounds are more evenly distributed with depth (at least 14 feet deep).

In Zone 5 soils, volatiles, base neutrals, acid extractables, pesticides and metals were detected. This confirmed the fact that waste water runoff from Baird and McGuire contained contaminants which adversely affected the South Street well field. Early investigation of Zone 5 reported yellow-green wastewater from Baird and McGuire collected in a depression. Contamination exists surficially and to at least a 14 foot depth in this zone.

Zone 6 soils consist of sediments of the Cochato River adjacent to the site. Volatiles, base neutrals, pesticides and metals were the predominant contaminants detected. The highest level of contamination existed at the mouth of the unnamed brook in the Cochato River. Sediments which contained the greatest amount of contamination had large amounts of organic material. The underlying bed soils (less organic material) exhibited less contamination.

The upstream sediment contamination boundary exists near station SD-10 and SD-11. (See Figure 6.) Areas upstream of this location were devoid of the characteristic "creosote" odor of the site.

Zone 7 soils are physically isolated from the site since they are on the opposite side of the Cochato River therefore no soil analyses were performed. There are no visible signs of dumping of wastes on the soil in Zone 7.

Zone 8 soils are contaminated with pesticides. The pesticide levels increase with depth. Base neutrals and volatiles were also detected in this zone. The pesticide contamination in the field east of the South Street wells is believed to be attributed to Baird and McGuire. It represents residual contamination from the period when the South Street wells were pumping. Contaminants were drawn through the aquifer towards the wellfield when the wells were pumping. At location B-116 and B-120 (See Figure 6) contamination is likely attributable to background levels with source(s) unknown. This is because these locations are far displaced from the site. The other areas in Zone 8, including the sand pit west of the well field, the wetland south of the

well field, and the Lake Holbrook area, have contamination which cannot be attributed to Baird and McGuire and the levels can be considered to be at an elevated background.

Zone "up" exhibited volatile, base neutral, pesticide and herbicide contamination. Since this zone is an upstream sediment zone, contamination cannot be attributed to Baird and McGuire. Contamination was detected in three out of four samples. Likely sources of the contamination are past mosquito spraying practices and herbicide applications in Lake Holbrook.

Zone "down" soil contamination exhibited volatile, base neutral and pesticide contamination. The more organic material in the sample, the greater the contaminant concentration. Deposition areas of organic materials showed higher contamination levels. The sand and gravel deposits in downstream areas are relatively clean.

Extent of Dioxin Contamination in Soils

The dioxin soil contamination data are based on 125 soil samples collected by EPA and its contractors. The majority of these samples were collected at the ground surface level, except in Zone 1 soils, where samples were collected beneath the mixing, laboratory and storage buildings.

In Zone 1 soils, dioxin was detected in 35 percent (11 out of 28 samples) of those analyzed. In general, higher levels were discovered beneath the building soils which were in the closest proximity to the process chemicals.

In Zone 2, soils dioxin was detected in 2 out of 8 samples. The levels were below 1 ppb in this zone. Further analysis will be performed during design of the creosote-like oil which is known to contain high pesticide levels. No valid analysis were obtained on this oil.

In Zone 3, 50% (13 of 26) of the samples contained dioxin. The occurrence of dioxin in the upland soils of the plant area down through the unnamed brook clearly establishes the brook as a route of transport.

In the wetland Zone 4S, no dioxin was detected in nine samples. In Zone 4N, dioxin was detected in 47% of the samples (11 of 27). Dioxin distribution in this zone appears to be randomly distributed from low to moderately high concentrations. Zone 4S is not subject to the same depositional scenario as Zone 4N. Zone 4N can receive site contaminants via the unnamed brook or the Cochato downstream of the site while 4S is upstream of both routes of transport.

In Zone 5 low levels of dioxin have been detected in 2 out of 3 samples. Zone 5 was subject to plant runoff.

No dioxin was detected in any of the remaining site zones nor in residential areas along South Street opposite of the site.

Summary

In general, the areas with the highest levels of soil contamination include the tank farm, under and around the buildings, under the paved areas of the plant area (Zone 1) and under the capped portion of the Site (Zone 2). In these areas, there is no discernible decrease in total contaminant levels with depth, including below the water table. The chief mechanisms by which soil contaminants were distributed in these areas (including spills and leaks, intentional disposal of waste, stormwater run-off, and groundwater transport and fluctuation) have resulted in contamination of virtually the entire soil column down to bedrock in these areas.

The soils in the outlying areas of the Site, including the north and south wetlands, the seasonally wet area and the wetlands north of the tank farm are, in general, less contaminated than soil in the plant and cap areas. The depth of soil contamination in these areas is also less than in the plant and cap areas. The prime transport mechanism by which soils in the outlying areas have become contaminated are stormwater run-off from the Site, intentional disposal of wastes into the wetlands, flooding and groundwater transport of contaminants from the Site.

The sediments with the highest contaminant concentrations were detected adjacent to the site. Upstream sediment contaminant concentrations were usually lower than downstream sediment contamination.

Extent of Groundwater Contamination

As presented in the RI, infiltration of precipitation through contaminated soils has been determined to be the main source of groundwater contamination. Groundwater and precipitation move through contaminated soil and pick up contaminants through particulate transport and/or chemical solubilities. Other sources of groundwater contamination include the direct discharge from septic systems, pipes and drains.

The identification and characterization of groundwater contamination is documented in Sections 5.30-5.40 of the RI and Sections 5.30-5.32.7 of the Addendum to the RI. Areal and vertical extent of groundwater contamination is developed within these sections.

Plume Description

Analytical data define the presence of a groundwater contamination plume originating at the Baird & McGuire facility, extending east towards, and to a limited extent beyond the Cochato River. The plume runs beneath those soils which received the bulk of contamination from Baird & McGuire disposal practices. It exists in varying degrees in portions of Zone 1, 2, 3, 4N, 4S, 5, 6 and 7. The eastern terminus of the plume is abrupt and is not a significant distance east of the river. The northern extent of the groundwater plume has been determined to terminate near well 919 in Zone 4N. (See Figure 6.) Groundwater contamination detected further north of well 919 is attributed to a leak in a subsurface gasoline tank which occured on property west of the northern monitoring locations.

The core of the contamination plume is characterized by levels of total base/neutral and acid extractable organics exceeding 10,000 ppb and by levels of total aromatic and chlorinated volatile organics exceeding 1000 ppb and 100 ppb, respectively. Concentrations of contaminants typically drop in orders of magnitude within 200 feet north and south of the plume axis.

The southern side of the groundwater contamination plume is skewed further south than would be expected from observed static groundwater flow. The skewing of the plume may be caused by the residual effects of pumping the South Street Well Field, or hydrogeologic factors. The contaminated groundwater extends into Zones 4S and 5 to the south.

Further south, near Well #1 in the South Street Well Field, contaminated groundwater exists. Since EPA has not discovered Baird & McGuire indicator contaminants at this location, it is believed to have been contaminated from an upgradient (southern) source.

Groundwater contamination has been detected upgradient or west of the Baird & McGuire facility (Zone 1). Transport of contaminants

is known to be occurring through bedrock fractures since wells screened within bedrock are contaminated, although in much lower levels than the central plume. The direction of groundwater flow is towards the east based on potentiometric surface data. From this information, it is believed that groundwater contamination from the site is not migrating a significant distance towards the west. The orientation of fracture bedding planes could result in the observed westward flow of contaminants. However, this would be for short distances where the regional component of flow toward the east would be the primary drawing force which would result in flow toward the Cochato River.

Further northwest of the site, contamination has been detected in the well of Accurate Metal Finishing. Due to the different contaminants and higher levels detected at Accurate than those detected at wells nearer the site, it is believed that this contamination is from another source, not Baird & McGuire. Refer to the RI addendum for more information.

Enforcement

The Baird & McGuire facility has had a lengthy history of violating environmental laws. From the mid-1950's on, the company received numerous citations for violations of the Federal Insecticide, Fungicide, and Rodenticide Act. Further, both the state and the local governments took legal actions against the company at various times.

As noted in the Site History section, EPA involvement under CERCLA began in March 1983 with a removal action. Baird and McGuire Inc. stopped operating shortly thereafter, and the company and its officers took the position that they did not have sufficient assets to pay for the work necessary at the site.

In October 1983, the United States of America, on behalf of the Administrator of EPA, filed a cost recovery action under sections 104(a) and (b) and 107(a) of CERCLA. The complaint sought reimbursement for costs incurred by the United States in remedying site conditions from Baird & McGuire, Inc., Baird Realty Co. Inc., (subsequently known as the Ann E. Realty Trust, Inc.) Cameron M. Baird, and Gordon M. Baird.

Baird & McGuire, Inc. owned and operated the Baird & McGuire facility. Baird Realty Co. Inc. was a record owner of part of the site. Cameron Baird was the president, treasurer, and chief executive of Baird & McGuire, Inc., while Gordon M. Baird (Cameron's brother) was the chairman of the board of Baird & McGuire, Inc. The government contends that both individuals exercised control over the company's conduct, activities and operations.

The defendants to the lawsuit, as listed above, were also the sole Potentially Responsible Parties ("PRPs") identified by EPA. As described earlier, Baird & McGuire, Inc. operated as a chemical mixing and batching facility. Chemicals were sent to Baird & McGuire for use in producing final products. The company was not in the business of disposing of hazardous substances or waste sent by other companies, so that EPA has not designated the Baird & McGuire chemical suppliers as PRPs.

The PRPs maintained from early on in discussions with EPA both that they lacked the financial assets to conduct the remedy and that they were not liable. The PRPs also provided some information as to their finances, and the United States obtained a lien on a parcel of property owned by the Anne E. Realty Trust.

As a result, EPA determined that the PRPs were unable and unwilling to implement the full remedy at the site.

At this time, the parties have reached an agreement in principle on a settlement, although the negotiations on the language of

a Consent Decree continue. The PRPs, as well as the insurers of one of Baird & McGuire, Inc., have agreed to pay a substantial sum to EPA. EPA will also have full access to the site for the purposes of implementing the remedy. The United States will retain the right to proceed against two other Baird & McGuire, Inc. insurers. EPA anticipates that the parties will reach final agreement on the terms of a Consent Decree in the near future, if they have not already done so. That Consent Decree will be published for public comment by the Department of Justice following its signature by the PRPs and EPA.

Remedial Planning Activity

The response actions at Baird & McGuire have been phased into operable units. An operable unit is a response action consistent with achieving a permanent remedy. These operable units may include removal or remedial actions involving source controls and/or management of migration. The first operable unit involved the emergency removal action of 1983-84. This action consisted of the removal of approximately 1000 cubic yards of contaminated soils, the installation of the groundwater interception/recirculation system, temporary capping and limited fencing.

The second operable unit represents the IRM. The IRM encompasses the construction of a new 12" water supply main, demolition of the mixing building, laboratory and tank farm, disposal of underground tanks and the installation of temporary capping.

The third operable unit was the emergency removal action of 1985 in response to the discovery of dioxin. This action resulted in extensive sampling of the air, water and soil of the area and the installation of approximately 5700 feet of fencing.

This ROD characterizes the selected remedy which will comprise operable unit 4. The selected remedy, Alternative No. 4M, will be discussed in sections to follow.

Operable unit four focuses upon management of migration and source control remediation solution. Management of migration is defined in the NCP (Fed. Reg. Nov.20, 1985 Vol.50 No.224) as actions that are taken to minimize and mitigate the migration of hazardous substances or pollutants or contaminants and the effects of such migration. Source control is defined as measures which are intended to contain the hazardous substances or pollutants or contaminants where they are located or eliminate potential contamination by transporting the hazardous substances or pollutants or contaminants to a new location.

Alternatives Evaluation

OBJECTIVES

The public health and environmental objectives for the Baird & McGuire site are as follows:

1) Minimize the risk for the human population of direct contact with contaminated soils/sediments
2) Remediate the contaminated aquifer within a reasonable time to prevent present or future impacts to groundwater drinking water supplies
3) Protect surface waters from future contaminant migration
4) Minimize long-term management and/or maintenance requirements

DEVELOPMENT OF ALTERNATIVES

The process of generating alternatives to meet these public health and environmental objectives was affected by the presence of dioxin. Presently, there are no RCRA permitted facilities off-site which can accept dioxin contaminated wastes. Therefore, only on-site remediation alternatives for dioxin contaminated soils were included in the FS. Contamination occurs sporadically in Zones 1 through 5.

There are several other limiting factors which also affect the alternative generation process. Some of these are:

1) Approximately 66% of the contaminated soil areas are located within the 100 year floodplain

2) Approximately 44% of the contaminated soil areas are classified as wetlands

3) Bedrock underlying the Site is fractured and now carries contaminated groundwater

Other limiting factors can be found in the FS on pgs 4-6 and 4-7.

The alternatives were grouped based on the requirements in the NCP 300.68(f)(i-v).

1) Alternatives for Off-Site Treatment or Disposal

There are no remedial alternatives involving off-site treatment or disposal of wastes from the Site because there are no off-site facilities permitted to treat or dispose of dioxin-contaminated materials in the nation.

2) Alternatives Exceeding Standards

Due to the extent of contamination at the Site and background contamination present in surrounding areas, it was not possible to develop an alternative that would exceed all applicable, relevant or appropriate requirements.

3) Alternatives That Attain Standards

There are six remedial alternatives that are considered to attain standards. These are identified as Alternative Nos. 3, 3A, 3B, 4A and 4M.

4) Alternatives That Do Not Attain Standards

There are three remedial alternatives that are considered not to attain standards, but which are expected to reduce the likelihood of present or future threats from the hazardous substances and that provide significant protection to public health and welfare and the environment. These are identified as Alternative Nos. 4B, 4C and 4D.

5) No Action Alternative

Under the No Action Alternative, identified herein as Alternative No. 5, the following actions are assumed:

1. Building demolition and water line relocation will proceed as currently planned;

2. The Site will remain fenced as at present;

3. Clean soil material will be placed over portions of Zones 1, 2, 3 and 5 where surficial soils are contaminated.

4. The existing groundwater recirculation system will be shut down; and,

5. Periodic groundwater and surface water quality monitoring will be done for 30 years.

The alternatives were developed based on the components listed below:

1. RCRA CAP - Zone dependent

2. NON RCRA CAP - either Zone 6 or none

3. NO CAP - Zones 7 & 8

4. SOIL EXCAVATION - zone or hot area dependent

5. SOIL DISPOSAL - RCRA landfill, incineration, or none

6. GROUNDWATER CONTAINMENT - slurry wall around Zones 1, 2 and 3 and/or pumping wells or none

7. GROUNDWATER INTERCEPTION - pumping wells or none

8. GROUNDWATER TREATMENT - included or none

9. FLOOD PROTECTION - levees, temporary or permanent

All the alternatives include relocating the unnamed brook.

INITIAL SCREENING OF ALTERNATIVES

The alternatives were screened initially, consistent with the process outlined in the NCP Section 300.68(G). This resulted in the dropping of three alternatives from further consideration. These alternatives (4B, 4C and 4D) are described below with justification for elimination.

Description of Alternative 4B

Alternative No. 4B

1. RCRA CAP - Zones 1 through 5 (in-place capping of contaminated soils)

2. NON-RCRA CAP - Zone 6 (Cochato River inside security fence)

3. NO CAP - Zones 7 and 8

4. SOIL EXCAVATION - None

5. SOIL DISPOSAL - None

6. GROUNDWATER CONTAINMENT - Slurry wall around Zones 1, 2 and 3

7. GROUNDWATER INTERCEPTION - Wellpoint system

8. GROUNDWATER TREATMENT - On-Site treatment plant

9. FLOOD PROTECTION - Levee option C (permanent)

Alternative 4B was eliminated from detailed evaluation for two reasons as defined in the NCP:

(1.) Acceptable engineering practices, (i.e., reliability); and
(2.) Effectiveness, (i.e., adverse impacts).

This alternative essentially relies on containment of contaminated soils under an impermeable cap covering Zones 1-5. Because the

contaminated soils would not be excavated and would not be destroyed, they will remain as a source of groundwater contamination until they are removed by the groundwater extraction/treatment/reinjection system. The estimated time required for groundwater pumping and treatment would be a minimum of 65 years and probably longer. This time period is based on the assumption that treatment will continue until contaminants reach non-detectable levels. All subsequent estimates are based on this rationale. The reliability of the treatment system's operation and maintenance over this extended time period is extremely uncertain; this, in turn, calls into question the effectiveness of this alternative in meeting the stated objective of aquifer restoration within a reasonable period of time.

The in-situ capping also would cause adverse environmental impact in that the wetlands in Zones 4 and 5 would be permanently destroyed without opportunity for reestablishment. This alternative thus would violate Executive Order 11990 by unnecessary filling a wetland where other practical alternatives exist.

Description of Alternative 4C

1. RCRA CAP - Zones 1, 2 and 3 (over on-Site landfill)

2. NON-RCRA CAP - Zone 6 (Cochato River inside security fence)

3. NO CAP - Zones 7 and 8.

4. SOIL EXCAVATION - Zones 4N, 4S and 5 (to 4-foot depth) followed by clean backfilling to facilitate future wetland restoration

5. SOIL DISPOSAL - On-Site landfill (RCRA design) of 100,000 cubic yards of material

6. GROUNDWATER CONTAINMENT - Slurry wall around Zones 1, 2 and 3

7. GROUNDWATER INTERCEPTION - none

8. GROUNDWATER TREATMENT - none

9. FLOOD PROTECTION - Levee Option C (permanent)

Alternative 4C was eliminated from detailed evaluation for two reasons as defined in the NCP.

(1.) Acceptable engineering practices, (i.e. reliability); and
(2.) Effectiveness.

This alternative relies on permanent containment of contaminated soils/groundwater by means of a cap and slurry wall with no groundwater extraction/treatment and an onsite RCRA landfill for 100,000 cubic yards of soils excavated from wetland Zones 4 and 5. The reliability of this containment in perpetuity is highly

questionable. Furthermore, the renovation of groundwater would rely on natural attenuation/degradation processes expected to take hundreds of years. Thus, the objective of groundwater restoration within a reasonable time period would not be achieved.

Description of Alternative 4D

1. RCRA CAP - Zones 1 through 5 (in-place capping of contaminated soils)

2. NON-RCRA CAP - Zone 6 (Cochato River inside security fence)

3. NO CAP - Zones 7 and 8

4. SOIL EXCAVATION - None

5. SOIL DISPOSAL - None

6. GROUNDWATER CONTAINMENT - Slurry wall around Zones 1, 2 and 3

7. GROUNDWATER INTERCEPTION - none

8. GROUNDWATER TREATMENT - none

9. FLOOD PROTECTION - Levee option C (permanent)

Alternative 4D was eliminated from detailed evaluation for two reasons as defined in the NCP:

(1.) acceptable engineering practices; and
(2.) effectiveness.

The containment of contaminated soils and groundwater by means of a surface cap and a slurry wall tied into the till, without a system for withdrawal and treatment of the contaminated groundwater, addresses the direct contact threat but does not reliably address the problem of migration of contaminated groundwater. The existence of downward vertical gradients and the lack of an impermeable till, among other reasons, casts considerable doubt on the ability of this alternative to reliably prevent future continued offsite migration of contaminated groundwater. This alternative fails to meet the remedial goal of aquifer restoration. Secondly, this alternative, by capping contaminated wetland soils in Zones 4 and 5 in-situ, would effectively permanently destroy the wetlands. This would directly violate the Executive Order 11990, since other alternatives exist which would not require permanent destruction.

DETAILED EVALUATION OF REMAINING ALTERNATIVES

The remaining alternatives were subject to the required detailed analysis as described in the NCP § 300.68(h). This analysis evaluated the remedial alternatives and used the following criteria:

1. Technical Evaluation
   a. reliability
   b. implementability
   c. safety considerations

2. Institutional Evaluation
   a. applicable or relevant and appropriate requirements
   b. ability of alternative to attain or exceed standards, or reduce likelihood of present or future threats from the hazardous substances

3. Public Health Evaluation
   a. ability to meet remedial objectives of maintaining low risks or reducing risks

4. Environmental Impact Evaluation
   a. beneficial effects of the alternative
   b. adverse effects of the alternative

5. Cost Evaluation
   a. capital costs
   b. operation and maintenance costs
   c. present worth analysis

A more complete description of these criteria can be found in the FS in Sections 5.11-5.15. Sections 5.20-5.80 in the FS evaluate the required criteria for the detailed analysis of the alternatives. The following section represents the general findings of the detailed analysis for the alternatives, beginning with Alternative No. 3. A summary of the costs of the remedial alternatives is included as Table 3.

Description of Alternative No. 3

1. RCRA CAP - Zones 1, 2 and 3 (over on-Site landfill)

2. NON-RCRA CAP - Zone 6 (Cochato River inside security fence)

3. NO CAP - Zones 7 and 8

4. SOIL EXCAVATION - Zones 4N, 4S and 5 (to 4-foot depth) followed by clean backfilling to facilitate future wetland restoration

5. SOIL DISPOSAL - On-Site landfill (RCRA design) of 100,000 cubic yards of material

6. GROUNDWATER CONTAINMENT - Slurry wall around Zones 1, 2 and 3

7. GROUNDWATER INTERCEPTION - Wellpoint system to recover groundwater plume from Zones 1 through 7

8. GROUNDWATER TREATMENT - On-Site treatment plant

9. FLOOD PROTECTION - Levee option C (permanent)

Alternative No. 3 represents an alternative which is considered to attain all applicable or relevant and appropriate Federal public health and environmental requirements. It has been developed to incorporate known and proven remediation technologies.

Technically, Alternative No. 3 is believed to be capable of construction. Areas of difficult constructability involve the excavation of wetland soils due to the high water table. In addition, sedimentation controls in the Cochato River would need to be implemented during river sediment capping. Ambient air monitoring would be required during excavation and landfilling and mitigative measures taken if necessary to protect workers and area residents from adverse air impacts.

The areas of highest soil contamination on the site are or will be contained beneath temporary caps installed as part of the emergency removal and IRM actions. These areas will not be excavated under this alternative. The soils which are to be excavated will be disposed of in a RCRA landfill which will be built on top of these existing capped areas.

Under Alternative No. 3, the capping of Zones 1, 2, and 3 as part of a RCRA landfill will be in compliance with the relevant and appropriate RCRA regulations (40 CFR 264.310). The cap and slurry wall will be designed to meet the closure performance standard (40 CFR 264.111). The capping of Zones 2 and 3 in place will leave a large volume of contamination within the seasonal high water table and subject to continued migration. This alternative requires the construction of the slurry wall, groundwater pumping and long term post closure care.

Excavation, filling and landfilling in a RCRA landfill in Zones 1, 2 and 3 of waste from Zones 4N, 4S and 5 will remove the great majority of waste from the wetlands and with wetlands restoration will comply with Executive Order 11990 relating to wetlands. However, it is not certain that wetlands can be fully reestablished under this excavation scenario.

Flood protection (Levee Option C) is necessary to insure the long term protection of the cap and landfill. The flood protection will be designed to meet the RCRA location requirements (264.118(b)) and appropriate guidance.

The groundwater interception and treatment system will be designed to attain RCRA groundwater protection requirements under 40 CFR 264.94. Consistent with the Ground Water Protection Strategy (GWPS), the aquifer will be restored to usable water quality to the extent feasible. Storage and process tanks associated with the water treatment plant will also meet Federal guidelines under RCRA. The groundwater would be treated to a quality sufficient for either subsurface or surface discharge.

Because a large quantity of wastes are left in contact with groundwater beneath the existing temporary caps, the groundwater interception and treatment system would take at least forty years and possibly as long as sixty-five years to treat groundwater to acceptable levels at the monitoring boundary. Because of the relatively long time frame for treatment of groundwater, Alternative No. 3 fails to meet the remedial objectives of aquifer restoration within a reasonable time and minimization of longterm management and maintenance.

The stabilization proposal for Cochato River sediments (Zone 6) does not provide total containment and isolation as is generally required for hazardous wastes under RCRA. However, in-place stabilization of the sediment, which functions as a groundwater filter, reduces the likelihood of present and future threats from resuspension of contaminated materials in the river. Cochato River water quality would be monitored to ensure that applicable or relevant and appropriate standards are met.

Long-term institutional requirements will include permanent regulatory limitations on future land use of the on-site landfill and prohibitions on excavation in the Cochato River and temporary limitations on activities in the wetland areas undergoing restoration. The levee, landfill and slurry wall must be maintained in perpetuity. In addition, long term, post-closure requirements will be implemented for the landfill.

Description of Alternative 3A

1. RCRA CAP - Zones 1, 2 and 3 (over on-Site landfill)

2. NON-RCRA CAP - Zone 6

3. NO CAP - Zone 7 and 8

4. SOIL EXCAVATION - Zones 1 and 2 to 8 feet, Zones 3 thru 5 to 4 feet and removal of "creosote" material followed by clean backfilling to facilitate future wetland restoration

5. SOIL DISPOSAL - On-Site RCRA landfill of 250,000 cubic yards of material

6. GROUNDWATER CONTAINMENT - Slurry wall around Zones 1, 2 and 3

7. GROUNDWATER INTERCEPTION - Wellpoint system

8. GROUNDWATER TREATMENT - On-Site treatment plant

9. FLOOD PROTECTION - Levee option C (permanent)

Detailed Analysis of Alternative No. 3A

Alternative No. 3A is considered to attain all applicable or relevant and appropriate Federal Public Health and environmental requirements.

These technologies are believed to be capable of being constructed. The difficulties with construction in the wetland Zones 4S, 4N and 5 are the same as those previously discussed for Alternative No. 3. In addition, Alternative No. 3A involves deep soil excavations in Zones 1, 2 and 3 with an increase in both technical complexity and health and safety requirements. The logistics of excavating in the same Zones where the landfill will be constructed would further complicate the construction. A temporary staging area would need to be constructed to contain soils from these Zones until they could be placed in the landfill.

The estimated lifetime of the RCRA landfill is at least 30 years. However, the wastes to be landfilled are expected to remain hazardous for much longer. Therefore, the long term reliability of this alternative is questionable. The remedial objective of minimization of long-term management and/or maintenance is not achieved.

Groundwater treatment time is anticipated to be 38 years and is shorter than Alternative No. 3 (65 years) due to the fact that a large volume of soil (source material for groundwater contamination) will be removed (i.e. isolated from groundwater). This time frame for treatment fails to meet the remedial objective of aquifer restoration within a reasonable time frame.

The performance and institutional considerations are the same as those described in the previous alternative, Alternative No. 3.

The Public Health concerns and environmental evaluation are the same as discussed in the FS for Alternative No. 3.

Description of Alternative No. 3B

1. RCRA CAP - Zones 1, 2 and 3 (over on-Site landfill)

2. NON-RCRA CAP - Zone 6

3. NO CAP - Zone 7 and 8

4. SOIL EXCAVATION - Zones 1 and 2 to 8 feet, Zones 3 thru 5 to 4 feet and removal of "creosote" material; wetland restoration in Zones 4N, 4S and 5

5. SOIL DISPOSAL - On-Site RCRA landfill of 250,000 cubic yards of material, until destruction in on-Site incinerator with delisting of residue and on-Site disposal

6. GROUNDWATER CONTAINMENT - Slurry wall around Zones 1, 2 and 3

7. GROUNDWATER INTERCEPTION - Wellpoint system

8. GROUNDWATER TREATMENT - On-Site treatment plant

9. FLOOD PROTECTION - Levee option C (temporary)

Alternative No. 3B is considered to attain all applicable or relevant and appropriate Federal Public Health and environmental requirements. These technologies are believed to be capable of being constructed and will be reliable upon completion. The difficulties with excavation and construction in the wetlands are the same as previously discussed.

Alternative No. 3B involves deep soil excavations which will result in greater technical and health and safety requirements. Logistic complications would develop during excavation for excavation is planned in areas in which the interim RCRA landfill would be built. A temporary staging area would need to be constructed to contain soils from these areas until they could be placed in the landfill.

Soil treatment in Alternative No. 3B involves the use of incineration technology to permanently destroy the contamination contained in the landfill. Design phase pilot studies would be performed to eliminate uncertainties as to the specific type and operation of thermal destruction technology necessary to attain the stringent regulatory requirements for destruction of dioxin, while producing an ash that can be backfilled on-site without posing an unacceptable risk to either human health or the environment. (Pilot studies at other dioxin sites have shown that these technologies do exist).

Groundwater treatment time is anticipated to be 38 years due to the fact that a large volume of soil (contaminant source material for the groundwater) will be removed. This treatment time is approximately 30 years shorter than the 65 years estimated under Alternative No. 3 but still fails to meet the remedial objective

for aquifer restoration within a reasonable time frame. All other remedial objectives are met.

Alternative 3B provides a high degree of reliability since it removes the majority of waste from within the water table and destroys it in an on-site incinerator. The institutional issues are the same as in the previous alternative (Alternative 3) regarding landfilling, excavation, groundwater extraction and treatment and flood protection. In addition, the construction and operation of an onsite incinerator must comply with the relevant sections of RCRA (40 CFR 264, Subpart O) and relevant air quality standards. The incinerator must meet the technical standards in RCRA including the January 14, 1985, rule requiring the achievement of destruction and removal efficiency (DRE) of 99.9999%. The soil ash remaining after incineration must be demonstrated to be protective of the public health and the environment or disposed of in a RCRA landfill.

Description of Alternative No. 4M

Alternative No. 4M

1. RCRA CAP - none

2. NON RCRA CAP - none in Zone 6 - Cochato River (see Future Actions Section)

3. NO CAP - Zone 7 and 8

4. SOIL EXCAVATION - "Hot Areas" only in Zones 1 thru 5 and remove "creosote" material (191,000 cubic yards) (See Figure 7)

5. SOIL DISPOSAL - Treatment in on-site incinerator (No interim storage in a RCRA landfill)

6. GROUNDWATER CONTAINMENT - Wellpoint pumping system

7. GROUNDWATER INTERCEPTION - Wellpoint system to recover groundwater plume from Zones 1 through 7

8. GROUNDWATER TREATMENT - On-site treatment plant providing metals precipitation, activated sludge, biological, filtration and activated carbon treatment

9. FLOOD PROTECTION - Levee option C (temporary)

Alternative No. 4M is a slight modification of Alternative No. 4 presented in the FS. Alternative No. 4M differs in components 1, 2, 5 and 6 above. No interim RCRA landfill or RCRA capping would be required. Instead, staging areas would be utilized to contain excavated soils prior to incineration.

The river sediment capping decision would be deferred to the future water supply feasibility study (discussed in the Future Actions Section).

The soils would be excavated, dewatered if necessary, staged and then incinerated as is described in Alternative No. 3B. Staging amounts would be in proportion to the feed ability of the incinerator. Excavated areas would be backfilled and revegetated.

A slurry wall was not included as part of this alternative due to questions about its reliability and effectiveness which are discussed in detail in the Recommended Alternative Section.

Alternative No. 4M can be described as an advanced and innovative application of a technology (thermal decomposition) to remediate a hazardous waste problem. Through use of this technology, minimization of present or future threats to the public health, welfare and the environment would be achieved. This alternative also is considered to attain all applicable or relevant and appropriate Federal public health and environmental requirements and achieves all the remedial objectives.

Alternative No. 4M has an estimated groundwater treatment time of 10 yrs. The estimate is based on the number of aquifer pore volumes that would be necessary to treat contaminants in the groundwater to non-detectable levels following the removal of 95% of the total mass of contaminants from the soil. This 10-year estimate of treatment time may change depending on the treatment standards determined in design (see Consistency with Other Environmental Laws Section). Alternative No. 4M has an incineration program time of an estimated 5 years.

As in the previous alternatives, the excavation and filling of wetlands will be consistent with Executive Order (11990) and Section 404(b)(1) guidelines. The destruction of waste in the onsite incinerator will meet the RCRA standards and relevant air standards. The groundwater interception and treatment system will meet the RCRA Groundwater Protection requirements and Ground Water Protection Strategy.

Alternative No. 4M has beneficial environmental effects because no permanent loss of wetlands would occur. Wetland reestablishment is more feasible since not all of the wetland zones would be excavated. Smaller areas would be excavated and therefore would be easier to replant and reestablish. Zone 3 wetland areas would not be lost for no permanent RCRA cap is anticipated to be needed after excavation. Wetlands in Zone 3 would be re-established instead.

APPENDIX A

COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE BAIRD & McGUIRE SITE

Community relations activities conducted at the Baird & McGuire Site include the following:

* U.S. EPA, Massachusetts DEQE, NUS Corporation and local officials met to discuss Superfund remedial action plans. This meeting resulted in mandatory clean up and preventive measures being imposed on Baird & McGuire by EPA and the Town of Holbrook (March 1983).

* A Preliminary Site Assessment was released in April, 1983.

* In May, 1983 EPA released a Remedial Action Master Plan.

* Information repositories were established at the Braintree, Holbrook and Randolph Public Libraries.

* A Remedial Investigation Work Plan was developed in March 1984.

* A draft Remedial Investigation for the Baird & McGuire site was released (May 1985).

* A public meeting was held by EPA to accept comments on the Remedial Investigation (June 1985).

* EPA assisted in the organization of the Baird & McGuire Citizens Advisory Committee (July 1985). This committee has met on a monthly basis to review technical documents and act as a liason between concerned citizens and government agencies.

* After the discovery of dioxin at the site EPA solicited input from local officials and residents regarding sampling locations in August, 1985. This input was incorporated into the sampling plan.

* The final Addendum to the Remedial Investigation (phase two) was released (June, 1986).

* The final Feasibility Study was released in July, 1986.

* A fact sheet which summarized the Remedial Investigation and Feasibility Study was sent to concerned citizens and the information repositories in July, 1986.

* Following the release of the Feasibility Study, a public comment period was held from August 13 to September 8, 1986.

* EPA held a public hearing to discuss the results of the Feasibility Study and to describe the remedial alternatives that are being evaluated (September 3, 1986). Citizen comments were also documented at this hearing.

The wetland areas which will be excavated represent a severe but temporary impact. Nonetheless, through restoration, a low permanent impact is expected.

Description of Alternative 4A

1. RCRA CAP - Zones 1, 2 and 3 (over on-Site landfill)
2. NON-RCRA CAP - Zone 6
3. NO CAP - Zone 7 and 8
4. SOIL EXCAVATION - "Hot Areas" only in Zones 1 thru 5 and remove "creosote" material (191,000 cubic yards) (See Figure 7)
5. SOIL DISPOSAL - On-Site landfill (RCRA design)
6. GROUNDWATER CONTAINMENT - Slurry wall around Zones 1, 2 and 3
7. GROUNDWATER INTERCEPTION - Wellpoint system
8. GROUNDWATER TREATMENT - On-Site treatment plant
9. FLOOD PROTECTION - Levee option C (permanent)

Alternative No. 4A is an alternative which attains all the applicable or relevant and appropriate Federal public health and environmental requirements. The alternative is expected to provide significant protection to the public health, welfare and the environment and to reduce the likelihood of present or future threats from the hazardous substances.

Alternative No. 4A is the same as Alternative No. 4, except that the excavated "hot area" materials would not be ultimately disposed of in an onsite incinerator, but would remain landfilled onsite. Thus, Alternative No. 4A is similar to Alternative No. 3, but involves excavation of a larger quantity of material for onsite landfill disposal. The deep excavation into the watertable in the "hot areas" would make the construction aspects difficult. Additional safety considerations would be necessary due to the deep excavations.

Alternative No. 4A involves limited excavation in wetlands areas which results in a reduced wetland restoration area. This gives wetland restoration a better chance of being successful because many of the established plants in the undisturbed wetlands could propagate to the excavated and backfilled wetland areas.

The length of groundwater treatment time is approximately 10 years under Alternative No. 4A. The short time of treatment

would occur because 95% of the mass of contaminants have been removed. The remedial objective of treating the contaminated aquifer within a reasonable time is achieved under this alternative.

The technologies described in Alternative No. 4A would be implementable and reliable for the design life of the landfill, estimated to be at least 30 years. However, the wastes to be landfilled are expected to remain hazardous for a much longer time period. Therefore, the long term reliability of this alternative is questionable. The remedial objective of minimization of longterm management and/or maintenance would not be achieved.

Alternative 4A excavates hot spots in Zones 1 through 5 and landfills them. It has many of the same institutional issues involved with the previous alternatives relating to capping, excavation, landfilling, groundwater interception and treatment, flood protection, air quality during construction and stabilization.

Alternative No. 5

Alternative No. 5 is the No Action Alternative. Under a No Action scenario, all the public health and environmental risks associated with the Site would remain. The remedial objectives would not be achieved. This alternative was eliminated from further consideration. Further explanation on why the No Action alternative was eliminated can be found in the FS on pages 5-60 to 5-63.

Recommended Alternative

The NCP defines the appropriate extent of remedy as a cost-effective alternative that effectively mitigates and minimizes threats to and provides protection of public health, welfare and the environment. With certain specific exceptions, this requires the selection of a remedy that attains or exceeds applicable or relevant and appropriate Federal public health and environmental requirements. Cost, technology and reliability are also to be considered. Based on a consideration of these criteria the recommended alternative for the Baird & McGuire Site is Alternative No. 4M.

Alternative No. 4M represents a cost effective alternative which effectively mitigates and minimizes threats to, and provides adequate protection of, public health and welfare and the environment. This alternative attains applicable or relevant and appropriate Federal public health and environmental requirements for the Site. Alternative No. 4M, in conjunction with future actions at the Site, achieves all the remedial public health and environmental objectives:

1) The human population will be at minimum risk from direct contact with contaminated soils.

2) The aquifer will be remediated within a reasonable time-frame to prevent present or future impacts to groundwater drinking water supplies.

3) Surface water will be protected from future contaminant migration.

4) Longterm management and/or maintenence requirements will be minimized.

As previously noted, certain components of Alternative No. 4 as presented in the FS were modified in developing Alternative No. 4M. The following discussion presents the rationale for the modification of those components.

1. RCRA CAP; 5. SOIL DISPOSAL (INTERIM RCRA LANDFILL)

Alternative No. 4 utilized a RCRA landfill (including a RCRA cap) as an interim storage measure for the soils until they could be incinerated. The landfill would prevent direct contact and further contamination of groundwater and surface water during the incineration set up time (estimated 2-3 years). EPA does not believe this is a cost-effective approach due to the needless extra costs of construction of the landfill and the risks associated with the additional soil handling requirements such as increased particulate generation, additional worker exposure, and potential runoff and erosion problems. The status of the site with the temporary caps, groundwater recirculation system, and fence, achieves the goals of an interim solution without a landfill. Soil excavation will be coordinated with incineration feed rates to minimize the amount of soil which will be staged at any one time.

2. NON RCRA CAP (River sediment capping)

Alternative No. 4 included placement of a permeable cap over the contaminated Cochato River sediments of Zone 6 to prevent direct contact and to minimize the downstream transport of sediments. More data is needed on the sediment contamination upstream and downstream of the site before a decision on sediment remediation can be made. The Future Actions Section details the proposed study. The existing fence will prevent direct contact until that time.

6. GROUNDWATER CONTAINMENT

On pages 5-12 and 5-13 of the FS, GHR lists technical reasons why slurry walls were determined to be advantageous. EPA disagreed with the use of slurry walls for the Baird & McGuire site for the following reasons:

1. In general, the Agency's experience with slurry walls at other sites demonstrates that they tend to leak contaminants when not properly keyed into bedrock. The GHR proposal calls for the slurry wall to extend to the top of a very permeable (10^{-3} cm/sec) glacial till. Thus, the permeable glacial till will undermine the effectiveness of the slurry wall.

2. The slurry wall will not extend to bedrock, and vertical downward gradients will enable contaminants to pass under the slurry wall, resulting in a large amount of contaminants continuing to migrate from the site toward the Cochato River. At the present time, a large amount of contamination is present in the till verifying that the till is a potential pathway of contaminant migration which would not be affected by slurry wall construction; it would continue to be a source that needs remediation.

3. The potential is strong that the slurry wall which was planned completely around the site would inhibit fresh groundwater inflow. The cap would prevent vertical infiltration (recharge). The result of a slurry wall and a cap with a pump would be that the permeable deposits would become unsaturated in a short time leaving the volatile and semivolatile organics tied up in the soils in an unsaturated zone and unable to be flushed.

4. Groundwater treatment time is unaffected by the slurry wall installation because migration in the till deposits remains unchanged. Cleanup in the overburden will be an order of magnitude sooner than the elimination of contamination in the till deposits. The ultimate length of cleanup time is based on the time needed to clean the till.

5. Because groundwater velocities are less than a foot per day, and power outages and pump failures are short term problems, power outages do not represent a significant problem. The amount of groundwater migration during a pump failure would be minimal.

6. Based on the minimal drawdown from the present groundwater recirculation system, a system will be designed to minimize the capture of clean groundwater while maximizing the capture zone of highly contaminated water. The data presented by GZA in their Interim Groundwater Containment Report, August, 1985, shows capture zones of less than 200 feet at a 15 gpm pumping rate. A slurry wall will do little to enhance capture of contaminated water.

7. The recommended groundwater treatment system will also have the capability of shutting off certain areas once they are clean or reach performance standards. With a slurry wall, pumping may have to continue indefinitely to prevent mounding effects.

8. A slurry wall will also create a boundary which might have a detrimental effect on the future yield of the South Street Well Field if or when it comes back into service.

Alternative No. 4M is more cost effective than Alternatives Nos 3, 3A and 4A, which rely on a permanent RCRA landfill for all excavated soils. Although the respective present worth costs of $15.4 million, $18.1 million and $14.7 million are significantly lower than the $44.4 million for Alternative 4M, the long-term effectiveness and reliability of on-site landfilling are uncertain. The wastes involved are persistent, toxic, bioaccumulative and mobile. Thus, the ability of the landfill alternatives to meet the objectives of site remediation depends on the viability of permanent containment, since no waste destruction or stabilization would occur prior to landfilling. The questionable reliability of a well designed landfill to provide containment in perpetuity for wastes of this type together with the uncertainties associated with forever maintaining the landfill are key factors in ruling out these landfill alternatives.

Both Alternatives 3B and 4M utilize thermal decomposition which will provide permanent destruction of the contaminants in the excavated soils. Alternative 3B would include excavation of 250,000 cubic yards of soil in Zones 1-5. The surface area to be excavated is greater than that of Alternative 4M with the additional area primarily in wetland Zones 4N, 4S and 5. Given the uncertainties that exist in reestablishing wetlands in these excavated areas, an attempt was made to restrict the excavation in the wetlands to the "hottest" areas and to leave intact those wetland soils where contaminant levels pose minimal risks to human health and the environment. Thus, Alternative 4M utilizes a "hot area" approach to define the areal limits of excavation, resulting in an estimated 191,000 cubic yards for excavation. Because this excavation goes deeper than 3B, the alternative is actually more effective since it reduces the time needed for groundwater renovation from 38 to 10 years while reducing the present worth cost from $65.6 Million to $44.4 million. Alternative 4M is also more effective in that it minimizes both the short term wetland impacts associated with excavation and the area requiring longterm reestablishment. Detailed wetland mitigation through restoration will be developed during the design.

Alternative No. 4M is a complete remedy. It treats or destroys all contaminated media (soil, groundwater) with concentrations which pose a risk to the public health, through incineration and groundwater treatment technologies.

Following successful completion of incineration, groundwater interception and treatment and wetland restoration under Alternative No. 4M, longterm beneficial environmental results will be achieved. Specifically, uncontaminated wetlands and soils will increase the environmental vitality of the site compared to its present state.

In summary, Alternative No. 4M has the following advantages:

1) A permanent remedy following the conclusion of incineration and groundwater interception and treatment
2) Complete destruction of hazardous substances on-site eliminating future containment/leaching problems and the potential need for future off-site remedies
3) No long term wetland loss since wetlands are restored or left uncapped
4) Aquifer remediation
5) Low O&M costs

Extent of Excavation

Alternative 4M incorporates excavation of Hot Areas. The excavation of Hot Areas has been determined by EPA to be the most advantageous form of excavation. The Hot Areas were delineated based on contamination profiles developed in the RI Addendum Plan Nos. GS-1 through GS-3. The limits of excavation were established so that the contaminant levels in the remaining soils are one to two orders of magnitude lower than the levels in the soil which are to be excavated. Change in levels of contamination were correlated with change in topographic elevation lines to define the Hot Areas. The FS anticipates that this approach will result in approximately a 95% removal of the total mass of contaminants from the soil.

The Hot Area excavation scenario does leave hazardous substances behind in wetland Zones 4N, 4S and 5. Concentration of critical contaminants in the remaining unexcavated areas will be within the EPA recommended guidance for target chemicals in terms of public health risk. The target total individual carcinogenic risk resulting from exposure may range anywhere between 10^{-4} to 10^{-7}. The following tables represent the reduction in risk in the Zones where hazardous substances remain. The " Risk After Remediation" column values were obtained by lowering the risk assessment numbers by one order of magnitude (a factor of ten) from the values presented in the FS.

Zone 4N		Risk	Risk After Remediation
Surface Soil -	"No Action, Worst Case"	4.3×10^{-4}	4.3×10^{-5}
Surface Soil -	"No Action, Present Conditions"	9.2×10^{-5}	9.2×10^{-6}
Deep Soil -	"No Action, Worst Case"	1.5×10^{-5}	1.5×10^{-6}

Zone 4S		Risk	Risk After Remediation
Surface Soil -	"No Action, Worst Case"	6.2×10^{-5}	6.2×10^{-6}
Surface Soil -	"No Action, Present Conditions"	1.3×10^{-5}	1.3×10^{-6}
Deep Soil -	"No Action, Worst Case"	1.6×10^{-5}	1.6×10^{-6}

Zone 5		Risk	Risk After Remediation
Surface Soil -	"No Action, Worst Case"	6.0×10^{-5}	6.0×10^{-6}
Surface Soil -	"No Action, Present Conditions"	1.3×10^{-5}	1.3×10^{-6}
Deep Soil -	"No Action, Worst Case"	3.7×10^{-5}	3.7×10^{-6}

The remaining areas of contamination after Hot Area excavation present carcinogenic risk of anywhere between 10^{-4} to 10^{-7} from potential exposure based on toxicity and chemical intake data for both the "present conditions" and "worst case" scenarios.

The depth of excavation in the Hot Areas will be to the top of the water table only. Technical difficulties develop if excavations were to proceed into the water table. Some of the complications of excavation into the water table include: the extensive dewatering of the soils required; side wall cave-ins; contamination of clean soils by contact with contaminated groundwater; and the possibility of volatization of organics when groundwater is exposed to the air.

However, a maximum excavation depth will be achieved by hydrodynamic lowering of the water table. Water which is withdrawn will be treated in the onsite groundwater treatment plant. Treated groundwater would be either discharged on-site or off-site through injection wells into the aquifer or discharged to surface waters (Cochato River; Unnamed Brook) or discharged directly to the sanitary sewer. The final point(s) of discharge will be mainly dependent on the capacity of the aquifer to handle the additional water from the treatment plant. The aquifer is the preferable point of discharge. If the aquifer cannot achieve the recharge capacity, other discharge points will be utilized. Any additional treatment requirements based on the final point of discharge will be included in the design of the treatment plant (i.e. activated carbon adsorption for surface water discharge).

The test burn will be designed and carried out in full compliance with RCRA requirements. The test burn will include each of the various soil types, including samples from the most contaminated areas of the site. The air emissions and ash will be tested to confirm that the contaminant levels remaining are protective of the public health and the environment. The ash will be backfilled onsite into areas where excavations occurred. Loam will be added to supplement the fill material and aid in the reestablishment of vegetation.

Ambient air quality will be monitored during on site remediation activities to ensure that on-site and off-site levels of particulates and volatile organic compounds do not reach unacceptable levels. A detailed monitoring plan including on-site action levels, site perimeter monitoring and collection of meteorologic data will be included in the design.

Acceptable site perimeter levels and on-site "action levels" will be developed based on applicable standards and guidance from EPA and the Centers for Disease Control. Action levels are the ambient levels which will trigger specific actions which may include discontinuing the excavation, groundwater treatment or incineration and any additional measures needed to reduce air contaminant levels. The design will describe these specific measures in detail.

Consistency with Other Environmental Laws

Environmental laws which are applicable or relevant and appropriate to the recommended source control and management of migration alternatives at the Baird & McGuire site are:

- Resource Conservation and Recovery Act (RCRA)
- Clean Water Act
- Safe Drinking Water Act
- Clean Air Act
- Executive Order 11990 (Protection of Wetlands)
- Executive Order 11988 (Floodplain Management)

As specified in the Detailed Analysis of alternatives section, Alternative 4M is expected to fully comply with the above laws. The primary environmental law of concern at Baird & McGuire is the Resource Conservation and Recovery Act (RCRA) 42 USC § 6901, et seq. The recommended remedy was reviewed for consistency with relevant and appropriate RCRA technical standards:

40 CFR § 264 Subpart G, Closure and Post-Closure
40 CFR § 264 Subpart O, Incinerators
40 CFR § 264 Subpart F, Groundwater Protection
40 CFR § 264 Subpart K, Surface Impoundments
40 CFR § 264 Subpart N, Landfills

The source control action of closure by excavation of the hot spots in areas 1, 2, 3, 4N, 4S and 5 will comply with the closure performance standard § 264.111 and the the surface impoundment closure requirements: closure by removal of waste and waste residues.

The proposed residual soil levels will provide adequate protection of public health and the environment. During the design, a sampling plan for excavation will be proposed that will document that the remaining contamination will present a lifetime cancer risk from potential exposure to be within the 10^{-4} to 10^{-7} risk range. The sampling will occur in conjunction with construction.

Excavation, filling and restoration of the wetlands will comply with the technical intent of Executive Order 11990 -- Protection of Wetlands and the Clean Water Act § 404(b)(1) guidelines. The hot spot excavation will minimize the destruction of the wetlands in comparison with the capping alternatives. The remedial action contains components to restore the wetlands which may result in the improvement of the beneficial values of the wetlands. The restoration of the wetlands after excavation will be performed consistent with the 404(b)(1) guidelines, and with EPA and State review of the design of the mitigation measures. The Agency feels it is necessary to perform the hot spot excavation to adequately protect public health and the environment.

The treatment of the approximately 191,000 cubic yards of excavated soil and debris will be in compliance with the RCRA 264 Subpart O Incinerator Standards. A test burn will be performed to ensure that it is feasible to meet the required Destruction and Removal and Efficiency (DRE) of 99.9999% for Principal Organic Hazardous Constituent (POHC). The POHC'S will be estimated prior to the trial burn. The trial burn will demonstrate that air emissions meet all relevant State and Federal air quality standards and other levels necessary to protect public health. The trial burn, operating parameters, and monitoring plan will be reviewed by EPA and DEQE prior to implementation.

Following the completion of the trial burn, the Agency will make a decision regarding the final disposition of the treated soil. The Agency will utilize site-specific exposure/risk modeling to determine if the residual contamination will pose a threat to health or the environment through any route of exposure (groundwater, surface water or direct contact). If it is found that incineration residual contamination requires further treatment or has disposal restrictions, the Agency will reevaluate the recommended alternative.

The recommended management of migration, groundwater extraction and treatment, will meet the intent of the RCRA Groundwater Protection requirements. The groundwater protection regulations require the setting of groundwater protection standards which must be protective of the public health and the environment. The groundwater levels can be set at background, Maximum Contaminant Levels (MCL's) or Alternate Concentration Levels (ACL's) -- site specific levels that are demonstrated to be protective of the public health and the environment. During the design of the groundwater interception and treatment system, restoration target levels will be proposed based on existing data. After 5 years of operation, the Agency will determine in a supplemental decision document if the restoration target levels are achievable and if they are adequate to protect public health and the environment. Due to the wide range of contaminants at the site, levels will be based on both standards and risk levels. Due to the nature of contamination and site specific conditions, it is not possible to establish levels at this time. The system will be designed to recover groundwater to the extent feasible from the contaminated areas. The restoration of the aquifer is consistent with the Groundwater Protection Strategy (GWP's) which classifies the aquifer at Baird & McGuire as Class II (current or potential usage) and requires the restoration of these aquifers.

The effluent from the groundwater treatment system will meet the applicable and relevant standards. To the extent feasible treated groundwater will be discharged back to the aquifer to aid in flushing. In the event that all extracted groundwater cannot be recharged to the aquifer, an alternative method of discharge will be evaluated such as to surface waters or the municipal sewer.

A groundwater monitoring program will be designed and implemented to document the efficiency of the pump and treat system consistent with 40 CFR 264.100(d). The monitoring program will include sampling points that will verify that the "hot spot" excavation was successful at removing the large majority of contamination.

Flood protection measures will be designed and implemented consistent with 40 CFR 264.18(b). This measure will insure that there are no unplanned releases to the environment during excavation and treatment due to flooding. Alternative 4M is consistent with Executive Order 11988 (Floodplain Management) since it results in the restoration and preservation of the natural and beneficial value of the floodplain.

Appendix A includes a more specific discussion of consistency with environmental laws in terms of the State of Massachusetts.

Operation and Maintenance

Alternative No. 4M includes two components which involve long term remediation, incineration and groundwater interception and treatment. Incineration costs are considered to be part of the capital costs of the clean-up. Capital costs will be split on a 90% Federal and 10% State cost sharing basis.

The operation and maintenance (O&M) costs of the groundwater interception and treatment system are considered as capital costs until soil remediation is complete. Following soil remediation, operation of the groundwater interception and treatment system are considered O&M costs. Costs for operation and maintenance are split on a 90% Federal, 10% State basis during the first year. After the first year of O&M, the State is responsible for 100% of the O&M costs into the future.

Some of the specific duties included under O&M of the groundwater interception and treatment system are the monitoring of interception/reinjection pumps and pipes, and effluent and influent, daily O&M of the treatment plant and periodic disposal of spent carbon and waste sludge. The possibility exists of on-site regeneration of spent carbon and disposal of sludge in the on-site incinerator. The feasibility of this will be determined during design.

General overall site O&M will continue during remediation. Some of these duties include fence maintenance, trash disposal, lawn mowing and snow plowing of access roads.

The following table represents the estimated costs and duration of O&M activities at Baird & McGuire.

Activity	Unit Cost	Duration	Net Cost
Treatment Plant O&M (1)	$1,520/day	4 years	2,219,200
Security	$10,000/month	10 years	1,200,000
Mow Cap (2)	$3,900/year	2 years	7,800
Well Monitoring	$23,500/year	30 years	705,000
		Total	$4,132,000

Notes

(1) Cost based on 25-75 gpm treatment plant. A 100 gpm treatment plant is the recommended design but the costs are not anticipated to vary greatly from the O&M value presented.

(2) Based on 3 mows per year until cleanup begins.

The State agency responsible for the implementation of O&M is the Massachusetts Department of Environmental Quality Engineering (DEQE). EPA's estimated level of funding is considered to be 90% of the cost of the first year of O&M (O&M costs for the groundwater treatment plant are expected to commence in year 7 of the cleanup). This is approximately $631,935.

Schedule

Approve Remedial Action (sign ROD)	9/29/86
Complete Enforcement Negotiations	10/30/86
Start Design	11/1/86
Sign Superfund State Contract	3/31/87
Complete Design	11/1/87
Start Construction	1/1/88
Complete Construction of Treatment Plant	7/4/89
Complete Incineration	7/4/94
Complete Groundwater Treatment	7/4/99

Future Actions

Additional remedial actions are necessary due to the water supply shortages caused by contamination from the Baird & McGuire site. Past contaminant releases from the site into the Cochato River resulted in the closing of sluice gates on the Richardi Reservoir. The Cochato River formerly had been utilized as a surface water source to the Richardi Reservoir. Loss of the river as a source of water affects the Towns of Holbrook, Randolph and Braintree whose water supply is the Richardi/Great Pond Reservoir system.

Baird & McGuire's pollution has been documented as the cause of contamination of the South Street Well Field. The South Street Well Field was capable of supplying 1.8 mgd of water into the Holbrook/Randolph water supply system . The wells were never fully utilized due to the contamination from Baird & McGuire, originally detected in Well No. 3 in 1959. Well No. 3 was shut down in 1959, Well No. 2 in 1980 and Well No. 1 in 1982. EPA, under Superfund, can replace the lost demand for a well supply, when it was operating, not its capacity. The most likely replacement source for the lost demand is the Donna Road Well Field. The wells have been closed due to high iron and manganese concentrations in the water. Sampling results this spring indicate that the water is free of other contaminants. A focused Feasibility Study will be performed to establish the amount of past demand on the South Street Well Field and establish costs for modernization and iron and manganese removal at the Donna Road Well Field to replace the lost demand.

The sediments of the Cochato River adjacent to the site warrant remediation based on existing contaminant data. The FS proposed capping the sediments in place to eliminate the threat of direct contact and prevent downstream contaminated sediment transport. EPA believes that in order to remediate the sediment contamination problem both the upstream and downstream sediments must be evaluated in the remediation. Since it was beyond the scope of this FS to establish the risk associated with upstream and downstream sediments, no determination can be made presently as to what remediation approach should be taken. The future additional sampling and risk characterization of the sediments is integrally tied to the water supply issues of the Cochato River.

Further information will need to be obtained prior to sediment remediation and the determination of the feasibility of once again utilizing Cochato River as a water supply source. The study will include the following:

1) Distribution of sediment contamination and its associated risk to the public health or the environment
2) Flood issues associated with sediment remediation
3) Potential river flow diversion scenarios

4) The potential for monitoring of river water quality prior to its entering into the Richardi Reservoir.
5) The risk to the public health if the river is to be used as a water supply source under the various sediment remediation plans

In conjunction with design of the remedy, additional air monitoring will be performed in order to establish ambient air quality levels for volatile organics at the site. Two past air sampling events for volatile organics have resulted in invalid data due to laboratory contamination of the samples.

In conjunction with the design "target", groundwater restoration levels will be set. After five (5) years of operation and evaluation, the Agency will prepare a supplemental decision document to determine how long the groundwater extraction and treatment system will remain operational and to document that the target levels are achievable.

Community Relations

Community interest in the Baird & McGuire Site began in 1975 when a Holbrook resident reported a suspected illegal discharge to a wetland area adjacent to Baird & McGuire, Inc. The site was placed on the NPL in December 1982. Public interest has been high throughout EPA removal and remedial actions, as the problem has been covered in depth by the local and metropolitan Boston news media. Two hearings on renewal of the company's license to store chemicals were heavily attended, one in 1982 and the second in April 1983 when the Town Selectmen refused to renew the permit. Citizens are concerned about potential contamination of the municipal water supply for Braintree, Holbrook, and Randolph, and about potential airborne contamination.

Local interest heightened further in early 1985 when the Clean Water Action Project (CWAP), a national environmental action group, sent an organizer into the community. Approximately 250 letters were received by the EPA Regional Office around this time. They requested that EPA fence the site and provide 24 hour security, and urged reauthorization of Superfund. CWAP helped form a local group, People United to Restore the Environment (PURE). About 200 persons attended an EPA public meeting on June 10, 1985 to explain the results of the RI. PURE and CWAP held a press conference at which they demanded that a fence be erected around the eight-acre facility and that warning signs be posted. They also demanded that buildings on the site be removed, that a comprehensive health study be conducted, that a water main supplying water to Holbrook be diverted from the site, that citizens participate in the development of cleanup plans, that Cochato River sediments and area drinking water sources be tested, and that a meeting be held with the EPA Regional Administrator. The Holbrook Selectmen facilitated the formation of the Baird & McGuire Citizen's Task Force, which has met frequently on an as-needed basis since its inception.

In July 1985, public interest was increased when low levels of dioxin were discovered in soil at the site. EPA announced that emergency response authority would be used to erect fencing. The Massachusetts DEQE announced that it would grant funds to the Holbrook hazardous waste coordinator -- a position set up in towns statewide by DEQE -- to educate the public about the site and to serve as a liaison between the community and government agencies. EPA and DEQE representatives have attended frequent meetings of the Baird & Mcguire Task Force in the past year to provide information and hear citizens' concerns. EPA held a public meeting to explain the results of the RI/FS on August 20, 1986, at Holbrook High School. Approximately 50 persons attended, including representatives from the Baird & McGuire Task Force, citizens, and local officials. On September 3, 1986, a public hearing was held at the same location to record comments by the public including potentially responsible parties. Comments were given by represen-

tatives from the Baird & McGuire Task Force, a State Representative, a State Senator, members of PURE, members of the National Clean Water Action Project, Town Selectmen from Holbrook and Randolph, and local residents and citizens. Written comments from some of the same parties and additional parties were received during the remainder of the comment period. These comments and EPA's responses are summarized in the attached responsiveness summary. In addition, the comments are summarized below. After receiving several hundred letters and about a dozen telephone calls from citizens, EPA had postponed the two meetings and had extended the public comment period to ensure that all interested parties had an opportunity to comment.

Several citizens favored excavation of the "hot spots" with treatment in an on-site incinerator. Several citizens commented that EPA should consider the use of innovative technologies such as biodegradation in the cleanup process. Many citizens were opposed to the containment-based alternatives, as well as to the temporary solutions. Many citizens expressed concern about the overall effectiveness of incineration of contaminated soils, and about the types of testing to be done prior to on-site operation of an incinerator. One citizen questioned whether water quality sampling would be conducted during hook up of the watermain.

Many commenters oppose the import of contaminated materials from other locations for storage, destruction, or treatment at the Baird & McGuire site. A citizen expressed concern about the current groundwater interception and recirculation system. This citizen expressed concern that volatile organic compounds released during the aeration process may not be treated. A citizen questioned whether sources of contamination have been detected outside of the immediate site area. Many citizens requested frequent testing of the water supply and monitoring of contaminant levels on an ongoing basis. Citizens requested information on testing methods.

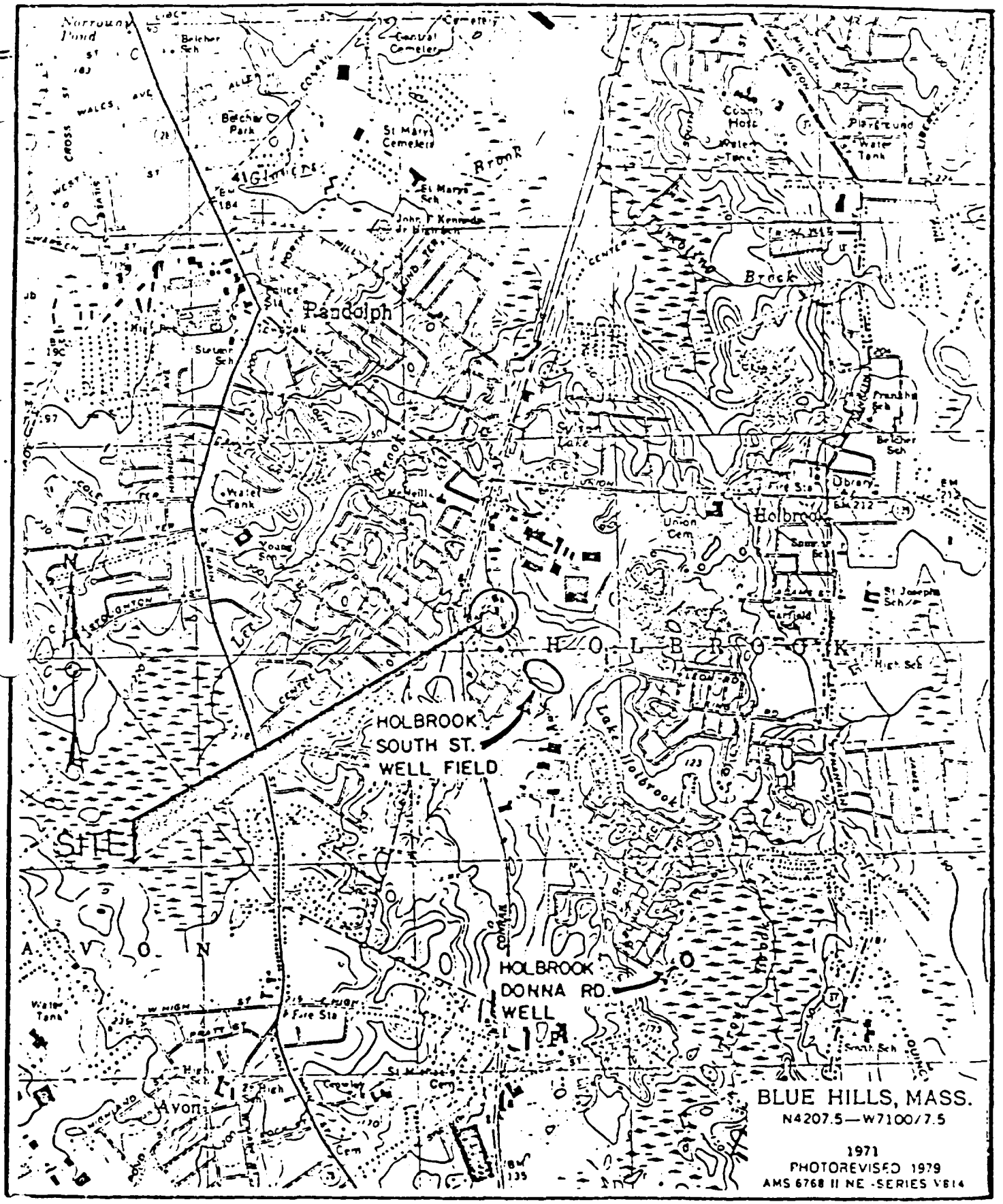

FIGURE 1

LOCUS PLAN

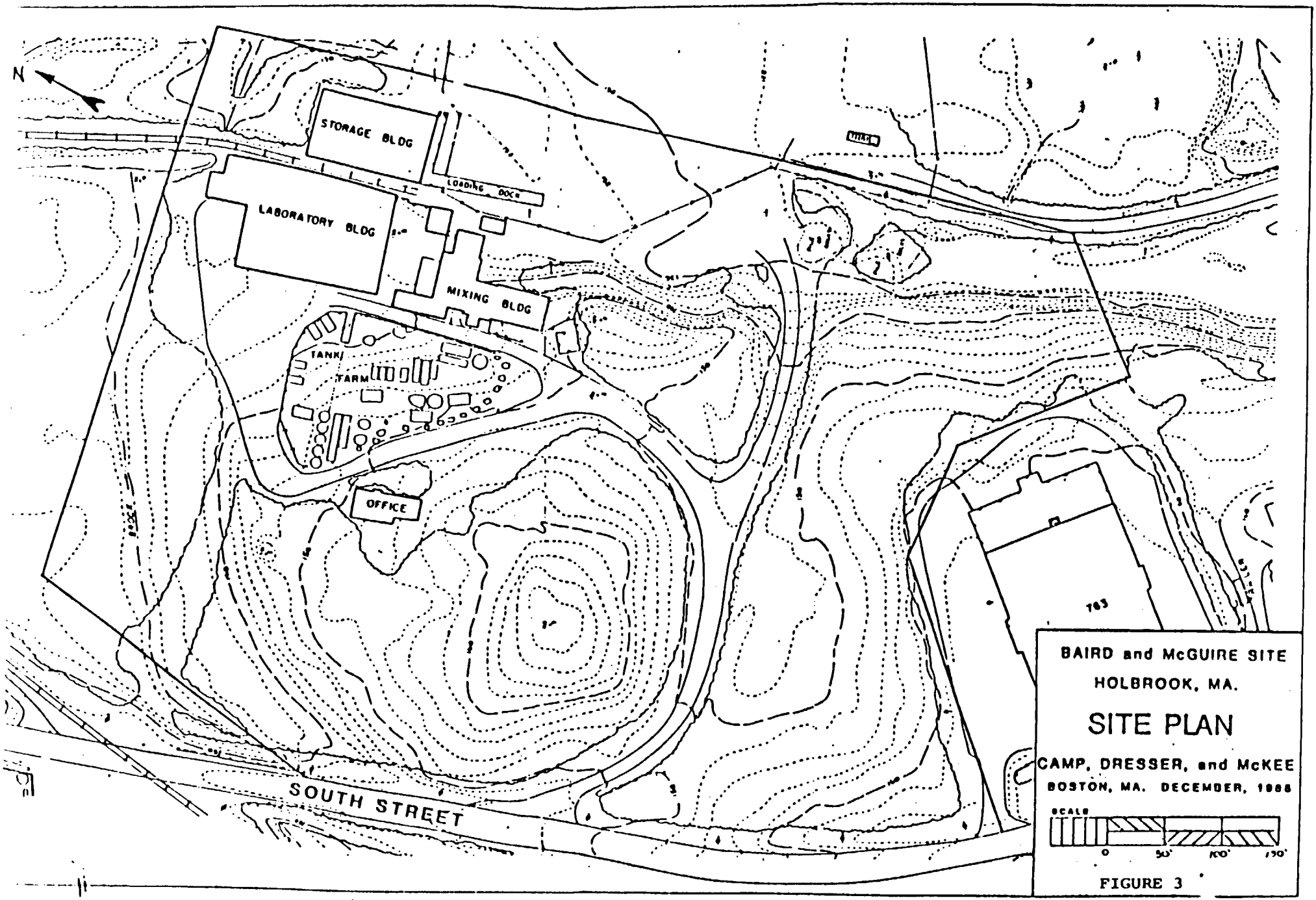
N
STORAGE BLDG
LOADING DOCK
LABORATORY BLDG
MIXING BLDG
TANK FARM
OFFICE
SOUTH STREET
BAIRD and McGUIRE SITE
HOLBROOK, MA.
SITE PLAN
CAMP, DRESSER, and McKEE
BOSTON, MA. DECEMBER, 1988
SCALE
0
50'
100'
150'

FIGURE 3

FIGURE 2

BAIRD & McGUIRE SITE
HOLBROOK, MASSACHUSETTS

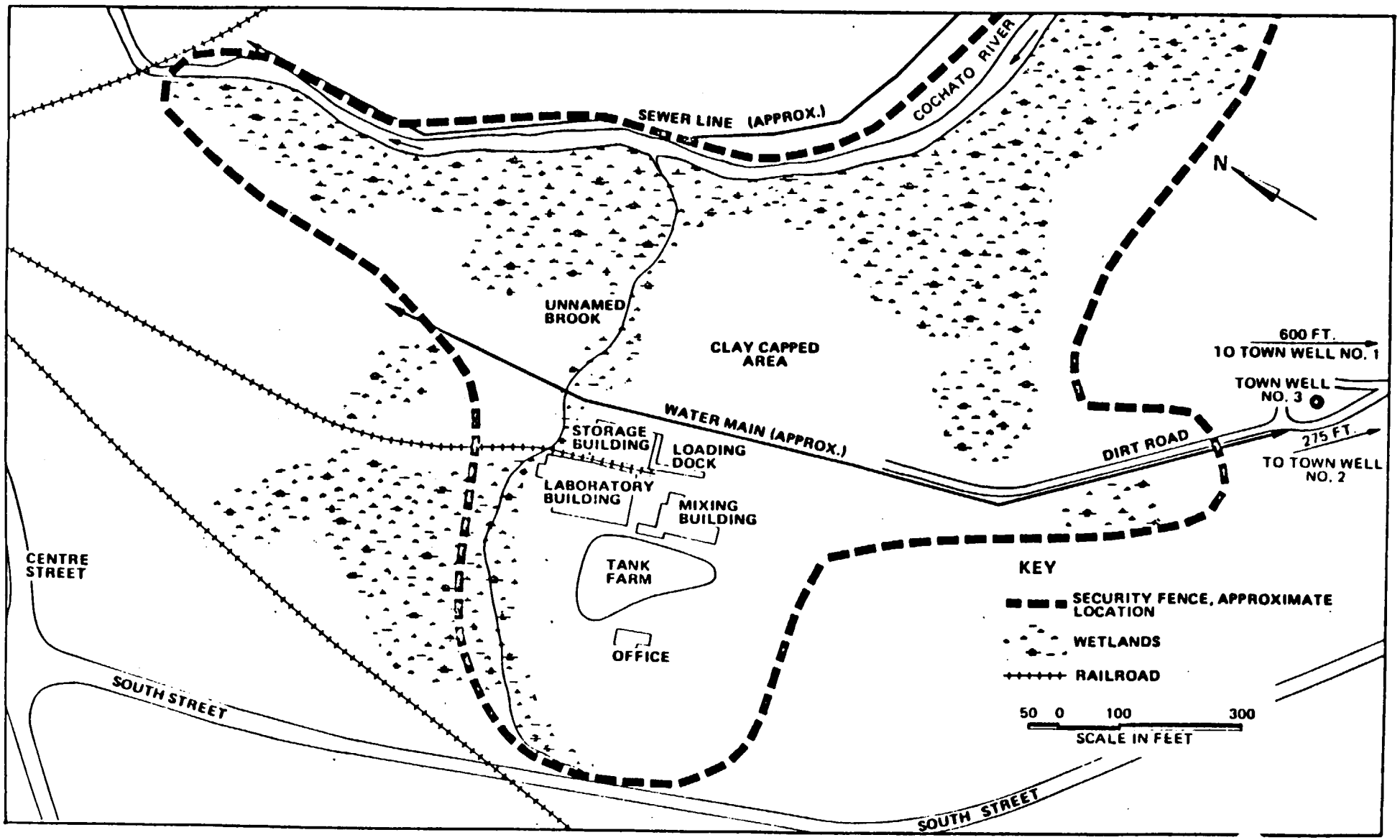

FIGURE 4

REMEDIAL ACTION ZONES
BAIRD & McGUIRE SITE

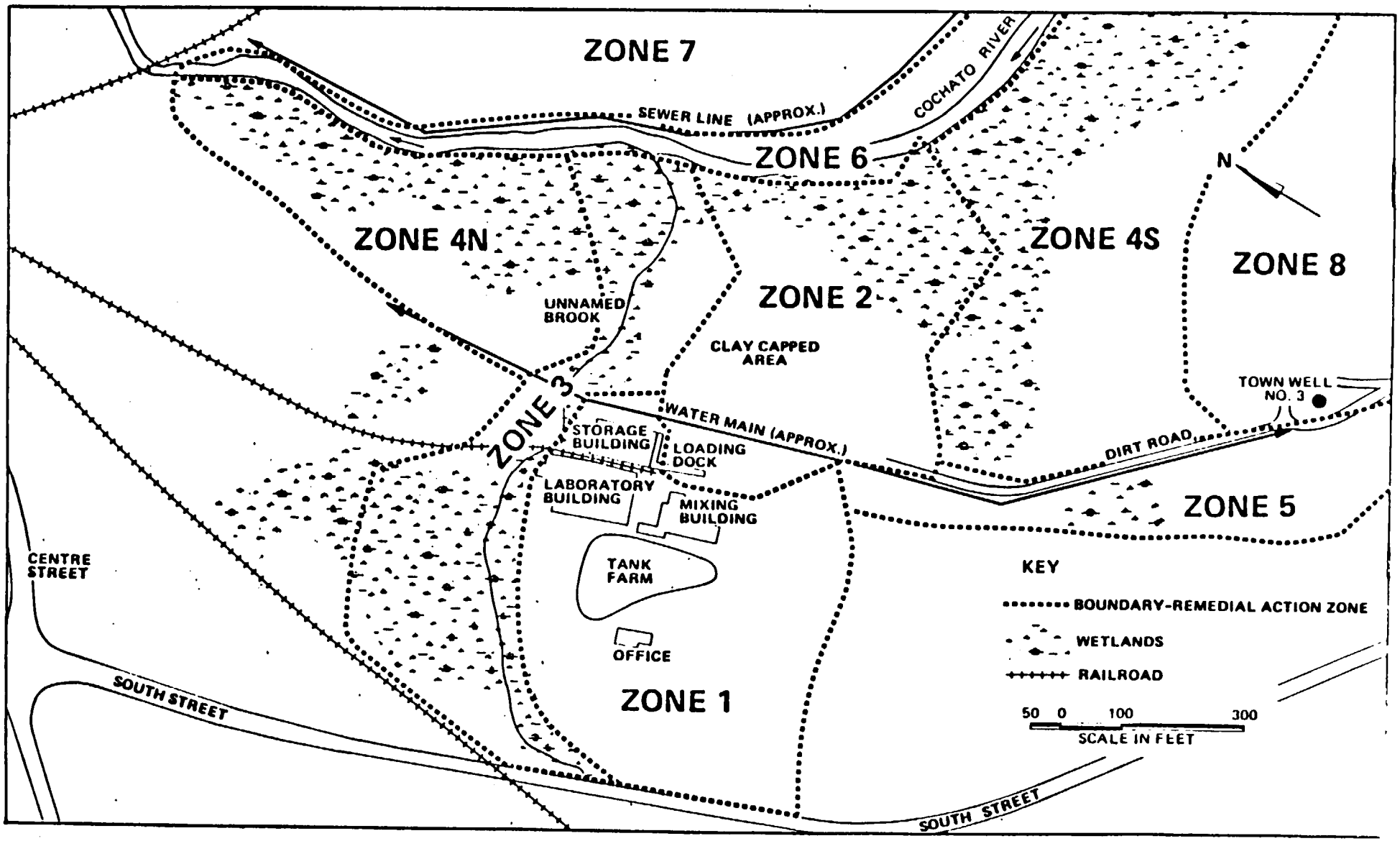

FIGURE 5

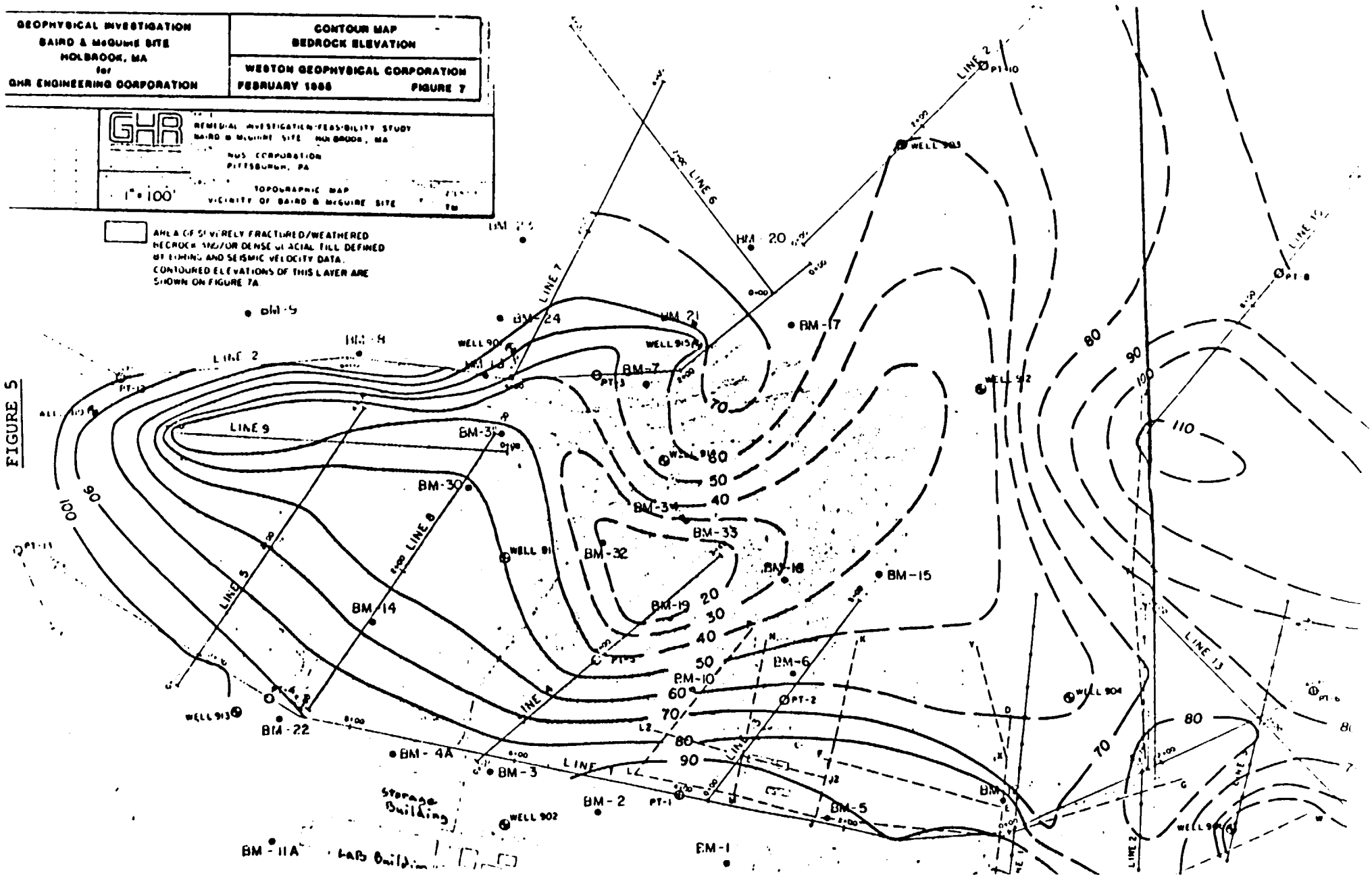
GEOPHYSICAL INVESTIGATION
BAIRD & McGUIRE SITE
HOLBROOK, MA
for
GHR ENGINEERING CORPORATION
CONTOUR MAP
BEDROCK ELEVATION
WESTON GEOPHYSICAL CORPORATION
FEBRUARY 1986 FIGURE 7
GHR
REMEDIAL INVESTIGATION-FEASIBILITY STUDY
BAIRD & McGUIRE SITE HOLBROOK, MA
NUS CORPORATION
PITTSBURGH, PA
1" = 100'
TOPOGRAPHIC MAP
VICINITY OF BAIRD & McGUIRE SITE
AREA OF SEVERELY FRACTURED/WEATHERED BEDROCK AND/OR DENSE GLACIAL TILL DEFINED BY DRILLING AND SEISMIC VELOCITY DATA. CONTOURED ELEVATIONS OF THIS LAYER ARE SHOWN ON FIGURE 7A
FIGURE 5
LINE 1
LINE 2
LINE 3
LINE 4
LINE 5
LINE 6
LINE 7
LINE 8
LINE 9
LINE 12
LINE 13
BM-1
BM-2
BM-3
BM-4A
BM-5
BM-6
BM-7
BM-10
BM-11A
BM-14
BM-15
BM-16
BM-17
BM-18
BM-19
BM-20
BM-21
BM-22
BM-24
BM-30
BM-32
BM-33
BM-34
WELL 901
WELL 902
WELL 903
WELL 904
WELL 913
WELL 913A
PT-1
PT-2
PT-3
PT-4
PT-5
PT-6
PT-8
PT-10
PT-11
PT-12
Storage Building
LAB Building
20
30
40
50
60
70
80
90
100
110

FIGURE 6

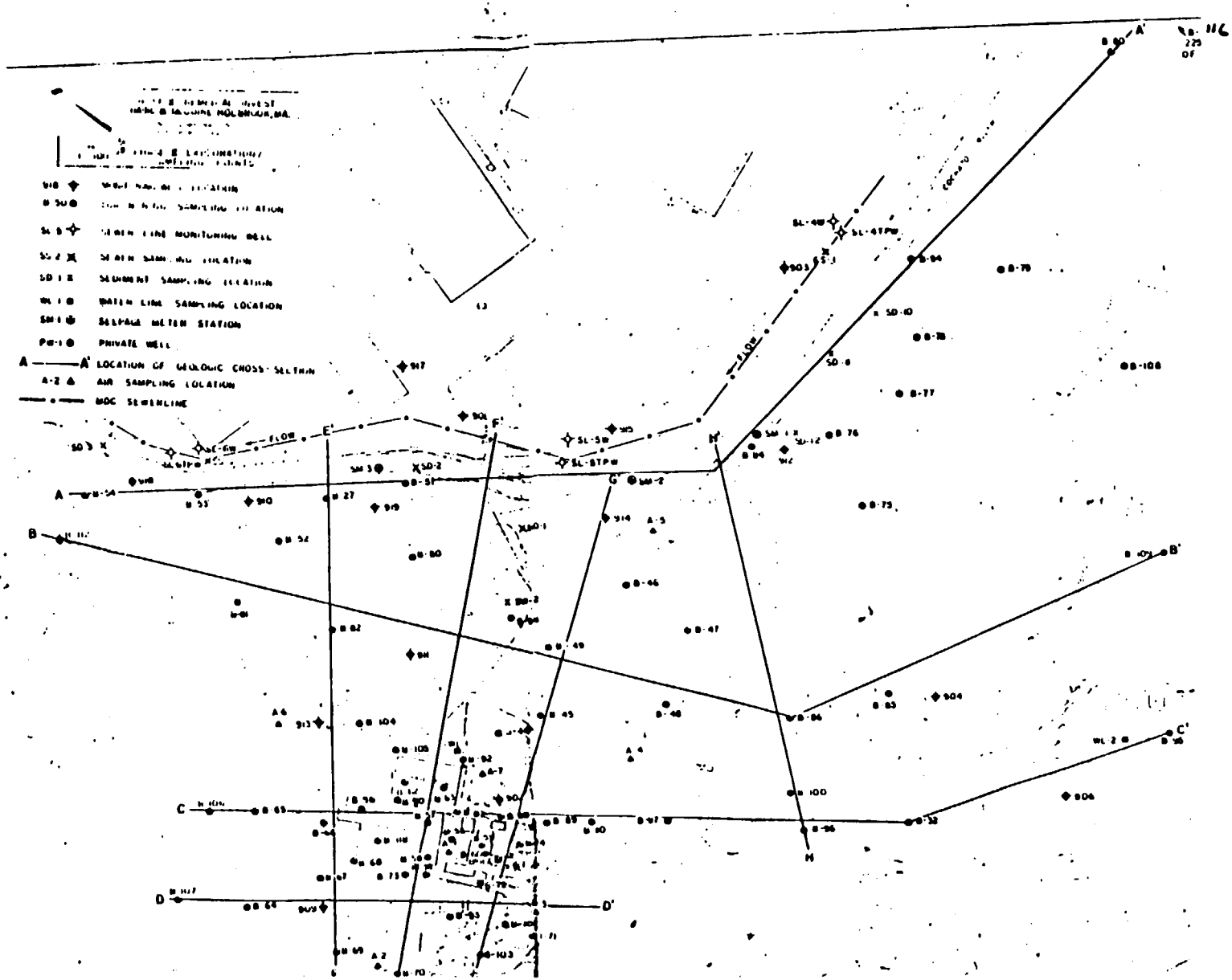
A
A'
B
B'
C
C'
D
D'
E
E'
F
F'
G
G'
H
H'
SL-6TPW
SL-5TPW
SL-8TPW
SL-4TPW
SD-1
SD-2
SD-3
SD-4
SD-5
SD-6
SD-7
SD-8
SD-9
SD-10
SD-11
SD-12
SM-1
SM-2
SM-3
SM-4
SM-5
A-1
A-2
A-3
A-4
A-5
A-6
A-7
WL-1
WL-2
WL-3
WL-4
WL-5
WL-6
WL-7
WL-8
WL-9
WL-10
WL-11
WL-12
WL-13
WL-14
WL-15
WL-16
WL-17
WL-18
WL-19
WL-20
WL-21
WL-22
WL-23
WL-24
WL-25
WL-26
WL-27
WL-28
WL-29
WL-30
WL-31
WL-32
WL-33
WL-34
WL-35
WL-36
WL-37
WL-38
WL-39
WL-40
WL-41
WL-42
WL-43
WL-44
WL-45
WL-46
WL-47
WL-48
WL-49
WL-50
WL-51
WL-52
WL-53
WL-54
WL-55
WL-56
WL-57
WL-58
WL-59
WL-60
WL-61
WL-62
WL-63
WL-64
WL-65
WL-66
WL-67
WL-68
WL-69
WL-70
WL-71
WL-72
WL-73
WL-74
WL-75
WL-76
WL-77
WL-78
WL-79
WL-80
WL-81
WL-82
WL-83
WL-84
WL-85
WL-86
WL-87
WL-88
WL-89
WL-90
WL-91
WL-92
WL-93
WL-94
WL-95
WL-96
WL-97
WL-98
WL-99
WL-100
WL-101
WL-102
WL-103
WL-104
WL-105
WL-106
WL-107
WL-108
WL-109
WL-110
WL-111
WL-112
WL-113
WL-114
WL-115
WL-116
WL-117
WL-118
WL-119
WL-120
WL-121
WL-122
WL-123
WL-124
WL-125
WL-126
WL-127
WL-128
WL-129
WL-130
WL-131
WL-132
WL-133
WL-134
WL-135
WL-136
WL-137
WL-138
WL-139
WL-140
WL-141
WL-142
WL-143
WL-144
WL-145
WL-146
WL-147
WL-148
WL-149
WL-150
WL-151
WL-152
WL-153
WL-154
WL-155
WL-156
WL-157
WL-158
WL-159
WL-160
WL-161
WL-162
WL-163
WL-164
WL-165
WL-166
WL-167
WL-168
WL-169
WL-170
WL-171
WL-172
WL-173
WL-174
WL-175
WL-176
WL-177
WL-178
WL-179
WL-180
WL-181
WL-182
WL-183
WL-184
WL-185
WL-186
WL-187
WL-188
WL-189
WL-190
WL-191
WL-192
WL-193
WL-194
WL-195
WL-196
WL-197
WL-198
WL-199
WL-200
WL-201
WL-202
WL-203
WL-204
WL-205
WL-206
WL-207
WL-208
WL-209
WL-210
WL-211
WL-212
WL-213
WL-214
WL-215
WL-216
WL-217
WL-218
WL-219
WL-220
WL-221
WL-222
WL-223
WL-224
WL-225
WL-226
WL-227
WL-228
WL-229
WL-230
WL-231
WL-232
WL-233
WL-234
WL-235
WL-236
WL-237
WL-238
WL-239
WL-240
WL-241
WL-242
WL-243
WL-244
WL-245
WL-246
WL-247
WL-248
WL-249
WL-250
WL-251
WL-252
WL-253
WL-254
WL-255
WL-256
WL-257
WL-258
WL-259
WL-260
WL-261
WL-262
WL-263
WL-264
WL-265
WL-266
WL-267
WL-268
WL-269
WL-270
WL-271
WL-272
WL-273
WL-274
WL-275
WL-276
WL-277
WL-278
WL-279
WL-280
WL-281
WL-282
WL-283
WL-284
WL-285
WL-286
WL-287
WL-288
WL-289
WL-290
WL-291
WL-292
WL-293
WL-294
WL-295
WL-296
WL-297
WL-298
WL-299
WL-300
WL-301
WL-302
WL-303
WL-304
WL-305
WL-306
WL-307
WL-308
WL-309
WL-310
WL-311
WL-312
WL-313
WL-314
WL-315
WL-316
WL-317
WL-318
WL-319
WL-320
WL-321
WL-322
WL-323
WL-324
WL-325
WL-326
WL-327
WL-328
WL-329
WL-330
WL-331
WL-332
WL-333
WL-334
WL-335
WL-336
WL-337
WL-338
WL-339
WL-340
WL-341
WL-342
WL-343
WL-344
WL-345
WL-346
WL-347
WL-348
WL-349
WL-350
WL-351
WL-352
WL-353
WL-354
WL-355
WL-356
WL-357
WL-358
WL-359
WL-360
WL-361
WL-362
WL-363
WL-364
WL-365
WL-366
WL-367
WL-368
WL-369
WL-370
WL-371
WL-372
WL-373
WL-374
WL-375
WL-376
WL-377
WL-378
WL-379
WL-380
WL-381
WL-382
WL-383
WL-384
WL-385
WL-386
WL-387
WL-388
WL-389
WL-390
WL-391
WL-392
WL-393
WL-394
WL-395
WL-396
WL-397
WL-398
WL-399
WL-400
WL-401
WL-402
WL-403
WL-404
WL-405
WL-406
WL-407
WL-408
WL-409
WL-410
WL-411
WL-412
WL-413
WL-414
WL-415
WL-416
WL-417
WL-418
WL-419
WL-420
WL-421
WL-422
WL-423
WL-424
WL-425
WL-426
WL-427
WL-428
WL-429
WL-430
WL-431
WL-432
WL-433
WL-434
WL-435
WL-436
WL-437
WL-438
WL-439
WL-440
WL-441
WL-442
WL-443
WL-444
WL-445
WL-446
WL-447
WL-448
WL-449
WL-450
WL-451
WL-452
WL-453
WL-454
WL-455
WL-456
WL-457
WL-458
WL-459
WL-460
WL-461
WL-462
WL-463
WL-464
WL-465
WL-466
WL-467
WL-468
WL-469
WL-470
WL-471
WL-472
WL-473
WL-474
WL-475
WL-476
WL-477
WL-478
WL-479
WL-480
WL-481
WL-482
WL-483
WL-484
WL-485
WL-486
WL-487
WL-488
WL-489
WL-490
WL-491
WL-492
WL-493
WL-494
WL-495
WL-496
WL-497
WL-498
WL-499
WL-500
WL-501
WL-502
WL-503
WL-504
WL-505
WL-506
WL-507
WL-508
WL-509
WL-510
WL-511
WL-512
WL-513
WL-514
WL-515
WL-516
WL-517
WL-518
WL-519
WL-520
WL-521
WL-522
WL-523
WL-524
WL-525
WL-526
WL-527
WL-528
WL-529
WL-530
WL-531
WL-532
WL-533
WL-534
WL-535
WL-536
WL-537
WL-538
WL-539
WL-540
WL-541
WL-542
WL-543
WL-544
WL-545
WL-546
WL-547
WL-548
WL-549
WL-550
WL-551
WL-552
WL-553
WL-554
WL-555
WL-556
WL-557
WL-558
WL-559
WL-560
WL-561
WL-562
WL-563
WL-564
WL-565
WL-566
WL-567
WL-568
WL-569
WL-570
WL-571
WL-572
WL-573
WL-574
WL-575
WL-576
WL-577
WL-578
WL-579
WL-580
WL-581
WL-582
WL-583
WL-584
WL-585
WL-586
WL-587
WL-588
WL-589
WL-590
WL-591
WL-592
WL-593
WL-594
WL-595
WL-596
WL-597
WL-598
WL-599
WL-600
WL-601
WL-602
WL-603
WL-604
WL-605
WL-606
WL-607
WL-608
WL-609
WL-610
WL-611
WL-612
WL-613
WL-614
WL-615
WL-616
WL-617
WL-618
WL-619
WL-620
WL-621
WL-622
WL-623
WL-624
WL-625
WL-626
WL-627
WL-628
WL-629
WL-630
WL-631
WL-632
WL-633
WL-634
WL-635
WL-636
WL-637
WL-638
WL-639
WL-640
WL-641
WL-642
WL-643
WL-644
WL-645
WL-646
WL-647
WL-648
WL-649
WL-650
WL-651
WL-652
WL-653
WL-654
WL-655
WL-656
WL-657
WL-658
WL-659
WL-660
WL-661
WL-662
WL-663
WL-664
WL-665
WL-666
WL-667
WL-668
WL-669
WL-670
WL-671
WL-672
WL-673
WL-674
WL-675
WL-676
WL-677
WL-678
WL-679
WL-680
WL-681
WL-682
WL-683
WL-684
WL-685
WL-686
WL-687
WL-688
WL-689
WL-690
WL-691
WL-692
WL-693
WL-694
WL-695
WL-696
WL-697
WL-698
WL-699
WL-700
WL-701
WL-702
WL-703
WL-704
WL-705
WL-706
WL-707
WL-708
WL-709
WL-710
WL-711
WL-712
WL-713
WL-714
WL-715
WL-716
WL-717
WL-718
WL-719
WL-720
WL-721
WL-722
WL-723
WL-724
WL-725
WL-726
WL-727
WL-728
WL-729
WL-730
WL-731
WL-732
WL-733
WL-734
WL-735
WL-736
WL-737
WL-738
WL-739
WL-740
WL-741
WL-742
WL-743
WL-744
WL-745
WL-746
WL-747
WL-748
WL-749
WL-750
WL-751
WL-752
WL-753
WL-754
WL-755
WL-756
WL-757
WL-758
WL-759
WL-760
WL-761
WL-762
WL-763
WL-764
WL-765
WL-766
WL-767
WL-768
WL-769
WL-770
WL-771
WL-772
WL-773
WL-774
WL-775
WL-776
WL-777
WL-778
WL-779
WL-780
WL-781
WL-782
WL-783
WL-784
WL-785
WL-786
WL-787
WL-788
WL-789
WL-790
WL-791
WL-792
WL-793
WL-794
WL-795
WL-796
WL-797
WL-798
WL-799
WL-800
WL-801
WL-802
WL-803
WL-804
WL-805
WL-806
WL-807
WL-808
WL-809
WL-810
WL-811
WL-812
WL-813
WL-814
WL-815
WL-816
WL-817
WL-818
WL-819
WL-820
WL-821
WL-822
WL-823
WL-824
WL-825
WL-826
WL-827
WL-828
WL-829
WL-830
WL-831
WL-832
WL-833
WL-834
WL-835
WL-836
WL-837
WL-838
WL-839
WL-840
WL-841
WL-842
WL-843
WL-844
WL-845
WL-846
WL-847
WL-848
WL-849
WL-850
WL-851
WL-852
WL-853
WL-854
WL-855
WL-856
WL-857
WL-858
WL-859
WL-860
WL-861
WL-862
WL-863
WL-864
WL-865
WL-866
WL-867
WL-868
WL-869
WL-870
WL-871
WL-872
WL-873
WL-874
WL-875
WL-876
WL-877
WL-878
WL-879
WL-880
WL-881
WL-882
WL-883
WL-884
WL-885
WL-886
WL-887
WL-888
WL-889
WL-890
WL-891
WL-892
WL-893
WL-894
WL-895
WL-896
WL-897
WL-898
WL-899
WL-900
WL-901
WL-902
WL-903
WL-904
WL-905
WL-906
WL-907
WL-908
WL-909
WL-910
WL-911
WL-912
WL-913
WL-914
WL-915
WL-916
WL-917
WL-918
WL-919
WL-920
WL-921
WL-922
WL-923
WL-924
WL-925
WL-926
WL-927
WL-928
WL-929
WL-930
WL-931
WL-932
WL-933
WL-934
WL-935
WL-936
WL-937
WL-938
WL-939
WL-940
WL-941
WL-942
WL-943
WL-944
WL-945
WL-946
WL-947
WL-948
WL-949
WL-950
WL-951
WL-952
WL-953
WL-954
WL-955
WL-956
WL-957
WL-958
WL-959
WL-960
WL-961
WL-962
WL-963
WL-964
WL-965
WL-966
WL-967
WL-968
WL-969
WL-970
WL-971
WL-972
WL-973
WL-974
WL-975
WL-976
WL-977
WL-978
WL-979
WL-980
WL-981
WL-982
WL-983
WL-984
WL-985
WL-986
WL-987
WL-988
WL-989
WL-990
WL-991
WL-992
WL-993
WL-994
WL-995
WL-996
WL-997
WL-998
WL-999
WL-1000

FIGURE 7

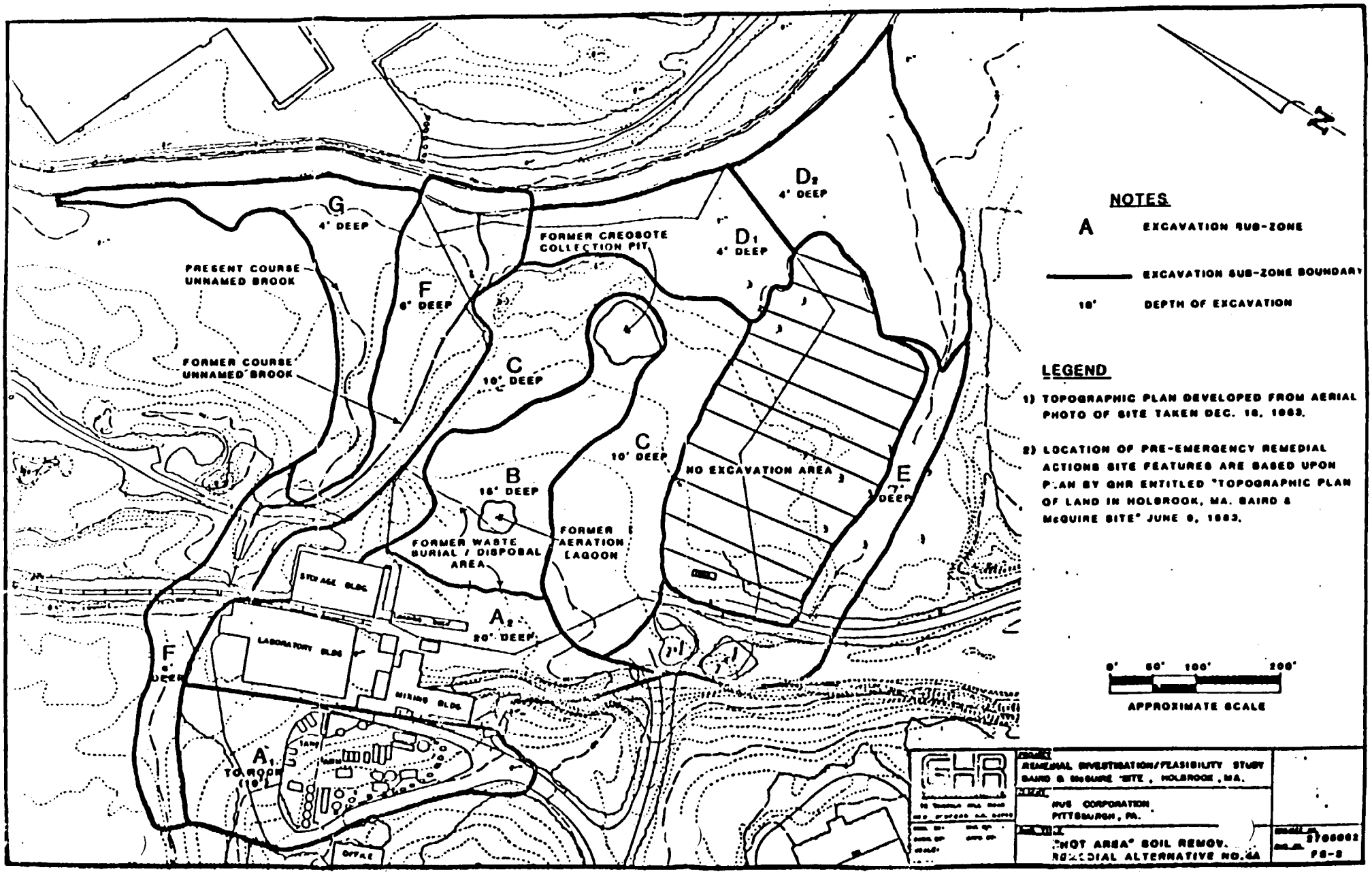
G
4' DEEP
F
8' DEEP
C
10' DEEP
B
18' DEEP
C
10' DEEP
D2
4' DEEP
D1
4' DEEP
E
7' DEEP
A2
20' DEEP
A1
10' DEEP
F
8' DEEP
PRESENT COURSE UNNAMED BROOK
FORMER COURSE UNNAMED BROOK
FORMER CREOSOTE COLLECTION PIT
FORMER WASTE BURIAL / DISPOSAL AREA
FORMER AERATION LAGOON
NO EXCAVATION AREA
STORAGE BLDG.
LABORATORY BLDG.
MIXING BLDG.
OFFICE
NOTES
A EXCAVATION SUB-ZONE
EXCAVATION SUB-ZONE BOUNDARY
18' DEPTH OF EXCAVATION
LEGEND
1) TOPOGRAPHIC PLAN DEVELOPED FROM AERIAL PHOTO OF SITE TAKEN DEC. 18, 1983.
2) LOCATION OF PRE-EMERGENCY REMEDIAL ACTIONS SITE FEATURES ARE BASED UPON PLAN BY GHR ENTITLED "TOPOGRAPHIC PLAN OF LAND IN HOLBROOK, MA. BAIRD & McGUIRE SITE" JUNE 8, 1983.
0' 50' 100' 200'
APPROXIMATE SCALE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
BAIRD & McGUIRE SITE, HOLBROOK, MA.
RVS CORPORATION
PITTSBURGH, PA.
"HOT AREA" SOIL REMOV.
REMEDIAL ALTERNATIVE NO. 4A
FS-8

Table 1

Selected Critical Contaminants at the Baird and McGuire Site

Compound (Note 1)	health Rating (Note 2)
1,1-Dichloroethylene	C
1,2-Dichloroethane	C
2,3,7,8-TCDD	C
4,4'-DDD	C
4,4'-DDE	C
4,4'-DDT	C
Aldrin	C
Arsenic	C
Benzene	C
Benzidine	C
Benzo(a)pyrene	C
Beryllium	C
BHC-alpha	C
BHC-beta	C
BHC-delta(tech)	C
BHC-gamma	C
Cadmium	C
Chlordane	C
Chloroform	C
Dieldrin	C
Heptachlor	C
Heptachlor epoxide	C
Nickel	C
Tetrachloroethylene	C
Trichloroethylene	C
Vinyl chloride	C
1,2-trans-Dichloroethylene	NC
1,3-trans-Dichloropropylene	NC
2-Butanone	NC
Barium	NC
Ethylbenzene	NC
Fluoranthene	NC
Lead	NC
Silver	NC
Toluene	NC
Xylenes (Tot) (tech)	NC
Zinc	NC
Total Other PAHs	SC
Dibenzofuran	SC

Table 2

PAH Compounds Included in the "Total Other PAH's" Category

2-Methylnaphthalene
Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(ghi)perylene
Benzo(k)fluoranthene
Chrysene
Dibenzo(a,h)anthracene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenanthrene
Pyrene

TABLE 3 - SUMMARY OF ALTERNATIVE COSTS

ITEM DESCRIPTION	ALTERNATIVE 3	ALTERNATIVE 3A	ALTERNATIVE 3B	ALTERNATIVE 4A	ALTERNATIVE 4M	ALTERNATIVE 5
1. Construct Levee Option C	202,000	202,000	202,000	202,000	202,000	202,000
2. Install slurry wall	920,000	920,000	920,000	920,000	N/A	N/A
3. Prepare landfill base	1,130,000	1,469,000	1,469,000	1,356,000	N/A	N/A
4. Excavate 100,000 CY soil and place in landfill	1,387,000	N/A	N/A	N/A	N/A	N/A
5. Wetland restoration	1,402,000	1,402,000	1,402,000	514,000	553,000	N/A
6. Excavate 250,000 CY soil and place in landfill	N/A	3,308,000	3,308,000	N/A	N/A	N/A
7. Excavate 191,000 CY soil and place in landfill	N/A	N/A	N/A	3,308,000	N/A	N/A
8. Excavate 191,000 CY and stage	N/A	N/A	N/A	N/A	1,681,000	N/A
9. Install groundwater intercept and recharge system	598,000	598,000	598,000	598,000	598,000	N/A
10. Install RCRA cap on landfill	1,975,000	2,568,000	2,568,000	2,370,000	N/A	N/A
11. Cap Zone 6 river sediments	337,000	337,000	337,000	337,000	N/A	N/A
12. Install and operate On-site treatment plant for 65yrs	6,675,000	N/A	N/A	N/A	N/A	N/A
14. Install and operate On-site treatment plant for 38yrs	N/A	6,540,000	6,540,000	N/A	N/A	N/A
15. Install and operate On-site treatment plant for 10yrs	N/A	N/A	N/A	4,297,000	4,297,000	N/A
16. Install GW monitoring system and monitor for 30yrs	720,000	720,000	720,000	720,000	720,000	720,000
17. Relocate unnamed brook	45,000	45,000	45,000	45,000	45,000	N/A
18. Incinerate soils in On-site incinerator	N/A	N/A	47,500,000	N/A	36,290,000	N/A
19. Other "no action" items	N/A	N/A	N/A	N/A	N/A	220,000
TOTAL	15,391,000	18,109,000	65,609,000	14,867,000	44,386,000	940,000

N/A - NOT APPLICABLE

Appendix A

Consistency with State Environmental Laws

The State of Massachusetts has identified various technical requirements of State environmental laws which will be taken into account during implementation of the remedy. This section will describe the requirements or standards identified to EPA by the State in terms of the various media affected by the remedy.

Air

The Massachusetts Department of Environmental Quality Engineering (DEQE), Division of Air Quality Control (DAQC) requires certain standards to be met during remediation at Baird & McGuire. The areas of concern include: dust and volatile emissions during site excavation, incineration of soil and incineration of sludge. The specific standards which DAQC sets as goals are attached and are the same as those utilized by EPA. These goals will be achieved during remediation.

The DAQC will have the opportunity to review EPA's contractor's prevention plan for dust, odor and noise, and the testing protocol for the burning of contaminated soil and sludge. Air quality modeling will be performed to determine air quality impacts during incineration and excavation. Monitoring and stack testing will occur in conjunction with the incineration test burn and operation. The design of the incinerator, test burn protocol and test burn data will be shared with DAQC staff for their review. Any site work is open to monitoring and review by DAQC staff.

Water

In regards to the groundwater interception and treatment system, all design plans and design specifications will be shared for review by the DEQE's Division of Water Pollution Control (DWPC). Operation manuals and maintenance schedules will be developed for the system and provided to assure proper O&M of the plant by the State. Groundwater monitoring plans and schedules will be developed to allow their implementation by the State.

Any DWPC requirements for formal public comment (such as allowance of discharge to groundwater from the system) will be superceded by the Superfund Public Participation process. During the operation of the groundwater interception and treatment plant, monitoring reports will be submitted to the EPA and DWPC by the contractor in charge of the plant operation.

If the State requires stricter discharge standards than EPA, the State will be required to pay the associated incremental cost (see NCP Compliance with State Requirements, Federal Register, November 20, 1985).

If discharge from the treatment plant will occur in either surface water or the municipal sewer, NPDS goals and publicly owned treatment works pre-treatment requirements will be met.

Wetlands

Alternative No. 4M represents the alternative which results in the least amount of wetland alteration while still achieving the public health goals and objectives. Any wetland alternation will be mitigated to the fullest possible extent. Wetland vegetative damages will be remediated. This is consitant with Executive Order 11990 (Protection of Wetlands).

Superfund Program
Holbrook - Baird & McGuire Site
DEQE/DAQC Standards Requirements

The Division of Air Quality Control (DAQC) requires certain standards to be met by Superfund site restoration contractors. The DAQC will review for completeness and standards compliance in three areas of this site restoration program. The three phases of interest to DAQC are:

A. Site Excavation; B. Incineration of soil; and C. Incineration of sludge.

1. Pre-excavation: background air quality should be determined. DAQC would like to review test results in order to do some background modeling - resources permitting.
2. Excavation: continuous air quality monitoring should be conducted. Standards for particulate matter should not be exceeded. The standards are: FAILED EPA

	Primary	Secondary
annual	75 ug/m^3	60 (guideline)
24 hour	260 ug/m^3	150 ug/m^3

During excavation it is expected that all necessary precautions will be used to control dust, odor and noise. DAQC would like to review the dust, odor and noise prevention plan the contractor will be utilizing. (310 CMR 7.09, Dust, Odor, Construction, and Demolition, and 310 CMR 7.10 Noise attached).

B. Incineration of Soil

1. Test burn. DAQC would like to review the test protocol for the test burning of contaminated soil. If resources permit DAQC staff will review the test report for the test burn. The emission standards for Hazardous Waste Incinerators are:
    a. Destruction and Removal Efficiency (DRE) of 99.99% for each Principal Organic Hazardous Constituent (POHG) [ref. 310 CMR 7.08(4)(h)1.]

b. For Dioxin DRE (guideline) is 99.9999%.

c. For Particulate emissions not to exceed 0.08 grains per dry standard cubic foot when corrected for the amount of oxygen in the stack gas.

When the waste water treatment phase of the program produces sludge, for incineration, a separate test burn should be conducted and the emissions and ash should be analyzed. A sludge disposal plan should be received and contingencies should be provided for to deal with any residual heavy metals.

The incinerator waste should be analyzed prior to returning the residue back to the excavated areas.

2. Incineration Program. If the test burn is found to be satisfactory the incinerator test/prototype is expected to be upscaled to a full-scale incinerator. The on-going incineration of contaminated soil should be stack tested on a continuous basis. The standards in part B.1.a;b; & c, are expected to be met throughout the complete site restoration program.

The DAQC expects to be receiving interim reports of the incineration program. It can be expected, since the infra-red incinerator is innovative technology, that some design changes and modifications will take place. DAQC would expect to be informed of these changes. (The proposed soil burning is planned to take five years, or more depending upon unforeseen interuptions.)

BIM:HR:ywl

Attachment

(310 CMR 4.00 through 310 CMR 5.00: RESERVED)

310 CMR 6.00: AMBIENT AIR QUALITY STANDARDS FOR THE COMMONWEALTH OF MASSACHUSETTS

Section

6.01: Definitions

(1) Department means the Department of Environmental Quality Engineering.

(2) Ambient Air means that portion of the atmosphere, external to buildings, to which the general public has access.

(3) Reference method means a method of sampling and analyzing for an air pollutant, as described in the Federal Register, Volume 36, number 228, November 25, 1971.

(4) Equivalent method means any method of sampling and analyzing for an air pollutant which can be demonstrated to the Department's satisfaction to have a consistent relationship to the reference method.

6.02: Scope.

(1) Primary ambient air quality standards define levels of air quality which the Department judges are necessary, with an adequate margin of safety, to protect the public health. Secondary ambient air quality standards define levels of air quality which the Department judges necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Such standards are subject to revision, and additional primary and secondary standards may be promulgated as the Department deems necessary to protect the public health and welfare.

(2) The promulgation of primary and secondary ambient air quality standards shall not be considered in any manner to allow significant deterioration of existing air quality in any portion of the Commonwealth.

6.03: Reference Conditions.

All measurements of air quality are corrected to a reference temperature of 25°C. and to a reference pressure of 760 millimeters of mercury (1,013.2 millibars).

6.04: Standards

(1) Sulfur Oxides (sulfur dioxide).

(a) Primary Ambient Air Quality Standards for Sulfur Oxides (sulfur dioxide). The primary ambient air quality standards for sulfur oxides, measured as sulfur dioxide by the reference method described in 40 CFR Part 50 or by an equivalent method, are:

1. 80 micrograms per cubic meter (0.03 p.p.m.) annual arithmetic mean.
2. 365 micrograms per cubic meter (0.14 p.p.m.) Maximum 24-hour concentration not to be exceeded more than once per year.

(b) Secondary Ambient Air Quality Standards for Sulfur Oxides (sulfur dioxide). The national secondary ambient air quality standard for sulfur oxides, measured as sulfur dioxide by the reference method described in 40 CFR Part 50 is: 1,300 micrograms per cubic meter. (0.5 p.p.m.) -- maximum 3-hour concentration not to be exceeded more than once per year.

6.04: continued

(2) Particulate Matter.

(a) Primary Ambient Air Quality Standards for Particulate Matter. The primary ambient air quality standards for particulate matter, measured by the reference method described in 40 CFR Part 50, or by an equivalent method, are:

1. 75 micrograms per cubic meter -- annual geometric mean.
2. 260 micrograms per cubic meter -- maximum 24-hour concentration not to be exceeded more than once per year.

(b) Secondary Ambient Air Quality Standards for Particulate Matter. The secondary ambient air quality standards for particulate matter, measured by the reference method described in 40 CFR Part 50, or by an equivalent method is: 150 micrograms per cubic meter -- maximum 24-hour concentration not to be exceeded more than once per year.

(3) Primary and Secondary Ambient Air Quality Standards for Carbon Monoxide. The primary and secondary ambient air quality standards for carbon monoxide, measured by the reference method described in CFR Part 50, or by an equivalent method, are:

(a) 10 milligrams per cubic meter (9 p.p.m.) -- maximum 8-hour concentration not to be exceeded more than once per year.

(b) 40 milligrams per cubic meter (35 p.p.m.) -- maximum 1-hour concentration not to be exceeded more than once per year.

(4) Primary and Secondary Ambient Air Quality Standards for Ozone. The primary and secondary ambient air quality standard for ozone, measured and corrected for interferences due to nitrogen oxides and sulfur dioxide by the reference method described in 40 CFR Part 50, or by an equivalent method, is 240 micrograms per cubic meter (0.12 ppm) - and is expressed in a statistical form so that determination of attainment will be made when the expected number of days per calendar year with maximum hourly average concentrations above 235 ug/M (0.12 ppm) is equal to less than one.

(5) Primary and Secondary Ambient Air Quality Standard for Hydrocarbons. The hydrocarbons standard is for use as a guide in devising implementation plans to achieve oxidant standards. The primary and secondary ambient air quality standards for hydrocarbons, measured and corrected for methane by the reference method described in 40 CFR Part 50, or by an equivalent method is: 160 micrograms per cubic meter (0.24 p.p.m.) -- maximum 3-hour concentration (6 to 9 a.m.) not to be exceeded more than once per year.

(6) Primary and Secondary Ambient Air Quality Standards for Nitrogen Dioxide. The primary and secondary ambient air quality standard for nitrogen dioxide, measured by the reference method described in 40 CFR Part 50, or by an equivalent method, is: 100 Micrograms per cubic meter (0.05 p.p.m.) -- annual arithmetic mean.

(7) Primary and Secondary Ambient Air Quality Standards for Lead. The primary and secondary ambient air quality standard for lead measured by the reference method described in 40 CFR Part 50, or by an equivalent method is: 1.5 micrograms per cubic meter - calendar quarter.

REGULATORY AUTHORITY

310 CMR 6.00: M. G. L. c. 111, s. 142 D.

COMMUNITY RELATIONS

RESPONSIVENESS SUMMARY

BAIRD & McGUIRE SUPERFUND SITE

HOLBROOK, MASSACHUSETTS

INTRODUCTION

This community relations responsiveness summary for the Baird & McGuire Site documents for the public record concerns and issues raised during remedial planning, comments raised during the comment period on the feasibility study, and the responses of EPA to these concerns.

The responsiveness summary is divided into the following sections:

Section I Overview. This section discusses EPA's proposed alternatives for remedial action, and the public reaction to these alternatives. The alternative preferred by EPA is also included in this section.

Section II Background on Community Involvement and Concerns. This section provides a brief history of community interest and concerns raised during remedial planning activities at the Baird & McGuire Site.

Section III Summary of Major Comments Received During the Public Comment Period and the EPA Responses to the Comments. Both written and oral comments are categorized by relevant topics. EPA responses to these major comments are also provided.

In addition to the above sections, Attachment A, included as part of this responsiveness summary, identifies the community relations activities conducted by the EPA during remedial response activities at the Baird & McGuire Site.

I. OVERVIEW

The Baird & McGuire Site encompasses the former Baird & McGuire chemical laboratory, storage and mixing buildings, office and tank farm. The Site itself is approximately 20 acres in size, and the plant area is located within 1500 feet of the water supply wells for the Town of Holbrook. These wells have been shut down permanently due to the presence of organic compounds in groundwater samples from the wells. In addition, an underground water main, which carries drinking water to sections of Holbrook, passes through the site. A new main is being completed to replace this main.

EPA initiated emergency response actions including removal of contaminated soil and construction of a groundwater interception/recirculation system in response to a breach in a creosote collection lagoon in 1983. In

1985, EPA announced Initial Remedial Measures (IRM) which included the destruction of Site buildings and the tank farm, relocation of the water main and capping soil hot spots.

An initial (Phase I) Remedial Investigation (RI) identified contaminated areas within the site and types of contamination which are present. Further information regarding the extent of contamination was gathered during the second phase of the RI. In order to assess various cleanup alternatives, a Feasibility Study (FS) was completed. Areas of contamination at and near the Site were divided into zones, and combinations of technologies were considered for the different zones. Ten alternative cleanup strategies were developed as outlined below:

* Alternative 3 (soil excavation and on-site disposal, groundwater containment, interception and treatment)
* Alternative 3A (more extensive soil excavation and on-site disposal, groundwater containment, interception and treatment)
* Alternative 3B (soil excavation, incineration and on-site disposal, groundwater containment, interception and treatment)
* Alternative 4 (soil excavation of "hot areas", incineration and on-site disposal, groundwater interception and treatment)
* Alternative 4A (soil excavation of "hot areas" and on-site disposal, groundwater containment, interception and treatment)
* Alternative 4B (capping rather than soil excavation, groundwater containment, interception, and treatment)
* Alternative 4C (soil excavation and on-site disposal, groundwater containment)
* Alternative 4D (capping rather than soil excavation, groundwater containment)
* Alternative 4M (soil excavation of "hot areas", incineration and on-site disposal, groundwater interception, and treatment)
* Alternative 5 (No action)

All of these alternatives (except the no action alternative) would also involve relocation of an unnamed brook which runs through the site, and construction of a flood protection levee. Citizen responses to these alternatives centered on groundwater treatment, future water supply, the handling of contaminated soil on-site, continued groundwater monitoring and disclosure of test results.

The alternative which is preferred by EPA is Alternative 4M. This alternative is based on Alternative 4. Alternative 4 proposed "hot area" excavation, interim on-site storage, incineration and groundwater interception and treatment. Alternative 4M does not include interim storage prior to incineration. Through the use of incineration technology and groundwater treatment, the present and future threats to the public health, welfare and the environment would be minimal.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Public interest in the Baird & McGuire site has been high since 1982 when hearings were held to consider renewal of the company's license to store chemicals. That interest has continued during the EPA's investigations and removal actions. The Clean Water Action Project (CWAP) helped to

organize a local citizens group, People United to Restore the Environment (PURE). In June 1985, EPA held a public meeting to explain the results of the preliminary remedial investigation. PURE and CWAP presented seven demands to EPA at this meeting. To answer those demands, EPA announced the Initial Remedial Measures to be undertaken at the site including relocation of the water main which runs through the site. EPA also assisted concerned citizens and officials in forming a citizens advisory committee to review and comment on technical reports.

Questions regarding the extent of contamination at the site were unanswered at the conclusion of the initial RI. Therefore, EPA initiated a second phase of the remedial investigation. During the second phase of the RI, dioxin was discovered in soils at the site. This announcement prompted heavy media coverage and intense public interest. In response, EPA authorized emergency funds to erect a longer fence around the site and the Massachusetts Department of Environmental Quality Engineering (DEQE) funded the postion of Hazardous Waste Coordinator to assist in public education and to act as a liason with government agencies.

Many concerns regarding the site and the findings of the RI were expressed by citizens during this time. These concerns and how the EPA and State Agencies addressed them are described below.

1. Residents conducted an informal survey and prepared a map of cancer incidences in the area.

   EPA Response: Review of the survey results by the Masssachusetts Department of Public Health indicated no significant increase in the incidence of cancer in 1982-83 or in adverse birth defects or infant mortality from 1980 to 1984. The Massachusetts Department of Public Health is continuing to study the problem.

2. Concern was expressed by residents that a water main running through the site may become contaminated.

   EPA Response: Testing of the water carried through the main revealed no contamination, however, EPA has authorized diverting the main. This action will limit possible future exposure and ease maintenance and construction problems which might arise during the implementation of the final remedial alternative. EPA will continue to test the water in the main on a quarterly basis until the new main is completed.

3. The public is concerned over the continued problems of access to the contaminated buildings on the site. Even though EPA erected a fence surrounding the site, teenagers and vandals reportedly enter the contaminated area at night.

   EPA Response: EPA has authorized destruction of the site buildings as part of the Initial Remedial Measures. The State is providing a 24 hour guard for the site.

III. SUMMARY OF MAJOR COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THE COMMENTS

Comments raised during the Baird & McGuire Site public comment period are summarized below. The public comment period was held from August 13 until September 8, 1986 to receive public comments and feedback on the draft Feasibility Study. Also included in this summary are comments received at an informational public meeting held August 20, 1986 and at a public hearing held September 3, 1986. The comments received during this period are categorized by relevant topics.

A. Remedial Alternative Preferences/ROD Recommendations

1. Several citizens expressed a preference for Alternative 4M, which is based on the excavation of "hot spots" with treatment in an on-site incinerator. Concerns were raised regarding the lack of a thorough risk assessment of this alternative. A comprehensive risk assessment was requested for the final alternative chosen.

   EPA Response: Alternative 4M is a modification of technologies evaluated under Alternatives 4, 4A and 3B, for which detailed risk assessments were performed as part of the Feasibility Study. The Record of Decision includes estimates of risk reduction achieved by the implementation of the recommended Alternative 4M. Further characterization of the risks of thermal destruction (e.g. incineration) will be performed during the Remedial Design. Trial burns of candidate thermal destruction technologies and air modeling of potential emissions will be performed.

2. There were several suggestions that EPA should consider the use of innovative technologies such as biodegradation in the cleanup effort. Commenters indicated that these technologies would be acceptable for use at the site on an experimental basis providing the public could maintain a high level of input into the testing and treatment process.

   EPA Response: Biodegradation was considered as a candidate technology during the Feasibility Study and was rejected by GHR Engineering Associates, Inc. on the basis of technical feasibility and reliability. The large number of hazardous compounds present at the site and the widespread distribution of these compounds in soils, sediments, and groundwater were factors which precluded the use of in-situ biodegradation. The recommended Alternative 4M includes the use of thermal destruction (e.g. incineration) for soils, an innovative technology. It also includes a multi-unit process treatment system for contaminated groundwater which does include a biological treatment process.

3. Many citizens indicated that the Record of Decision (ROD) should remain flexible and should include provisions for periodic review of new cleanup methods, comprehensive monitoring systems and a statement clarifying the role of the public as a participating force in the cleanup program.

EPA Response: The Record of Decision (ROD) is a statement of EPA's determination of the cost-effective remedial solution for a site. As such, it defines a conceptual framework for the remedial action. During design this conceptual framework will be translated into a detailed set of plans and specifications suitable for bidding. Minor modifications can be made during the design process, but major changes such as landfilling or offsite incineration rather than the recommened onsite thermal destruction cannot be made without amending the ROD.

Newly developed technologies which are developed with similar effectiveness in coming years will be reviewed for applicability to this site if the technologies selected in this ROD are determined to be ineffective or cannot be implemented for whatever reason.

Comprehensive monitoring systems will be developed during the design phase for inclusion in the plans and specifications. These systems will ensure that the remedy performs as designed and that the health and safety of onsite workers and local residents are protected during construction and operation.

The design and construction will be carried out by private contractors under Federal and State supervision. The public, primarily through the Task Force, will be involved in the design process by reviewing and commenting on the plans, specifications and other deliverables as they are produced by the design engineers. The Community Relations Plan will be updated to cover these design phase activities.

4. Many citizens opposed the containment-based alternatives as well as the temporary solutions. Citizens want the site and groundwater to be permanently decontaminated and appropriate measures provided to protect the public health and safety.

   EPA Response: The ROD recommends waste destruction by thermal treatment of soils and multiphase treatment of groundwater. Containment based alternatives were rejected on the basis of long term reliability and effectiveness.

5. A citizen stated that the cleanup should not subject the community to new and substantial risks, and that natural resources be disrupted as little as possible.

   EPA Response: EPA will monitor the remedial activities during construction and implementation to ensure that no new or substantial risks to the community will occur. Wetlands or other natural resources will be restored where disrupted to result in little or no long-term permanent damage.

B. Technical Questions/Concerns Regarding the Remedial Alternatives

1. Many citizens expressed concerns about the incineration of contaminated soils. These concerns were related to the overall effectiveness of this procedure, and the types of testing that will be done prior to on-site operation of an incinerator. The need for continuous

monitoring of the incineration operations, especially for volatile organic compounds and inorganic metals, was stressed throughout these comments.

EPA Response: Thermal destruction in general is a proven technique for virtually complete (greater than 99.99999%) destruction of organic wastes. During the design phase, pilot scale testing of various types of thermal destruction units will be conducted using actual soils from the site. Testing will be performed on critical or indicator pollutants, both inorganic and organic, to determine the effectiveness of the particular unit. This will be based on the ability of each unit, under various operating conditions, to destroy the wastes without creating residual ash that must be managed as a hazardous waste. Continuous monitoring of the thermal destruction process during operations will definitely be required.

2. A citizen requested that EPA provide documentation to demonstrate that no adverse public health impacts will occur due to stack gas emissions.

   EPA Response: EPA will develop models and document that no adverse public health or environmental impacts will occur as a result of incineration.

3. A major concern of many residents is the threat to their water supply due to the loss of the South Street well field. The public feels that EPA should perform further investigations into water supply issues, for example, the feasibility of using Great Pond as a water source and reopening the Donna well for use.

   EPA Response: EPA Region I will request funds in fiscal year 1987 to conduct a focused Feasibility Study on the various options available to replace the lost South Street well field production. The scope of the projects will be developed by EPA with input from DEQE and local officials. The schedule for this work is dependent on reauthorization of Superfund and the availability of funds.

4. A citizen requested that EPA treat groundwater at the South Street wells so that these wells will be a usable water source in the future.

   EPA Response: EPA cannot consider the feasibility of treating the water at the South Street well field until the portion of the aquifer beneath the Baird & McGuire site is remediated.

5. One citizen questioned whether water quality sampling would be done during the hook up of the new water main.

   EPA Response: Water quality sampling for the EPA's 129 priority pollutants has been conducted on a quarterly basis and will continue until the new water main is hooked up. Samples are taken from the water main before it enters the site area and after it leaves the site area to ensure that no contaminants are entering the water main. To date, the water supply has been free of contaminants

and safe to drink.

6. One citizen inquired about the quality of the surface water in the unnamed brook and the effect that heavy rains, seasonal changes or diversion of the brook might have on its water quality. Concern was also expressed that the unnamed brook could back up and contaminate other areas.

   EPA Response: Sampling in the unnamed brook was performed by GHR during the Remedial Investigation and the results are presented in that document. The results showed no contamination at the time of sampling. The analysis does not reflect changes which may occur due to seasonal fluctuations or storm events. The brook does not reach the Cochato River through surficial flow. It discharges to a wetland adjacent to the site and the river. The backup of contamination from the site is not of concern due to the fact that the river would carry any contaminants downstream with its flow. Due to the effects of dilution, any contaminants which reach the river would be below detectable limits.

7. Citizens inquired about the flow of the Cochato River into the Richardi reservior and the changes in water quality which might result. Commenters stated that the Cochato River should be diverted in order to protect water quality in the Richardi reservoir.

   EPA Response: The Cochato River has already been diverted from the Richardi reservoir and eventually flows into Boston Harbor. The river was diverted as a precautionary measure even though the analytical results of water samples from the river over the past few years have not evidenced surface water contamination from Baird & McGuire or other sources.

8. A citizen requested a guarantee from EPA that the Cochato River will not be tied into the water supplied by the Richardi reservoir.

   EPA Response: The decision on whether to use the Cochato River as a water supply source ultimately rests with the Braintree, Randolph and Holbrook Joint Water Board and the Massachusetts DEQE. EPA sampling to date indicates that the river water is free of contamination. Further EPA studies of the river sediments will provide more information regarding the risk associated with using the river as a water supply source.

9. Many commenters oppose the import of contaminated materials from other locations for either storage, destruction, or treatment at the Baird & McGuire site.

   EPA Response: EPA will not accept waste from offsite for storage, treatment or destruction at the Baird & McGuire Site.

10. The reliability of the current groundwater interception and recirculation system was questioned. Concern was expressed that volatile organic compounds released during the aeration process may not be treated.

EPA Response: The current groundwater interception and recirculation system is designed as a stop gap measure pending full remedial action. The system has fulfilled its objective of minimizing the offsite migration of contaminants in the aquifer system. Reports by GZA Corporation indicate that the system successfully captures 85-95% of the core of the contaminant plume.

The detailed design of the groundwater treatment system will consider the potential emission of volatile organics in the aeration process. If determined to pose a threat to workers and/or the area residents, air pollution controls will be incorporated into the system design.

11. The question was raised as to whether sources of contamination have been detected outside of the immediate site area.

EPA Response: Contamination which cannot be attributed to Baird & McGuire was detected during the Remedial Investigation. The Massachusetts DEQE is investigating other potential sources in the general area.

12. Many citizens requested frequent testing of the water supply and monitoring contaminant levels on an on-going basis. The type of tests performed, frequency of testing and sampling locations used were questioned. It was requested that this information be made available to the public as soon as possible.

EPA Response: See response to Question B5 for the schedule of priority pollutant analysis and sampling locations performed under Superfund authority. Other water supply testing and water quality monitoring functions are performed under the Safe Drinking Water Act's National Interim Primary Drinking Water Regulations for Maximum Contaminant Levels (MCL's) by local and state water supply officials. Testing covers organic and inorganic chemicals, turbidity, microbiological, radiological and aesthetic drinking water parameters.

C. Public Participation

1. Both the active citizen groups and concerned individuals stressed the importance of public participation in the cleanup process. The commenters would like to participate in the selection of the cleanup technology, in design of the testing and monitoring plans and in the design and construction of the chosen cleanup alternatives. Disclosure of all test results for public comment was also recommended.

EPA Response: EPA has continually solicited public participation during the RI/FS and IRMs and will continue to do so during the design and construction phases of the remedial action. Full public disclosure of all test results and other information will continue to be the Agency's policy, with the exception of information protected by confidentiality laws or contained in enforcement sensitive documents.

2. A citizen requested that EPA provide monthly public notices of information including test results.

EPA Response: The Agency will provide the public with information regarding the site activities, including test results, as they become available.

3. One citizen suggested that EPA set up educational programs on the subject of the site within the school system.

EPA Response: EPA has neither the funding nor the personnel to set up educational programs within the school system near the Baird & McGuire Site. We will assist local officials to the extent that our resources allow should they decide to institute such programs.

D. Funding Issues/Financial Responsibility

1. Several citizens commented that cost should not be a major consideration in choosing a remedial alternative. The thorough and safe cleanup of the site was cited as the most important priority.

EPA Response: The extent of remedial action elected by EPA must conform to a regulation known as the National Contingency Plan (40 CFR Part 300). Cost is one of several factors which must be considered in the decision making process. However, longterm effectiveness and reliability are also major considerations. In this particular ROD, thermal destruction was recommended over onsite landfilling even though the cost was approximately 3-4 times greater because it will provide a permanent remedy to contamination at the site.

2. Concern was expressed that funding for the cleanup process may not be available from EPA over the long term. Suggestions were made to award the funds under the constraints of a budgetary control mechanism or to utilize open-ended funding to address this problem.

EPA Response: Full funding for both the design and construction phases must be authorized before a contract can be awarded to either a design engineering firm or a construction contractor. EPA Region I has requested design funds for fiscal year 1987 and will request construction funds for fiscal year 1988. Availability of funds is dependent on Superfund reauthorization.

3. The Baird & McGuire Advisory Task Force requested that EPA allot funds to them for consultants and support personnel. The Task Force also suggested that a memorandum of understanding be established with the public schools in the area to provide for continued educational efforts. One citizen requested that a consultant be hired to study the necessity of relocating the Cochato River. A citizen also requested a technical assistant be provided to act as a liason between the Task Force and the government agencies.

EPA Response: The existing Superfund statute does not authorize the expenditure of funds for Advisory Task Force activities and therefore, EPA cannot provide these funds. The DEQE is currently funding an educational/support position on the Task Force.

E. Decision Process

1. What recourse is available to the public in the event that the final remedial alternative chosen by EPA is in conflict with the alternative supported by the public?

   EPA Response: Given the history of public involvement in EPA's studies at the site and the close working relationship between the Regional Project Manager and the Task Force, we do not anticipate public rejection of the recommended alternative. Although there is no formal appeal process, EPA would certainly be willing to meet with local officials and citizens to discuss the ROD and any objections which may be expressed.

2. One citizen questioned who would be responsible for approving future modifications to the final remedial alternative once it was chosen.

   EPA Response: The Regional Project Manager will be responsible for ensuring that the design and construction of the remedial action conforms to the ROD. Should the ROD require modification, the Regional Administrator would be the official responsible for authorizing any such modification.

3. Concern was expressed over the action to be taken against the potentially responsible parties (PRPs) involved in the Baird & McGuire site. Citizens want the PRPs to be held financially and/or criminally liable for the cleanup and damages.

   EPA Response: The United States, on behalf of EPA, initiated cost recovery actions in 1983 against the Baird & McGuire, Inc., Gordon Baird, Cameron Baird and the Baird Realty Trust, Inc. These are the only PRPs identified to date. A preliminary agreement has been reached which will require the PRPs and one insurer of Baird & McGuire, Inc. to pay a significant amount of money to the United States. EPA will have full access to the site to implement the remedial action and will receive proceeds from any land sales which may take place in the future. When the final agreement is signed, it will be released for public review prior to being finalized in court.

4. The feasibility of transferring the cleanup operations to the private industry which is developing in the area of hazardous waste cleanup was questioned. One citizen suggested that this option be kept open for future consideration.

   EPA Response: EPA has the authority and responsiblity under Superfund to remediate hazardous waste sites. EPA contracts with private engineering firms and construction companies to perform the design and construction activities. However, the Federal government is responsible for ensuring that the work is performed correctly since Federal funds are involved.

5. Several citizens wanted to know which companies were involved in

contamination of the site and which chemicals were used.

EPA Response: Baird & McGuire is the only company known to be responsible for site contamination. A list of the chemicals which were used and/or purchased by Baird & McGuire can be found in Appendix A of the Remedial Investigation.

F. **Design/Construction Phase**

1. Several citizens stated that the design of the remedial alternative should include provisions for reclamation of the site for future public use.

EPA Response: The site in question is privately owned. EPA plans to remediate the site as necessary to protect public health, welfare, and the environment. The final disposition of the property will be in question until settlement with the owners is reached.

G. **Background/Historical Questions**

1. A citizen questioned who authorized digging of the South Street wells number 1, 2, and 3, and when this authorization was issued. The reason for the location of these wells was also questioned.

EPA Response: The digging of the South Street wells was authorized by the Massachusetts DEQE and the Holbrook-Randolph Joint Water Board. The location of the wells was chosen based on recommendations received from consultants to the Joint Water Board.

2. The reason for diversion of the Cochato River several years ago was questioned. The results of testing performed at the Richardi reservoir at the same time were also questioned.

EPA Response: The gates on the Richardi Reservoir were closed as a precautionary measure as a result of a contaminant release from the Baird & McGuire Site into the Cochato River. Testing was performed in the reservoir at the time of the release. The results did not show any contamination from the Cochato River at the point of intake to the Richardi reservoir or in the reservoir itself.

3. One citizen inquired about the groundwater pumping direction and which residential areas were using contaminated water from the South Street wells prior to their closure.

EPA Response: The groundwater pumping at the South Street well field induced flows towards the wells. Modeling has shown that groundwater contaminants from Baird & McGuire could be induced to flow towards the wells under pumping scenarios. The South Street well field serviced residential areas in Holbrook.

4. The role of the Holbrook Board of Health during the site investigations was questioned.

EPA Response: The Holbrook Board of Health acted as an information source and interacted with the EPA on health issues during the investigations.

H. **Health Risks/Effects**

1. Concern was expressed by several citizens regarding the possible effects of the contamination on future generations. They urged EPA to expedite the cleanup of the site in order to lessen the potential health risks.

EPA Response: EPA has recommended the alternative which will remediate the site in the shortest possible time given the complexities of the site contamination and cleanup technologies available.