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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
EMERGENCY RESPONSE BRANCH
9311 GROH ROAD, ROOM 216
GROSSE ILE, MI 48138-1697

APR 16 1998

REPLY TO ATTENTION OF:

MEMORANDUM

SUBJECT: ACTION MEMORANDUM - Determination of Threat to Public Health, Welfare, or the Environment at the Yeoman Creek Landfill Site, Waukegan, Lake County, Illinois (Site ID # 05Z2)

FROM: Ralph H. Dollhopf, On-Scene Coordinator
Emergency Response Branch - Section 1

TO: William E. Muno, Director
Superfund Division

THRU: Richard C. Karl, Chief
Emergency Response Branch

I. PURPOSE

The purpose of this memorandum is to document the determination of an imminent and substantial threat to public health and the environment posed by the release of landfill gas containing hazardous substances and methane from the Yeoman Creek Landfill Site, Waukegan, Lake County, Illinois.

The actions proposed herein will mitigate site conditions by intercepting hazardous substances and methane in landfill gas before it laterally migrates from the site perimeter into the basements of residential and commercially occupied structures which immediately adjoin the landfill. Hazardous substances contained within the landfill gas are known to include the volatile organic compounds (VOCs) vinyl chloride, cis-1,2-dichloroethylene, benzene, toluene, ethyl benzene, xylene, styrene, chloroform, trichlorofluoromethane, 1,1,2,2,-tetrachloroethane, and tetrachloroethylene.

A previously installed building ventilation system has failed to maintain concentrations of landfill gas in off-site structures below action levels prescribed for potential VOC inhalation toxicity and for fire and explosion potential. In order to mitigate these threats, a landfill gas extraction system will be installed between the gas-generating wastes of the landfill and off-site structures where migrating gas is accumulating. This system will be designed, constructed, and operated in such a fashion that it is capable of actively or passively preventing migration of

landfill gas beyond the landfill perimeter. Specific performance criteria are described below. The fact that releases of hazardous substances and methane have already occurred and are likely to continue until removal activities have been completed requires that this action be considered time critical.

The Yeoman Creek Landfill Site is on the National Priorities List (NPL). The removal action described above is entirely consistent with the 1996 Record of Decision (ROD) for this Site.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID # ILD 980500102

A. Physical Location and Description

The Yeoman Creek Landfill (Landfill) Site (Site) is located between Sunset Avenue (W. Golf Road) on the north, Glen Flora Avenue on the south, Lewis Avenue on the west, and Western Avenue on the east in the City of Waukegan, Illinois. Its geographical coordinates are latitude 42° 23' 20" N, longitude 87° 50' 55" W. The landfilled area covers approximately 60 acres. The Site is adjacent to a large wetland, residential and commercial developments, including single family residences, apartment buildings, a nursing home, a doctor's office, a shopping center, and restaurants. Approximately 26,890 people, 23.2 percent of them black and 34.9 percent of them Hispanic, live within a 1-mile radius of the site. Homes in the area are 52.7 percent owner-occupied. The median household income of the area is $28,427.

Yeoman Creek flows in a southerly direction through the Site and into the Waukegan River 1.75 miles downstream. From that point, the Waukegan River flows another 2.25 miles to Lake Michigan.

The Landfill operated between 1958 and 1969, reportedly accepting both municipal and industrial wastes. The Landfill was largely constructed within wetlands and also within the flood plain of Yeoman Creek. Its depth is thought to be fairly shallow (maximum depth of waste burial of 19 feet). The total volume of waste landfilled at the Site is estimated to be in excess of one million cubic yards.

B. Site Background

The Site was operated as a municipal landfill from 1958 through 1969. The Edwards Field (south) portion of the Site operated from 1958 through 1963. The Yeoman Creek portion (north) was filled between 1962 and 1969. The Illinois Environmental Protection Agency (IEPA) inspected both portions of the Landfill periodically during the 1970s. IEPA reported repeated violations of leachate discharge and minimum cover thickness regulations throughout this period. Eventually, IEPA enforcement actions resulted in a 2-foot cover being placed over the entire extent of the Landfill by the City of Waukegan.

IEPA conducted more complete investigations of the northern portion of the Site between 1978 and 1981. This work resulted in the identification of significant concentrations of polychlorinated biphenyls (PCBs) in landfill leachate, Yeoman Creek surface water, and stream sediment and groundwater at the site. Subsequent sampling conducted by U.S. EPA during the 1980s confirmed the presence of PCBs in stream sediments and leachate, thereby facilitating placement of the Site on the NPL. In December 1989, a number of potentially responsible parties (PRPs) agreed to conduct a Remedial Investigation/Feasibility Study (RI/FS) and entered into an Administrative Order by Consent (AOC) with IEPA and U.S. EPA. This AOC included provisions for certain interim remedial measures, including construction of erosion control devices and security fencing at the site. Erosion control and fencing were completed in 1990. In 1991, the AOC was amended to include the southern (Edwards Field) area as a portion of the former facility to be addressed by the AOC.

Sampling for the RI was conducted between 1991 and 1993. The RI included provisions for the investigation of the subsurface migration of landfill gases. Measurement parameters used as indicators of landfill gases included percentage of the lower explosive limit (LEL) using an explosimeter and concentration of total organics in air using a flame ionization detector (FID). Gas probes were installed along the perimeters of the Landfill in order to provide locations for measuring these parameters as indicators of landfill gas migration from the site.

Elevated LEL readings were obtained from a number of these landfill gas probes along the northern perimeter of the landfill. This led to examination of the same parameters in basements and crawl spaces within 300 feet of those perimeter probes and resulted in the measurement of elevated readings at those locations. The following LEL readings were obtained at the 1401-1451 Golf Road building between October 1992 and January 1993:

Location	Date	% LEL
1401 Golf, basement ambient air	10/2/92	3-5
1401 Golf, SE corner where sump is located	10/2/92	60-100
1401 Golf, basement ambient air	10/8/92	4-5
1401 Golf, inside north tile	10/8/92	>100
1401 Golf, basement ambient air	1/21/93	1-10
1415 & 1419 Golf, sump inside tile	9/30/92	6
1425 Golf, basement breathing zone	1/21/93	4
1425 Golf, inside south tile	1/21/93	>100
1431 Golf, inside tile	9/30/92	47
1431 Golf, inside tiles	10/7/92	16 & 13
1431 Golf, basement breathing zone	1/20/93	2-3
1431 Golf, gas vent and inside tiles	1/20/93	90-100
1451 Golf, breathing zone basement	9/30/92	5
1451 Golf, inside south tile	9/30/92	47
1451 Golf, floor drain and tiles	10/7/92	87-100
1451 Golf, basement breathing zone	1/21/93	8-10
1451 Golf, cracks in floor	1/21/93	10-100
1451 Golf, holes	1/21/93	14-100

On October 7 and 8, 1992, air samples were collected by the Respondents (to the AOC) for analyses of chemical constituents from a basement sump and ambient air at 1451 Golf Road. The following hazardous substances were detected in at least one of these samples: vinyl chloride, cis-1,2-dichloroethylene, benzene, toluene, ethyl benzene, xylenes, and styrene. On October 7, 1992, one landfill gas probe was similarly sampled. On February 10, 1993, five additional gas probes were sampled. Analyses of these samples indicated the presence of trichlorofluoromethane, chloroethane, cis-1,2-dichloroethane, chloroform, benzene, trichloroethylene, toluene, xylenes, styrene, 1,1,2,2-tetrachloroethane, and tetrachloroethylene. Finally, elevated LEL readings were obtained in soil gas readings at gas probes installed between the northern boundary of the Landfill and Golf Road, including a probe at a location 15 feet from the Terrace Nursing Home.

In an effort to prevent combustible gases and hazardous substances from entering basements of occupied, off-site structures along Golf Road, the Respondents installed traps on the footing drains at basement sumps in February 1993. In March and April 1993, vents were installed on these traps. Despite these measures, high levels of explosive landfill gas persisted in the off-site structures. For example, in the basement of 1451 Golf Road, up to 10 percent of the LEL was measured in the breathing zone and up to 100 percent of the LEL was measured at basement floor cracks. At 1401 Golf Road up to 6 percent of the LEL was measured in the basement breathing zone, and greater than 100 percent of the LEL was detected at floor cracks.

In 1994, pursuant to a second AOC amendment, the Respondents agreed to implement additional landfill gas control measures at the Site. Installation of a building ventilation system designed to maintain a positive pressure differential between basement interiors and exteriors was the option preferred by the Respondents and was completed within that same year.

During a December 1997 to January 1998 review of site conditions, U.S. EPA Remedial and Emergency Response personnel determined that the operation of this system has not resulted in satisfaction of the performance criteria established by the 1994 AOC amendment. Specifically, the action level (100 parts per million (ppm)) established for toxicity of hazardous substance constituents of landfill gas in off-site structures has been consistently exceeded despite operation of this ventilation system. In addition, it was observed that the system has failed to maintain the positive pressure differentials for which it was designed in basements throughout the 1401-1451 Golf Road structure. Finally, the Respondents have failed to comply with specific AOC requirements regarding notification, response, and mitigation throughout these periods when the system does not perform as expected or designed.

Concentrations of landfill gas which exceed the hazardous substance toxicity threshold and which, in some cases, exceed 100 percent of the LEL continue to be present in off-site structures adjoining the Landfill. Monitoring frequency for these structures has been increased from monthly to daily. Additional landfill gas monitoring parameters are being measured. On January 16, 1998, the U.S. EPA Remedial Project Manager (RPM) requested that the Respondents submit a design for the installation of an active gas extraction system which will

capture gas before it migrates laterally off site into residential and commercial structures. Respondents had not submitted a design as of the date of this action memorandum.

III. THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The conditions at the Yeoman Creek Landfill Site present an imminent and substantial threat to the public health, or welfare, and the environment and meet the criteria for a removal action provided for in the National Contingency Plan (NCP), Section 300.415, Paragraph (b)(2). 40 C.F.R. § 300.415(b)(2)(i), (iv), (v), and (vi) respectively, specifically allows removal actions for:

a) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

As mentioned previously, numerous VOCs have been detected in landfill gas monitored at gas probes on the landfill and in occupied, off-site structures to which the gas has migrated. These detections have continued to occur at levels exceeding the 100 ppm health-based threshold despite several attempts by the Respondents to control them at the receptor location (basements). Potential exposure for occupants of these structures will continue until response actions prevent landfill gas from even reaching the structures. Vinyl chloride and benzene are classified by U.S. EPA as group A known human carcinogens and are known hazardous substance constituents of the landfill gas at Yeoman Creek. Others, such as chloroform and trichloroethylene are classified as group B2 probable human carcinogens. Styrene is considered to be a group C possible human carcinogen. In addition, non-cancer health effects are associated with exposure to some of the above hazardous substances.

b) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

In addition to the hazardous substances in migrating landfill gas described in paragraph a), high levels of methane, a major component of landfill gas, have been detected in probes at the landfill perimeter and within the basements of adjacent off-site structures. While methane has no inherent toxicity, it is highly explosive and functions as an asphyxiant upon its displacement of oxygen in confined, occupied spaces. At the Yeoman Creek Landfill Site, methane concentrations frequently exceed 100 percent of the LEL in the basements of off-site structures.

c) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

Landfill gas migration rates are directly influenced by a number of meterological and weather-related factors, including barometric pressure fluctuations, precipitation, and soil saturation and freezing differentials. Generally, worst case conditions for lateral migration of landfill gas are

present when surface soils on and off the landfill are frozen, preventing gas from escaping vertically before building pressure forces it to lateral, off-site locations.

d) Threat of fire or explosion;

Landfill gas typically contains high concentrations (up to approximately 75 percent) of methane. When methane accumulates in confined spaces at concentrations between its LEL (5 percent) and upper explosive limit (UEL=15 percent), an explosive atmosphere exists. The occurrences of fires and explosions in structures adjoining landfills and attributed to migration of landfill gas are well documented. They are almost always violent and frequently result in death and/or serious personal injury. For this reason, Federal and State landfill gas regulations require that landfill facilities manage landfill gas to ensure that 50 percent of the LEL for methane can never be measured beyond the facility perimeter and that 25 percent of the LEL cannot be detected within structures on or near the facility.

Levels of methane in landfill gas which has migrated to structures adjacent to the Yeoman Creek landfill routinely exceed 100 percent of the LEL and constitute a serious threat of catastrophic fire and/or explosion. Building ventilation systems of the type previously installed by the Respondents are not considered to be an appropriate form of gas management. Rather, they are considered as temporary mitigative options pending the active construction and timely completion of active gas extraction systems. The serious threat of fire and/or explosion in off-site structures adjacent to the Yeoman Creek Landfill Site will continue to exist until installation and operation of an active gas management system are implemented.

IV. ENDANGERMENT DETERMINATION

Given the Site conditions, the nature of the suspected hazardous substances on Site, and the potential exposure pathways described in Sections II and III above, actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

The OSC proposes that the following actions be taken by PRPs to mitigate threats posed by the presence of hazardous substances and methane in landfill gas at the Yeoman Creek Site:

1) Develop and implement a site health and safety plan and emergency contingency plan;

2) Implement appropriate site security measures;

3) Construct, operate, and maintain a landfill gas management system designed to intercept laterally-migrating landfill gas from the perimeter of the Yeoman Creek Landfill to off-

site structures along Sunset Avenue (W. Golf Road). The performance of this system shall be such that methane concentrations shall not exceed 0 percent of the LEL in any off-site structures and shall not exceed 50 percent of the LEL in soil at the landfill property boundary or within 100 feet of the waste burial boundary, whichever is less;

4) Develop a monitoring plan, including installation of a system of monitoring probes designed to allow appropriate evaluation of the gas extraction system performance;

5) This landfill gas monitoring plan will include provisions for routine monitoring (including dedicated probe placement, if necessary) of all site perimeters and, where warranted, off-site structures which could be impacted by lateral off-site migration of landfill gas from the Yeoman Creek Site.

Because waste is reported to have been deposited outside the legal boundaries of the landfill in the vicinity of off-site structures, it may be necessary to move some relatively minor waste volumes in order to properly construct the system. All hazardous substances, pollutants, or contaminants removed off site pursuant to this removal action for treatment, storage, and disposal shall be treated, stored, or disposed of at a facility in compliance, as determined by U.S. EPA, with the U.S. EPA Off-site Rule, 40 CFR § 300.440, 58 Federal Register 49215 (September 22, 1993).

The OSC has initiated consideration for provision of post-removal site control consistent with the provisions of Section 300.415(l) of the NCP. It is anticipated that any post-removal site control will be undertaken by potentially responsible parties (PRPs).

The response actions described in this memorandum directly address the actual or threatened release at the site of a hazardous substance, or of a pollutant, or of a contaminant which may pose an imminent and substantial endangerment to public health or welfare or to the environment. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions being addressed. It is anticipated that time-critical removal activities will take approximately 100 calendar days to complete.

Applicable or Relevant and Appropriate Requirements

All applicable, relevant, and appropriate requirements (ARARs) will be complied with to the extent practicable. A letter was sent to Mr. Greg Ratliff of the IEPA on February 19, 1998, requesting that the IEPA identify State ARARs. Any State or Federal ARARs identified in a timely manner for this removal action will be complied with to the extent practicable. The 1996 Record of Decision (ROD) for the Yeoman Creek Landfill requires that consideration be given to the following ARARS during implementation of final remedy activities for landfill gas control: Clean Air Act Sections 101 and 40 CFR 52; 40 CFR 61; 35 IAC811.311, 35 IAC.312; and 35 IAC 211, 212, 214, 215, 216, and 217.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Continued high risk to public health and the environment will result if no action or delayed action ensues.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with this site.

VIII. ENFORCEMENT

For administrative purposes, information concerning the enforcement strategy for this Site is contained in the Enforcement Confidential Addendum.

IX. RECOMMENDATION

This decision document represents the selected removal action for the Yeoman Creek Landfill Site developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based upon the Administrative Record for the Site. Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed removal action. You may indicate your decision by signing below.

APPROVE: Wm. E. Muno DATE: 4/15/98
Director, Superfund Division

DISAPPROVE: _____ DATE: _____
Director, Superfund Division

cc: K. Mould, U.S. EPA, 5202-G
D. Henne, U.S. Department of the Interior, **w/o Enf. Addendum**
T. Ayers, IEPA, DERR, **w/o Enf. Addendum**

PAGE 10
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HAS BEEN REDACTED

NOT RELEVANT TO THE SELECTION OF THE REMOVAL ACTION

ATTACHMENT 1

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
YEOMAN CREEK LANDFILL SITE
WAUKEGAN, LAKE COUNTY, ILLINOIS

ORIGINAL
MARCH 12, 1998

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	1992-1996	U.S. EPA	Public	U.S. EPA Administrative Record Index for Remedial Action at the Yeoman Creek Landfill Site: Original and Updates #1-3 (DOCUMENTS CONTAINED IN THE REMEDIAL AR ARE INCORPORATED BY REFERENCE INTO THE REMOVAL AR)	76
2	00/00/00	Dollhopf, R., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health, Welfare, or the Environment at the Yeoman Creek Landfill Site (**PENDING**)	

ENFORCEMENT ADDENDUM

YEOMAN CREEK LANDFILL SITE
WAUKEGAN, LAKE COUNTY, ILLINOIS
MARCH 1998

PUBLICLY DISCLOSABLE

I. Legal standards

In contrast to the text of the memorandum above, Section V., the legally applicable or relevant and appropriate standard for landfill gases under Illinois law limit landfill gas accumulation to 25 percent of the lower explosive limit (LEL) (equivalent to 1.25 percent methane concentration) in structures and 50 percent of the LEL in soils (equivalent to 2.5 percent methane concentration). Levels monitored within these structures exceeded 100 percent of the LEL, four times the ARAR standard, even with the AEVS system operating. In addition, it should be noted that monitoring at or above 5 percent methane (100 percent of the LEL) is the chemical concentration of methane that has been demonstrated to support an explosive condition in a confined space. Furthermore, methane gas has been monitored in soils adjacent to structures in this vicinity 30 times higher than the methane ARAR in soils, at levels exceeding 75 percent methane.

In addition, Section V above does not identify a standard for the accumulation of toxic hazardous substances within the adjacent structures. The potentially responsible parties (PRPs) that entered into the Second Amendment to the Administrative Order on Consent for the Remedial Investigation and Feasibility Standard (RI/FS) for this Site have agreed to a toxicity standard of 100 parts per million as determined through use of a flame ionization detector, which if exceeded would require additional work. This standard has not been consistently achieved or maintained.

Finally, with regard to the off-site disposal of wastes discussion on page 8 above, it should be clarified that the Record of Decision (ROD) for this Site provides standards and criteria upon which Site wastes may be consolidated on-Site rather than disposed of off-Site. To the extent that there is compliance with law and the ROD, this action shall provide the opportunity to consolidate wastes on-Site.

II. Potentially Responsible Parties

The amendment to the RI/FS for this response action is being offered to six potentially responsible parties (PRPs), which are major contributors of waste to the Site or are the owners or operators of the Site. Those parties are identified on the Third Amendment to the RI/FS Administrative Order on Consent.

ENFORCEMENT CONFIDENTIAL ADDENDUM
YEOMAN CREEK LANDFILL SITE
1 PAGE

HAS BEEN REDACTED

NOT RELEVANT TO THE SELECTION OF THE REMOVAL ACTION